

McBasic TX/FX

USER MANUAL



B+B SMARTWORX

Powered by

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ABOUT MCBASIC TX/FX

McBasic TX/FX is an IEEE 802.3 media converter that performs a single conversion between 100Base-TX twisted-pair and 100Base-FX multi-mode or single-mode fiber. Single-strand fiber versions are also available. The unit includes one RJ-45 connector for the twisted-pair port and either ST, SC, MT or LC connectors for the fiber port. McBasic TX/FX is a 1U high, standalone unit that includes diagnostic LEDs for each port and a universal (100/240 VAC) power supply.

NOTE: All versions of the 100 Mbps Fast Ethernet McBasic media converter, including 850 nm multi-mode fiber (TX/SX) and single-strand versions (TX/SSFX), will be referred to as McBasic TX/FX throughout this manual except where differences must be indicated.

NOTE: Some options require items that are sold separately, available from B+B SmartWorx.

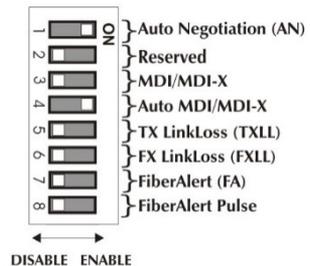
INSTALLING MCBASIC TX/FX

McBasic TX/FX comes ready to install; make all configurations after installation. To install McBasic TX/FX, first make sure that the unit is placed on a suitable flat surface. Attach the cables between the McBasic TX/FX and each device that will be interconnected; then plug the unit into a reliable, filtered power source.

NOTE: INSTALLATION TIP - Since single-strand fiber products use optics that transmit and receive on two different wavelengths, single-strand fiber products must be deployed in pairs, or connect two compatible B+B SmartWorx single-strand fiber products. The two connected products must also have the same speed and distance capabilities (i.e. both are single-mode [20km] or both are single/PLUS [40km]).

CONFIGURING MCBASIC TX/FX

McBasic TX/FX features an 8-position DIP Switch for configuring the unit after installation. Access this switch through a cut-out in the bottom of the unit. After configuring the DIP Switch, power down the unit and then power up again for changes to take effect. Default settings for the following features are shown at right.



AUTO NEGOTIATION ON MCBASIC TX/FX

McBasic TX/FX includes Auto Negotiation. When Auto Negotiation is enabled (default), the media converter negotiates as a 100 Mbps Full-Duplex device. If the device the McBasic TX/FX 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 McBasic TX/FX must be disabled. Half- and Full-Duplex settings must be manually set and match on both devices to which McBasic TX/FX is 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) ----- HDX
 HDX -----WRONG -----FDX



End to End Connection	Switch	TX/FX
Half-Duplex	Manually Configure HDX	Auto Negotiation Off
Full-Duplex	Manually Configure FDX	Auto Negotiation Off
Full-Duplex	Auto Negotiation On	Auto Negotiation On

Twisted-pair Crossover/Pass-Through Connections

Whether using crossover or straight-through CAT5 twisted-pair cabling, McBasic TX/FX will support both types of connections by one of the following methods:

DSW#1 Auto Negotiation (AN)	If set to default ON, the media converter will negotiate with the link partner to the speed and duplex mode. If set to OFF, FORCE mode is available, and the link partner must be set to FORCE mode as well.
DSW#2	(reserved)
DSW#3 MDI/MDIX	To manually configure McBasic TX/FX for a pass-through (MDI) or crossover (MDI-X) connection, move the Auto MDI/MDI-X Switch 4 to OFF; then move Switch 3 to the desired connection type: MDI=OFF and MDI-X=ON. If unsure of the type of connection, set the DIP Switch to a position that makes the twisted-pair LNK (link) LED glow.
DSW#4 Auto MDI/MDIX	McBasic TX/FX includes AutoCross, a feature that automatically selects between a crossover workstation or pass-through connection, depending on the connected device. To enable AutoCross, move the Auto MDI/MDI-X switch to the ON position.
DSW#5 TXLL	TX LinkLoss - diagnostic feature to troubleshoot a loss on the copper port.
DSW#6 FX LL	FX LinkLoss - a diagnostic feature to troubleshoot a loss on the fiber port.
DSW#7 FA	FiberAlert - a diagnostic feature to troubleshoot the loss of one strand of fiber.
DSW#8 FA Pulse	Pulsing FA - a diagnostic feature to troubleshoot the loss of one strand of fiber; Pulse FA can be enabled on both media converters.

ABOUT FIBERALERT & LINKLOSS

McBasic TX/FX comes with the following troubleshooting features:

- FX LinkLoss (a.k.a. "Fiber LinkLoss" or "LinkLoss")
- TX LinkLoss (a.k.a. "Twisted-pair LinkLoss" or "Reverse LinkLoss")
- FiberAlert (including Pulsing FiberAlert)

LinkLoss and FiberAlert are advanced troubleshooting features that can help locate "silent failures" on the 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 LinkLoss and FiberAlert can cause perfectly 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 "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. FiberAlert and LinkLoss allow this information to be obtained from the fiber, even when physical access to a remote device (and its link integrity LED) is not available.

LinkLoss

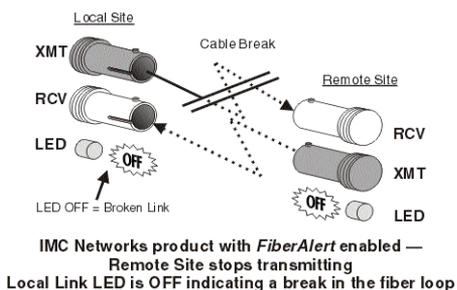
FX LinkLoss is a troubleshooting feature. When a fault occurs on the fiber segment of a conversion, FX LinkLoss detects the fault and passes this information to the twisted-pair segment. If a media converter is not receiving a fiber link, FX LinkLoss disables the transmitter on the media converter's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

TX LinkLoss

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 the 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 link on the device connected to the fiber port.

FiberAlert

FiberAlert minimizes problems associated with the loss of one strand of fiber. If a strand is unavailable, the B+B device at the receiver end notes the loss of link. The device will 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.



FIBERALERT AND LINKLOSS

The following table provides an overview of the troubleshooting features, their functionality and the recommended settings for a pair of media converters in a typical central/main site to remote site application:

LINKLOSS/FIBERALERT COMPARISON TABLE			
Feature	Fault Location	Disabled LEDs	Enable At:
FX LinkLoss	Fiber	Twisted-pair	Main Site Only
TX LinkLoss	Twisted-pair	Fiber	Remote Site Only
FiberAlert	Fiber	Fiber	Remote Site Only

NOTE: *INSTALLATION TIP* - Enable FiberAlert on only ONE side of a media conversion; enabling it on both sides will keep both transmitters off indefinitely. To enable FiberAlert on BOTH sides of the conversion, Pulsing FiberAlert on one unit must also be enabled. B+B SmartWorx recommends enabling Pulsing FiberAlert on ONE side.

NOTE: *FiberAlert* is not available/applicable on single-strand fiber versions of McBasic.

Pulsing FiberAlert

Use Pulsing FiberAlert in the following two situations:

1. When connecting two McBasic TX/FX units (or McLIM TX/FX modules) with FiberAlert enabled.
2. When connecting one McBasic TX/FX with FiberAlert enabled and one McBasic 10/100 unit with Link Fault Detection (LFD) enabled.

NOTE: Pulsing FiberAlert may be useful when connecting McBasic TX/FX to another manufacturer's product that has a similar feature to FiberAlert. Please refer to the McBasic 10/100 Installation Guide for more information on LFD.

Converter 1	Converter 2
FiberAlert Enabled	FiberAlert <u>and</u> Pulsing Fiber/Alert Enabled
FiberAlert Enabled	FiberAlert Disabled

NOTE: Pulsing - if unsure of how best to implement these features in the configuration, please contact B+B SmartWorx Technical Support.

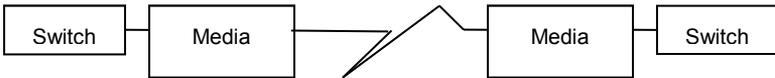
AUTO NEGOTIATION ON MCBASIC TX/FX

McBasic TX/FX includes Auto Negotiation. When Auto Negotiation is enabled (default), the media converter negotiates as a 100 Mbps Full-Duplex device; if the device the McBasic TX/FX 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 McBasic TX/FX must be disabled. Half- and Full-Duplex settings must be manually set and match on both devices to which McBasic TX/FX is connected.

The diagram below shows a typical application, followed by a table with three possible configurations.

HDX ----- OK (Manual Setting Only) -----HDX
 FDH ----- OK (Auto/Manual Setting) ----- HDX
 HDX -----WRONG -----FDH



End to End Connection	Switch	TX/FX
Half-Duplex	Manually Configure HDX	Auto Negotiation Off
Full-Duplex	Manually Configure FDH	Auto Negotiation Off
Full-Duplex	Auto Negotiation On	Auto Negotiation On

LED OPERATION

McBasic TX/FX features four diagnostic LEDs. The diagram below shows the location of the unit's LEDs. Connect the DC power source.



The LED functions are:

- FX RCV** Glows yellow when module is receiving data.
- TX LNK** Glows green when a twisted-pair link is established.
- FA** Glows green when FiberAlert is enabled. Blinks green when a FiberAlert situation occurs (i.e. the loss of one strand of fiber).
- FX LNK** Glows green when a fiber link is established.

TROUBLESHOOTING - INSTALLATION

- During installation, first test the fiber and twisted-pair connections with all troubleshooting features disabled; then enable features, if desired, just before final installation. This will reduce the features' interference with testing.
- When working with units where the features cannot be disabled, BOTH the twisted-pair and fiber connections must be established before the link LEDs will light.
- To test a media converter by itself, have an appropriate fiber patch cable, then follow these steps to test:

Step 1	Connect the media converter to the twisted-pair device with a twisted-pair cable.
Step 2	Loop a single strand of fiber from the Transmit port to the Receive port of the media converter.
Step 3	Verify that both twisted-pair and fiber link (see <i>LED Operation</i>) are on the media converter.

- Make sure to use the appropriate twisted-pair cable, and have the crossover/pass-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 be need to be added to the connection.

SPECIFICATIONS

Power Consumption (typical)

AC Input Load

100-240VAC $\pm 10\%$, 50/60 Hz, 1A

Heat generated

51 BTU/hr.

Operating Temperature

0 to +50 °C (+3 to +122 °F)

Storage Temperature

-25 to +85 °C (-13 to +185 °F)

Humidity

5 - 95% (non-condensing)

Dimensions

4.17H x 12.07W x 12.5D7 cm (1.64H x 4.75W x 4.95D in)

B+B SMARTWORX TECHNICAL SUPPORT

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STATEMENTS, PRECAUTIONS, GUIDELINES, REGULATORY**FCC RADIO FREQUENCY INTERFERENCE STATEMENT**

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.

ELECTROSTATIC DISCHARGE (ESD) 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 units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place 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.

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 the factory 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.

REGULATORY, STANDARDS, COMPLIANCES

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.



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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