



## User's Guide

### BSS Audio MC-1 Stand-Alone Media Converter

- Gigabit Ethernet
- Copper to Fiber
- 1000Base-T to 1000Base-SX/LX

BSS Audio MC-1 Gigabit Ethernet media converter connects 1000Base-T shielded or unshielded twisted-pair copper cable to 1000Base-SX or 1000Base-LX, fiber-optic cable. MC-1 is a stand-alone media converter

<b>MC-1</b>	RJ-45 1000Base-T 100 m (328 ft)*	SC, 1000Base-LX, 1310 nm single mode 10 km (6.2 miles)*
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\*Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation.

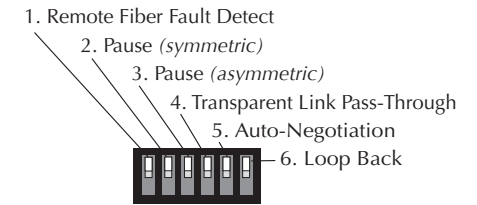
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## Installation

### Set the 6-position switch

The 6-position switch is located on the side of the media converter.

- Use a small flat blade screwdriver to set the recessed switches.
- All switches are shown in the default position, UP.



**Note:** Switch positions S2 and S3 work together to configure the media converter for Pause conditions.

#### S1 Remote-Fault Detection

up	Disabled
down	Enable

#### S2 & S3 work in combination

##### Pause

10 sw position 2 up and 3 down:	Symmetric
01 sw position 2 down and 3 up:	Asymmetric
11 sw positions 2 and 3 up:	Pause is OFF ( <i>default position</i> )
00 sw positions 2 and 3 down:	Symmetric and Asymmetric

#### S4 Transparent Link Pass-Through

up	Enable Link Pass-Through
down	Disable Link Pass-Through

#### S5 Fiber Auto-Negotiation

up	Disable Fiber Auto-Negotiation for the fiber link ( <i>default setting</i> )
down	Enable Fiber Auto-Negotiation for the fiber link

#### S6 Loop Back

up	Disable RX/TX signal loop back ( <i>default setting</i> )
down	Enable RX/TX signal loop back

\* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation (*TX = transmit, RX = receive*).

## Installation -- Continued

### Install Mode

During installation, set converter DIP switch 4 DOWN; leave all other switches in the UP position (*default*). This disables Transparent Link Pass-Through and Auto-Negotiation, allowing individual copper and fiber links to be established (*both copper port LEDs will turn ON with each device-to-device connection*) independent of a complete end-to-end connection.

### Operation Mode

After installation is complete (*all copper and fiber ports connected and linked*), set all switches to the UP position (*default*).

### Fiber Auto-Negotiation

Fiber Auto-Negotiation allows the fiber interface to detect and then advertise the supported features of the remote device; this occurs only when a fiber cable is connected to a device with a negotiating port. The process is as follows:

1. The fiber interface detects the supported features of the remote partner.
2. These abilities are passed to the twisted-pair interface and advertised.
3. Once the twisted-pair interface has a link at the highest common capability, it passes the result to the fiber interface.
4. The fiber interfaces then start advertising these capabilities. At this point, the link between the fiber and the negotiating port is complete.

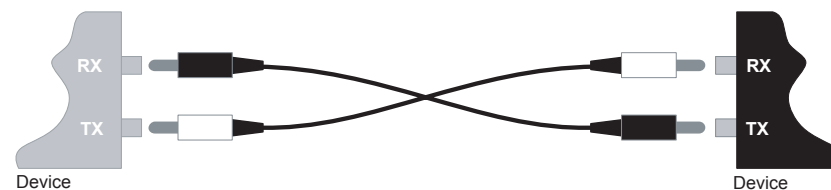
If the MC-1 is connected via fiber to another MC-1, both media converters must have the Fiber Auto-Negotiation setting disabled (*switch 5 UP*).

**Note:** Transparent Link Pass-Through (*switch position 4 enabled*) cannot be turned OFF (*disabled*) when Fiber Auto-Negotiation is ON (*enabled*).

## Installation -- continued

### Install the fiber cable

1. Locate a 1000Base-SX/LX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the MC-1 media converter as described:
  - Connect the male TX cable connector to the female TX port.
  - Connect the male RX cable connector to the female RX port.
3. Connect the fiber cables to the other device (*another media converter, hub, etc.*) as described:

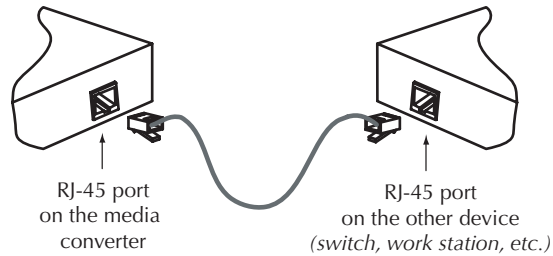


- Connect the male TX cable connector to the female RX port.
- Connect the male RX cable connector to the female TX port.

## Installation -- Continued

### Install the copper cable

1. Locate a 1000Base-T compliant copper cables with male, RJ-45 connectors installed at both ends.
2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the MC-1 media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device (*switch, workstation, etc.*).

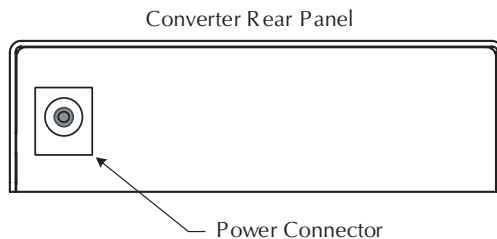


### Power the media converter

#### AC

The external power supply provided with this device is UL listed by the manufacturer of the power supply.

1. Install the power adapter cord to the back of the media converter.
2. Connect the power adapter plug to AC power.
3. Verify that the media converter is powered by observing the illuminated LED power indicator light.

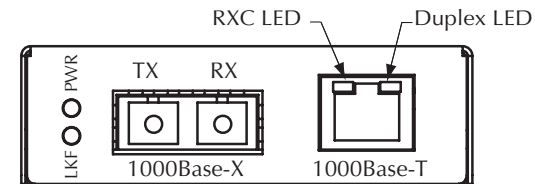


## Operation

### Status LEDs

Use the status LEDs to monitor the MC-1 media converter operation in the network.

PWR ( <i>Power</i> )	ON =	Connected to external AC power.
LKF ( <i>Fiber link</i> )	ON =	Fiber Connection
RXC ( <i>Copper receive</i> )	Flashing =	Receiving data on the copper link.
	ON =	Copper Link connection
Duplex	ON =	Full



### Remote-Fault Detect

Remote fiber fault detect (RFD) monitors the status of the fiber link. RFD must only be enabled on the remote converter. If RFD is enabled in the device at each end of the link, a link pass-through event will put the converters into an unrecoverable state (*unable to establish a link*).

### Pause

The pause feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

The pause feature can be set to one of four settings:

- Disable (*i.e., no pause*)
- Symmetrical pause
- Asymmetric TX (*transmit*) pause
- Asymmetric RX (*receive*) pause

Enable the pause feature if it is present on ALL network devices attached to the media converter(s); otherwise, disable the pause feature.

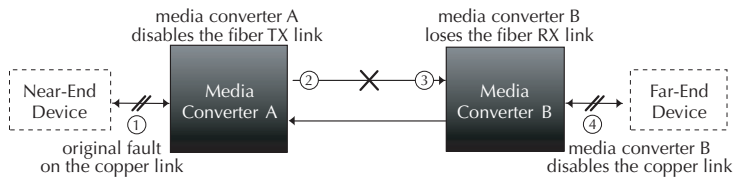
### AutoCross (*always on*)

The AutoCross feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to 10Base-T, 100Base-TX, or 1000Base-T devices, such as hubs, transceivers, or network interface cards (NICs). AutoCross determines the characteristics of the cable connection and automatically configures the unit to link up to its companion device regardless of the cable configuration.

## Operation - Continued

### Link Pass-Through

The Link Pass-Through feature allows the media converter to monitor both the fiber and copper RX (*receive*) ports for loss of signal. Refer to the illustration below. For example, in the event of a loss of an RX signal (1), the media converter will automatically disable the fiber TX (*transmit*) signal (2), thus, “passing through” the link loss (3). The far-end device is automatically notified of the link loss (4), which prevents the loss of valuable data unknowingly transmitted over an invalid link.



### Transparent Link Pass-Through

Transparent Link Pass-Through operates similar to Link Pass-Through with one exception: the fiber link between the converters remains active. A signal is passed through to the remote converter, causing it to shutdown the copper link, notifying the end device of the link failure.

### Auto-Negotiation

Auto-Negotiation enables automatic configuration to achieve the best possible mode of operation over a link between devices. A device with this feature enabled will broadcast its speed (*10Mbps, 100Mbps, etc.*) and duplex (*half/full*) capabilities to another device with this feature, then negotiate the best mode of operation between them—no user intervention required.

### Fiber Auto-Negotiation

Fiber Auto-Negotiation allows the fiber interface to detect and then advertise the support abilities of the remote device. It is supported only when the fiber is connected to a device with a negotiating port.

### Loop Back

This diagnostic feature enables the media converter to loop back the signal from the RX port to the TX port for testing and troubleshooting purposes. Test signals from a bit-error test unit can then be inserted into either the copper or fiber link to test a particular segment.

This type of diagnostic test can only be performed from the local to the remote device with loop back enabled on the remote device.

### SNMP

**Note:** SNMP is not supported in the MC-1.

## Cable Specifications

The physical characteristics must meet or exceed IEEE 802.3™ specifications.

### Fiber cable

Bit Error Rate:	<10 <sup>-9</sup>
Single mode fiber ( <i>recommended</i> ):	9 μm
Multimode fiber ( <i>recommended</i> ):	62.5/125 μm
Multimode fiber ( <i>optional</i> ):	100/140, 85/140, 50/125 μm

BSS Audio MC-1	1310 nm single mode
Fiber-optic Transmitter Power:	min: -9.5 dBm      max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -20.0 dBm    max: -3.0 dBm
Link Budget:	10.5 dB

### Copper cable (*Category 5 -- minimum requirement*)

- Gauge = 24 to 22 AWG; Attenuation = 22.0 dB /100m @ 100 MHz
- Straight-through OR crossover cable may be used.
- Shielded twisted-pair (STP) OR unshielded twisted-pair (UTP) may be used
- All pin pairs (*1&2, 3&6, 4&5, 7&8*) are active in a gigabit network.
- Use only dedicated wire pairs for the active pins; e.g., blue/white & white/blue, orange/white & white/orange, etc.
- Do not use flat or silver satin wire.

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## Technical Specifications

For BSS Audio Model MC-1 or equivalent

Standards:	IEEE 802.3ab™, IEEE 802.3 2000
Data Rate / Delay:	1000 Mbs/300 nsec
Dimensions:	3.25" x 0.1" x 4.8" (82mm x 25mm x 122mm)
Weight:	3 oz. (91 g) approximately
Power Consumption:	5.4W, 450mA @ 12VDC
Packet Size:	10 Kbytes (maximum)
MTBF*	382,000 hours (MIL217F2 V5.0) (MIL-HDBK-217F) 1,345,000 hours (Bellcore7 V5.0)
Operating Temp:	Tmra** 0°C to 50°C (32°F to 122°F)
Storage Temp:	-15°C to 65°C (5°F to 149°F)
Humidity:	10% to 90%, non condensing
Altitude:	0 to 10,000 feet
Warranty:	Lifetime

\*MTBF is estimated using the predictability method. This method is based on MIL-217F at 25°C ambient temperature, typical enclosure heat rise of 10°C, and nominal operating conditions and parameters. Installation and configuration specific MTBF estimates are available upon request. Contact Technical Support.

\*\*Manufacturer's rated ambient temperature.

For the most up-to-date information on the MC-1 media converter, view the user's guide on-line at: [www.bssaudio.com](http://www.bssaudio.com).

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

**WARNING:** Visible and invisible laser radiation when open. Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

**WARNING:** Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

**IMPORTANT:** Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building (*inside plant*) link segments that are not subject to lightening transients or power faults. Copper-based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building (*outside plant*) link segments that are subject to lightening transients or power faults.

## Troubleshooting

If the media converter fails, isolate and correct the fault by determining the answers to the following questions and then taking the indicated action:

1. Is the PWR (*power*) LED illuminated?  
NO
  - Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
  - Is the power adapter properly installed in the media converter and in the outlet?
  - Contact Tech Support: 1-800-931-2357.YES
  - Proceed to step 2.
2. Is the RXC (*copper link*) LED illuminated?  
NO
  - Check the twisted-pair copper cables for proper connection.
  - Contact Tech Support: 1-800-931-2357.YES
  - Proceed to step 3.
3. Is the LKF (*fiber link*) LED illuminated?  
NO
  - Check the fiber cables for proper connection.
  - Verify that the TX and RX cables on the media converter are connected to the RX and TX ports, respectively, on the other device.
  - If the media converter is connected to another MC-1 using fiber, verify the fiber Auto Negotiate is disabled (*DIP-switch 5 in the UP position*).
  - Contact Tech Support: 1-800-931-2357.YES
  - Proceed to step 4.
4. Is the RXC (*copper receive*) LED flashing?  
NO
  - If there is activity on the 1000Base-T port, disconnect and reconnect the twisted-pair copper cable to restart the initialization process.
  - Restart the workstation to restart the initialization process.
  - Contact Tech Support: 1-800-931-2357.YES
  - Contact Tech Support: 1-800-931-2357 .

## Contact Us

### Technical support

1-800-931-2357

### Address

BSS Audio  
8760 S. Sandy Parkway  
Sandy, Utah 84070

office: 801-566-8800  
tech support: 800-931-2357

## Compliance Information

### CE Mark

#### FCC regulations

This equipment has been tested and found to comply with the limits for a Class A digital 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 case the user will be required to correct the interference at the user's own expense.

#### Canadian regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

#### European regulations

##### Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

##### Achtung !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten. In diesem Fall ist der Benutzer für Gegenmaßnahmen verantwortlich.

##### Attention !

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.



In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.



**CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.**

**Der Anschluss dieses Gerätes an ein öffentliches Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweiligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.**



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