iMcV-Giga-MediaLinX TX/SFP

iMcV-Giga-MediaLinX TX/FX

Operation Manual

B+B SmartWorx®

+ IMC NETWORKS

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RADIO FREQUENCY INTERFERENCE STATEMENT

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.

WARRANTY

Limited Lifetime Warranty

Effective for products of B&B Electronics shipped on or after May 1, 2013, B&B Electronics 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 Electronics, 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 Electronics are not subject to any warranty or indemnity offered by B&B Electronics, but may be subject to the warranties of the other manufacturers.

Notwithstanding the foregoing, under no circumstances shall B&B Electronics 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 Electronics 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 Electronics or (iii) any descriptions, illustrations, figures as to performance, drawings and particulars of weights and dimensions contained in the B&B Electronics' 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 Electronics' 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 ELECTRONICS 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**.**

ABOUT THE IMCV-GIGA-MEDIALINX TX/SFP WITH CONFIGURATION CONTROL

The iMcV-Giga-MediaLinX TX/SFP provides a single conversion between 10/100/1000 Base-T twisted pair and 1000 Base-SX/FX fiber. This device Auto Negotiates speed and duplex on the copper port and the fiber is fixed at 1000Mbps. There is a fixed fiber and an SFP version available; both support jumbo frames up to 1632 MTU.

The iMcV-Giga-MediaLinX TX/FX, is a fixed fiber transceiver model, includes one 10/100/1000Mbps RJ-45 connector and one 1000Mbps SC fiber connector which can support Single Mode fiber or Multi Mode fiber in Dual Strand or Single Strand fiber. It supports LFPT, a diagnostic feature.

The iMcV-Giga-MediaLinX TX/SFP, is an SFP port-based model, includes one 10/100/1000Mbps RJ-45 connector and one SFP port, which was designed to support MSA –compliant fiber 100Mbps or 1000Mbps SFPs. The model will detect the SFP and run at the speed for which the SFP was designed. SFPs can be purchased from B+B SmartWorX to accommodate Single Mode or Multi Mode fiber in an array of fiber wavelengths. Copper Gigabit SFPs (SERDES) may also be installed in the SFP port. The iMcV-Giga-MediaLinX/SFP supports LFPT and Config Control. The model with fixed fiber ports does not support Config Control. The front faceplate is labeled accordingly.

Both models include LFPT, a diagnostic feature that can be enabled via a DIP Switch. This feature forces a port “down” state on one port when link is lost on the other port. The result is the link fault passes through the device. Understanding LFPT is critical to operating the device. For more information, please refer to the Link Fault Pass Through (LFPT) section.

Note: CWDM fiber options are available for both the SFP and the FX models.

Note: Unless noted otherwise, all references to the iMcV-Giga-MediaLinX TX/SFP in this manual are also applicable to the iMcV-Giga-MediaLinX TX/FX.

CONFIGURING THE IMCV-GIGA-MEDIALINX TX/SFP

The iMcV-Giga-MediaLinX TX/SFP may be configured with various features such as LinkLoss, FiberAlert, LinkFault Pass Through, Auto Negotiation, duplex mode and speed. The following sections include instructions for configuring both managed (via an SNMP-compatible management application such as iView²) and unmanaged modules.

INSTALLING IMCV-GIGA-MEDIALINX TX/SFP MODULES

The iMcV-Giga-MediaLinX TX/SFP can be installed in any B+B SmartWorx chassis with a blank slot. To install a module, remove the blank bracket covering the slots (if present) and slide the module into the chassis, via the card guides, until the module is seated securely in the connector. Secure the module to the chassis by tightening the captive screw.

MANAGED MODULES

To manage one or more iMcV-Giga-MediaLinX TX/SFP (s), an SNMP agent must be present in the chassis. To configure Managed Modules for available features, the end user can set DIP Switches or use the iView² software.

CONFIGURATION CONTROL AND SNMP MANAGEMENT

As the need for SNMP has grown, many network administrators who own the iMediaChassis series are installing an SNMP Management Module in order to manage and monitor IMC devices in the network. As a result, B+B SmartWorx now offers Configuration Control on many of the new iMcV-modules it designs; labels on the front faceplate are identified as such.

CONFIGURATION CONTROL WAS CREATED TO SOLVE SEVERAL ISSUES:

1. When non-Configuration Control iMcV-modules are placed in a managed chassis the iMcV-module's DIP Switches are ignored and the iMcV-module is configured by the chassis' management module. If the management module is removed or fails then the iMcV-modules will revert back to the DIP Switch settings. When an iMcV-module changes from management module settings to DIP Switch settings the traffic across the iMcV-module will drop for a very short period of time.

2. When introducing a management module to a chassis full of working non- Configuration Control iMcV-modules the iMcV-modules will stop using the DIP Switch setting and start using the management module settings. When an iMcV-module changes from DIP Switch setting to management module settings the traffic across the iMcV-modules will drop for a very short period of time.

3. When removing an old iMcV-module and replacing it with a different model iMcV-module the configuration of the old iMcV-module remains.

CONFIGURATION CONTROL HAD THREE GOALS WHEN IT WAS CREATED:

1. Any module, iMcV-module or management module, could be changed under power without losing any configuration.

2. The Management module can be added to a chassis without losing any configuration.

3. The Management module should not be “Mission Critical”. If the management module should be removed or fail the iMcV-modules should not experience an interruption in service.

THERE ARE TWO FEATURES THAT HAVE BEEN INCORPORATED IN CONFIGURATION CONTROL:

1. Any module, including the management module can be changed with the identical module under power and the configuration from the removed module will be automatically copied to the new module.

2. iMcV-Module DIP Switch settings can be used to make initial configuration settings overriding the management module’s setting. (see examples below for clarification)

TROUBLESHOOTING

• During installation, test the fiber and twisted pair connections with all troubleshooting features disabled. Once the physical connections have been established, the troubleshooting features of LinkLoss and FiberAlert can be enabled by using the DIP Switches or configuring them using the iView² software. However, it is important to remember that software will override hardware settings.

• Although a specific link segment, either the copper or the fiber, can be established, if the LNK LEDS do not reflect a state of active power, it is best to connect both segments.

• If a SM fiber transceiver is deployed for a short distance application, saturation may occur, contributing to loss of data or link. In such a case, add an optical attenuator to the fiber connection.

INSERTING A IMCV-MODULE

Without Configuration Control
The DIP Switches are ignored and the iMcV-module takes the configuration from the management module. This

With Configuration Control
If the iMcV-module is different (model or DIP Switch settings) from the iMcV-module installed in the slot previously, then the DIP Switch settings are used for configuration. This configuration is then copied up to the management module.

If the iMcV-module is exactly the same (model and DIP Switch settings) to the iMcV-module previously installed, the iMcV-module will use the settings from the management module.

INSERTING A MANAGEMENT MODULE

Without Configuration Control

iMcV-Modules in an unmanaged chassis use DIP Switch settings. When the management module is inserted the iMcV-modules use the configuration stored in the management module. This will more than likely change the configuration of the iMcV-modules. At the very least, it will cause a short interruption in data flowing through the iMcV-modules.

With Configuration Control

The iMcV-modules copy their configuration up to the management module. The iMcV-modules keep working with no configuration change and no interruption in data.

Note: If the end user has a mixture of standard iMcV-Modules as well as Configuration Control iMcV-Modules, it is important to understand how SNMP and DIP Switches will impact the cards depending on their capability. Standard iMcV-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.

Warning: Installing modules without understanding the effects of LinkLoss and FiberAlert can cause functioning units to appear flawed or even non-functional.

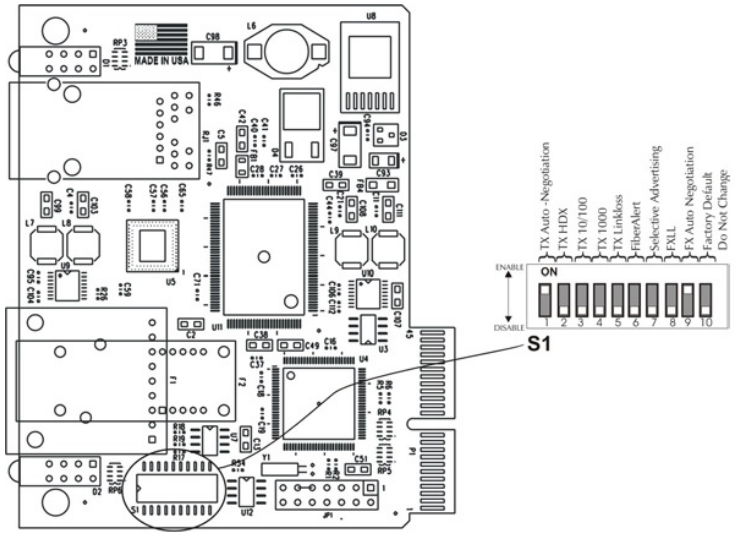
MANAGED MODULES

Before installing, configure the iMcV-Giga-MediaLinX TX/SFP modules for desired features. The table below indicates the available features and settings for the iMcV-Giga-MediaLinX TX/SFP modules.

After configuring the DIP Switches for the desired settings, install the module and connect the appropriate cables (refer to Installing an iMcV-Giga-MediaLinX TX/SFP section for more information.

DIP SWITCHES

DIP Switch on S1	Feature	Default Settings
1	TX Auto Negotiation	ON
2	TX Port-HDX (ON) or FDX (OFF)	OFF
3	TX Port-100 (ON) or 10 (OFF)	OFF
4	TX Port-1000	OFF
5	TX LinkLoss (TXLL)	OFF
6	FiberAlert	OFF
7	Selective Advertising	OFF
8	FX LinkLoss (FXLL)	OFF
9	FX Auto Negotiation	ON
10	Factory Configured— Do Not Change	OFF



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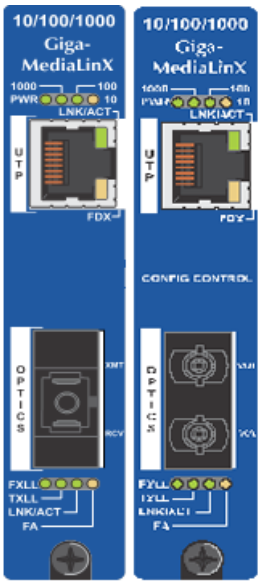
LEDS



RJ-45 LED Indicators	
Power	Glows green when powered
1000	Glows green at 1000 Mbps
100	Glows green at 100 Mbps
10	Glows green at 10 Mbps
LNK/ACT	Glows green when a link is established Blinks green when data activity occurs (This is true for both LNK/ACT LEDs)
Optics LED Indicators	
FDX	Glows amber in Full-Duplex mode Off in Half-Duplex mode
FXLL	Glows green when FX LinkLoss is enabled Blinks when FX LNK is lost
TXLL	Glows green when TX LinkLoss is enabled Blinks when TX LNK is lost
LNK/ACT	Glows green when a link is established Blinks green when data activity occurs
FA	Glows amber when FiberAlert is enabled

NOTE: If an SFP is installed, whether a 100Mbps or gigabit SFP, the OPTICs LED will be lit green, as long as there is an active SFP.

NOTE: Blinking does not display within iView².

FAR END FAULT (FEF)

FEF is permanently enabled for 100Mbps. When enabled, and a fault occurs on the fiber line, affecting data in one direction, an FEF signal will be sent in the opposite direction, indicating the fault. When enabling LFPT, FXLL will act on this signal propagating the loss of link to the copper port when FXLL is enabled. The FEF function can trigger the FA function and may keep both transmitters off indefinitely.

For more information on LinkLoss, contact B+B SmartWorx Technical Support

AUTOCROSS FEATURE FOR TWISTED PAIR CONNECTION

All twisted pair ports on the iMcV-Giga-MediaLinX TX/SFP includes AutoCross, a feature that automatically selects between a crossover workstation and a straight- through connection depending on the connected device

AUTO NEGOTIATION TX PORT

The iMcV-Giga-MediaLinX TX/SFP ships from the factory with Auto Negotiation enabled on the twisted pair port. In this mode, the twisted pair port negotiates for speed and duplex, autosensing 10 Mbps Full-Duplex, 10 Mbps Half-Duplex, 100 Mbps Full-Duplex, 100 Mbps Half-Duplex, or 1000 Mbps Full-Duplex with Flow Control. Auto Negotiation is set to ON by default. FX Auto Negotiation (FX Port) The iMcV-Giga-MediaLinX TX/SFP includes the FX Negotiation feature, which allows Auto Negotiation or a Force Mode on the Gigabit fiber link. Enabled by default, it must be enabled or disabled on both ends of the connection to establish a link. Only enable this feature if the connecting device supports it. When FX Auto Negotiation is enabled, Fiber Alert does not need to be enabled.

FLOW CONTROL

Flow Control is used to throttle the END device to avoid dropping packets during network congestion. Flow Control is enabled by Default when the port is set to Auto Negotiation. The copper port will automatically use the physical layer back pressure for Flow Control when configured to Half Duplex Operation.

SELECTIVE ADVERTISING (TX PORT)

Selective Advertising, when used in combination with Auto Negotiation, advertises only the configured speed and duplex mode for the twisted pair port. This allows configuration of both the twisted pair port's speed (10, 100 or 1000 Mbps) and Duplex mode (FDX or HDX).

Selective Advertising (Switch 7) functions only with Auto Negotiation (Switch 1) enabled.

Selective Advertising Configuration			
Desired Speed/Duplex (1000Mbps)	Switch 2: Duplex	Switch 3: Speed (100Mbps)	Switch 4: Speed
TX Port-1000 - FDX	ON	FOO	ON
TX Port-100 - FDX	ON	ON	OFF
TX Port-100 - HDX	OFF	ON	OFF
TX Port-10 - FDX	ON	OFF	OFF
TX Port-10 - HDX	OFF	OFF	OFF

FORCE MODE FOR DUPLEX (TX PORT)

The twisted pair port on the iMcV-Giga-MediaLinX TX/SFP can be set to either Half- or Full-Duplex operation in 10, 100, 1000Mbps (1000 Mbps is always FDX). Before manually setting the duplex mode, disable Auto Negotiation by setting DIP Switch 1 to OFF.

• The twisted pair port is configured for Full-Duplex by default, which is the ON position on DIP Switch 2.

• Configure the twisted pair port for Half-Duplex by setting DIP Switch 2 to the OFF position.

FORCE MODE FOR SPEED (TX PORT)

The speed on the twisted pair port (10, 100, or 1000 Mbps) can also be set to forced mode. Before manually setting the speed mode, disable Auto Negotiation by setting DIP Switch 1 to OFF.

• Configure the twisted pair port for 10 Mbps operation by setting both DIP Switches 3 and 4 to the OFF position.

• Configure the twisted pair port for 100 Mbps operation by setting DIP Switch 3 to the ON position and DIP Switch 4 to OFF.

• Configure the twisted pair port for 1000 Mbps operation by setting DIP Switch 4 to the ON position. (When ON, Switch 4 overrides Switch 3).

FX LINKLOSS, TX LINKLOSS, FIBERALERT, LINK FAULT PASS THROUGH AND FAR END FAULT

The iMcV-Giga-MediaLinX TX/SFP includes such troubleshooting features as FiberAlert, FX LinkLoss, and TX LinkLoss, which can help locate "silent failures" on the network. This section explains how FiberAlert and LinkLoss work, and how they will react in a network configuration, which should be understood before attempting to enable any of these features.

WARNING: Installing modules without understanding the effects of LinkLoss and FiberAlert can cause functioning units to appear flawed or even 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.

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. FXLL LED will then blink, to indicate the fiber port has lost link reporting the fault to the copper port.

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. The result is in a loss of the link on the device connected to the fiber port. TXLL LED will then blink, and to also indicate that the copper port has lost link reporting the fault to the copper port.

FIBERALERT (FA)

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 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.

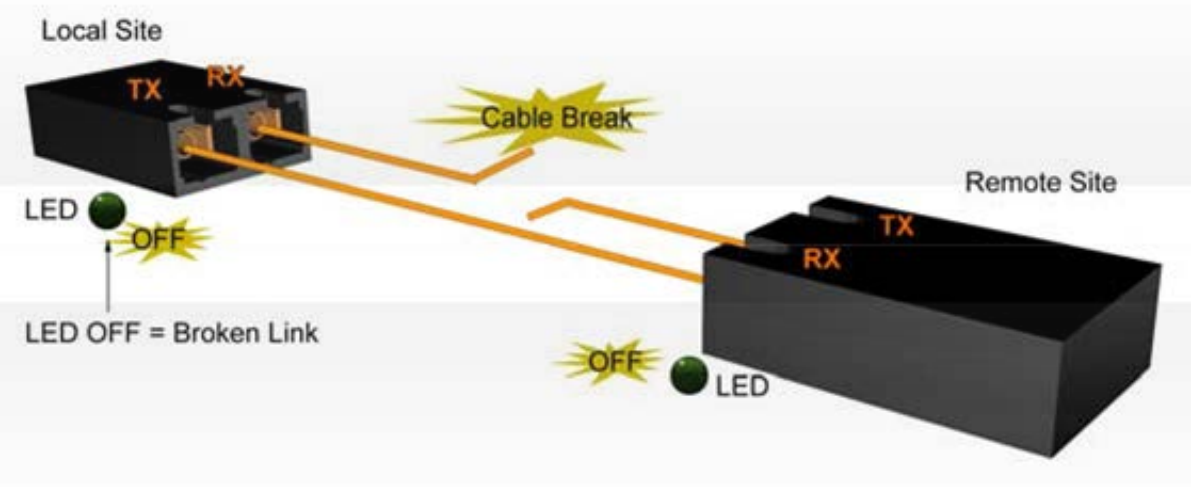


Figure 2. Fiber Alert

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

LINK FAULT PASS THROUGH (LFPT)

Link Fault Pass Through, LFPT, is a troubleshooting feature that combines TX LinkLoss (Twisted Pair, copper interface) and FX LinkLoss (Fiber, fiber interface) from both the local and remote B+B SmartWorx media converters, when used in pairs. This feature, when enabled, will pass a link fault through the device at each segment. If a link fails on one interface of the media converter, the media converter will force the link down on its link partner and then forward it to the next interface. The fault will be carried onto the local end. LFPT can be enabled via DIP Switches or through SNMP management (if the product supports it).

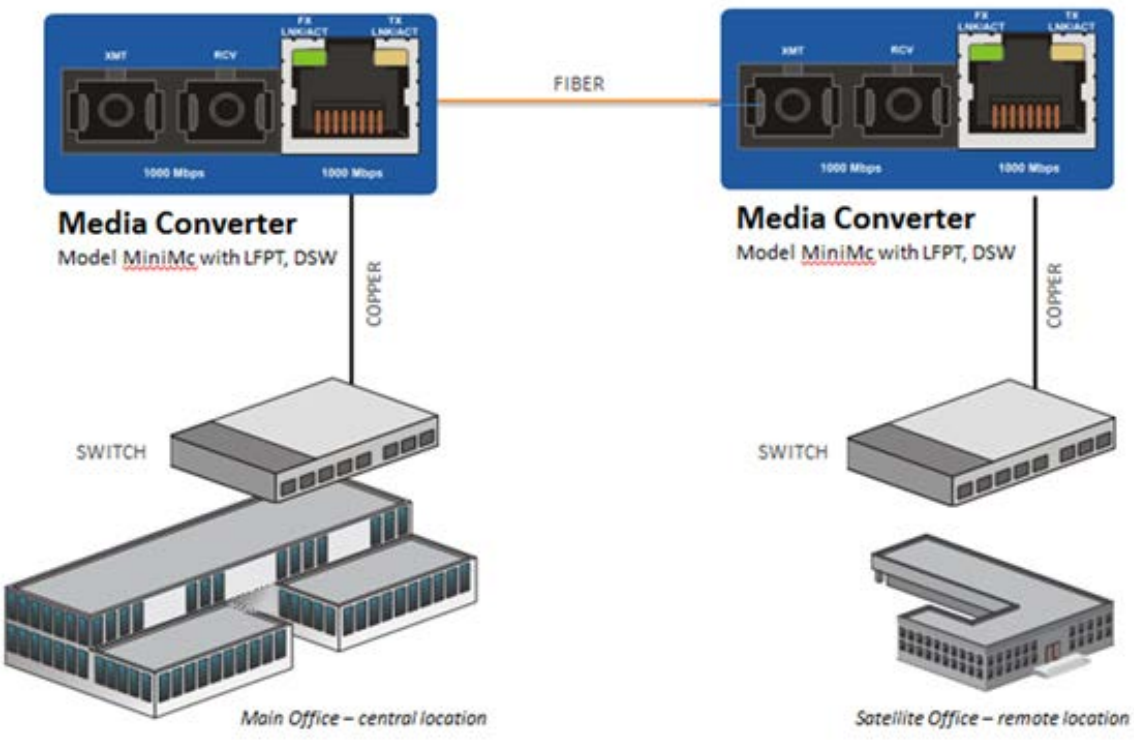


Figure 3. Sample LFPT Products

If a fault should occur on the fiber (Segment 2) without LFPT enabled, both switches would display an active link on the fiber interfaces of the media converters even though a link has failed between the two. Since neither switch would sense a failed link, they would not extinguish the LED on their copper interfaces.

When LFPT is enabled through SNMP management, and a fault occurs on the fiber segment (Segment 2), both media converters would pass that fault through to the next segment. Media converter 1 would force the copper segment 1 down which switch 1 would sense, and it would issue a Trap. Media converter 2 would force the copper [CAT5] segment 3 down, which switch 2 would sense, and it would issue a Trap. The SNMP server would receive the Traps and take the appropriate actions to help remedy the issue (usually by sending an alert to the network administrator).

LFPT is a diagnostic feature that many network administrators require in media converter devices, in order to reduce troubleshooting and down time in a network application. If a single fault occurs, all Link LEDs will extinguish, and the network admin will investigate, fix and verify that all links are active before the customer may realize a down condition.

SPECIFICATIONS

Power	
Power Consumption	Input Load 500 mA (Typical)
Environmental -- Intended for indoor and outdoor use.	
Operating Temperature	+32°F to +122°F (0°C to +50°C)
Storage Temperature	-13°F to +158°F (-25°C to +70°C)
Operating Humidity	5 - 95% (non-condensing)
LED Indicators	**RJ-45**
Power	Glows green when powered
1000	Glows green at 1000 Mbps
100	Glows green at 100 Mbps
10	Glows green at 10 Mbps
LNK/ACT	Glows green when a link is established Blinks green when data activity occurs (This is true for both LNK/ACT LEDs)
LED Indicators	**Optics**
FDX	Glows amber in Full-Duplex mode Off in Half-Duplex mode
FXLL	Glows green when FX LinkLoss is enabled Blinks when FX LNK is lost
TXLL	Glows green when TX LinkLoss is enabled Blinks when TX LNK is lost
LNK/ACT	Glows green when a link is established Blinks green when data activity occurs
FA	Glows amber when FiberAlert is enabled

NOTE: If an SFP is installed, whether a 100Mbps or gigabit SFP, the OPTICs LED will be lit green, as long as there is an active SFP.

NOTE: Blinking does not display within iView².

CERTIFICATIONS

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC). For further details, contact B+B SmartWorx..

CLASS 1 LASER PRODUCT

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

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 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.

ELECTROSTATIC DISCHARGE PRECAUTIONS

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or standalone 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.

DISPOSAL

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 ELECTRONICS TECHNICAL SUPPORT

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