



## User's Guide

### SBFTF10xx-15x

#### Stand-Alone Media Converter

- **Copper to Fiber**
- **10/100 Bridging (2-Port)**
- **10Base-T/100Base-TX to 100Base-FX**

The SBFTF10xx-15x 2-port Ethernet/Fast Ethernet bridging media converter connects 10Base-T Ethernet or 100Base-TX Fast Ethernet twisted-pair copper network devices to network devices on a 100Base-FX Fast Ethernet fiber network.

Part Number	Port One - Copper 10Base-T/100Base-TX	Port Two - Duplex Fiber-Optic 100Base-FX
SBFTF1011-150	RJ-45 100 m (328 ft)*	ST, 1300 nm multimode 2 km (1.2 miles)*
SBFTF1013-150	RJ-45 100 m (328 ft)*	SC, 1300 nm multimode 2 km (1.2 miles)*
SBFTF1014-150	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 20 km (12.4 miles)*
SBFTF1015-150	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 40 km (24.8 miles)*
SBFTF1018-150	RJ-45 100 m (328 ft)*	MT-RJ, 1300 nm multimode 2 km (1.2 miles)*
SBFTF1029-150**	RJ-45 100 m (328 ft)*	SC, 1310 nm (TX)/1550 nm (RX) single mode, 20 km (12.4 miles)*
SBFTF1029-151**	RJ-45 100 m (328 ft)*	SC, 1550 nm (TX)/1310 nm (RX) single mode, 20 km (12.4 miles)*
SBFTF1029-152***	RJ-45 100 m (328 ft)*	SC, 1310 nm (TX)/1550 nm (RX) single mode, 40 km (24.8 miles)*
SBFTF1029-153***	RJ-45 100 m (328 ft)*	SC, 1550 nm (TX)/1310 nm (RX) single mode, 40 km (24.8 miles)*

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

\*\* SBFTF1029-150 and SBFTF1029-151 are intended to be installed in the same network where one is the **local** converter and the other is the **remote** converter.

\*\*\* SBFTF1029-152 and SBFTF1029-153 are intended to be installed in the same network where one is the **local** converter and the other is the **remote** converter.

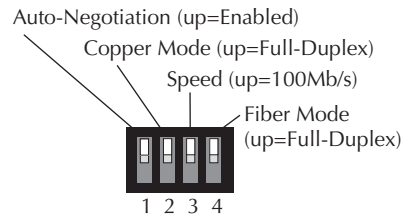
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## Installation

**CAUTION:** Wear a grounding device and observe electrostatic discharge precautions when setting the 4-position switch. **Failure to observe this caution could result in damage to, and subsequent failure of, the media converter.**

### Set the 4-Position Switch

- The 4-position switch is located on the side of the media converter.
- Use a small flat-blade screwdriver or a similar device to set the recessed switches.
- Refer to the drawing for the locations of the four individual switches.



#### 1. Auto-Negotiation

- Up Enables Auto-Negotiation on the copper port.  
Advertises 100 Mb/s full-duplex and half duplex,  
and 10 Mb/s full-duplex and half duplex.
- Down Disables Auto-Negotiation on the copper port.

#### 2. Copper Mode

(Applies only if switch 1 is down.)

- Up Forces full-duplex operation on the copper port.
- Down Forces half-duplex operation on the copper port.

#### 3. Speed

(Applies only if switch 1 is down.)

- Up Forces 100 Mb/s operation on the copper port.
- Down Forces 10 Mb/s operation on the copper port.

#### 4. Fiber Mode

- Up Forces full-duplex operation on the fiber port.
- Down Forces half-duplex operation on the fiber port.

## Installation -- Continued

**CAUTION:** Wear a grounding device and observe electrostatic discharge precautions when setting the jumper. **Failure to observe this caution could result in damage to, and subsequent failure of, the media converter.**

### Set the Jumper

The Far-End Fault jumper is labeled “FE” for enable Far-End Fault and “FD” for disable Far-End Fault (see page 6).

#### Enable

A fault on the fiber link causes the media converter to transmit a Far-End Fault signal.



Enable Far-End Fault

#### Disable

No Far-End Fault signal is transmitted when a fault occurs.



Disable Far-End Fault

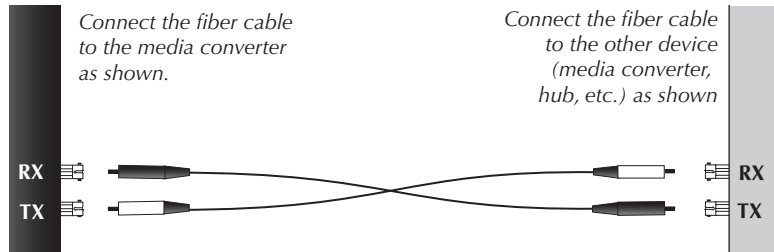
To set the jumper:

- Using a small screwdriver, remove the four (4) screws that secure the cover and carefully remove the cover from the media converter.
- Locate the jumper on the circuit board labeled “FE” and “FD”.
- Using small needle-nosed pliers or similar device, move the jumper to the desired position. (Refer to the drawings above.)
- Carefully replace the cover on the media converter and replace the four (4) screws that secure the cover to the media converter.

## Installation -- Continued

### Install the Fiber Cable

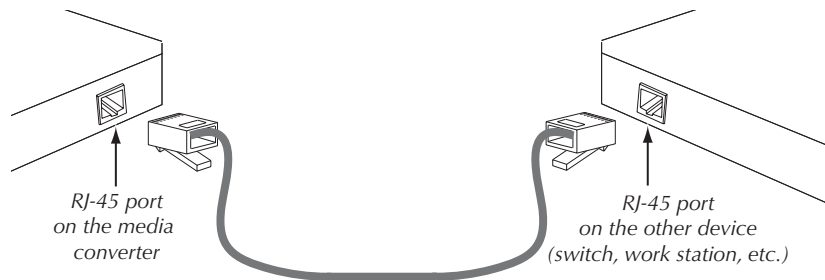
1. Locate or build 100Base-FX fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the media converter as described:
  - Connect the male **TX** cable connector to the female **TX** connector.
  - Connect the male **RX** cable connector to the female **RX** connector.
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** connector.
  - Connect the male **RX** cable connector to the female **TX** connector.



### Install the Twisted-Pair Copper Cable

1. Locate or build 10Base-T or 100Base-TX 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 connector on the media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port connector on the other device (switch, workstation, etc.).

**NOTE:** The MDI (straight-through) or MDI-X (crossover) cable connection is configured automatically, according to the network conditions.



## Operation

### Power the Media Converter

1. Connect the barrel connector on the power adapter to the media converter's power port (located on 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.

For DC power, consult the user's guide for the Transition Networks SPS1872-xx DC external power supply for powering the media converter.

**NOTE:** The external power supply provided with this product is UL listed by the power supply's manufacturer.

### Status LEDs

Use the status LEDs to monitor the media converter and the network connections.

#### PWR (Power)

On = Connection to external AC or DC power.

#### FLNK (Fiber Link)

On = Fiber link connection.

Flashing = Fiber network activity.

#### FDPX (Fiber Duplex)

On = Full-duplex fiber connection.

Off = Half-duplex fiber connection.

#### TLKN (Twisted-Pair Link)

On = Copper link connection.

Flashing = Copper network activity.

#### TDPX (Twisted-Pair Duplex)

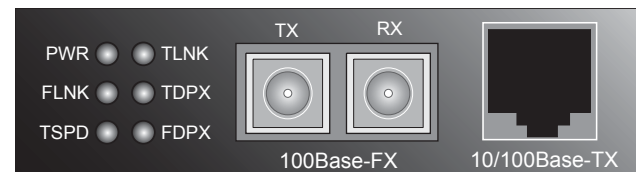
On = Full-duplex copper connection.

Off = Half-duplex copper connection.

#### TSPD (Twisted-Pair Speed)

On = 100 Mb/s.

Off = 10 Mb/s.



## Operation - Continued

### Product Features

#### Auto-Negotiation

The Auto-Negotiation feature allows the media converter to automatically configure itself to achieve the best possible mode of operation over a link. The media converter broadcasts its speed (10 Mb/s or 100 Mb/s) and duplex capabilities (full or half) to the other devices and negotiates the best mode of operation. Auto-Negotiation allows quick and easy installation because the optimal link is established automatically. No user intervention is required to determine the best mode of operation.

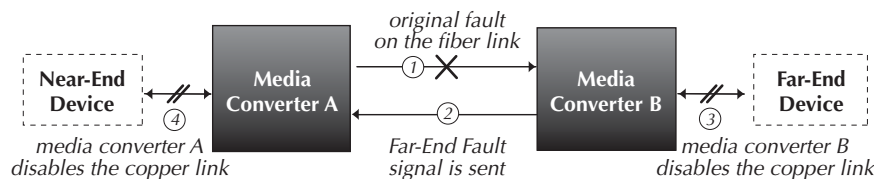
A scenario where the media converter is linked to a non-negotiating device is a case where the user may want to **disable** Auto-Negotiation. In this instance, the mode of operation will drop to the least common denominator between the two devices (e.g. 10 Mb/s, half-duplex). Disabling this feature gives the user the ability to force the connection to the desired speed and duplex mode of operation.

#### AutoCross™

When the AutoCross feature is activated, it allows either straight-through (MDI) or crossover (MDI-X) copper cables to be used when connecting to 10Base-T or 100Base-TX devices. AutoCross determines the characteristics of the connection and automatically configures the unit to link up, regardless if the copper cable is MDI or MDI-X configuration. (This feature does not require operator intervention.)

#### Far-End Fault

When a fault occurs on an incoming fiber link (1), the media converter transmits a Far-End Fault signal on the outgoing fiber link (2). In addition the Far-End Fault signal also activates the Link Pass-Through feature, which, in turn, disables the link on the copper portion of the network (3) and (4).



## Operation - Continued

### Product Features - Continued

#### Full-Duplex Network

In a full-duplex network, maximum cable lengths are determined by **the type of cables** that are used. See page 1 (front cover) for the cable specifications for the different **SBFTF10xx-15x** models.

The 512-Bit Rule **does not apply** in a full-duplex network.

#### Half-Duplex Network (512-Bit Rule)

In a half-duplex network, the maximum cable lengths are determined by the round trip delay limitations of each Fast Ethernet **collision domain**. (A collision domain is the longest path between any two terminal devices, e.g. a **terminal, switch, or router**.)

The 512-Bit Rule determines the maximum length of cable permitted by calculating the round-trip delay in **bit-times (BT)** of a particular collision domain. If the result is less than or equal to 512 BT, the path is good.

For more information on the 512-Bit Rule, see the white paper titled "Collision Domains" on the Transition Networks website at: [www.transition.com](http://www.transition.com).

## Cable Specifications

**Copper Cable** Maximum cable distance: 100 meters

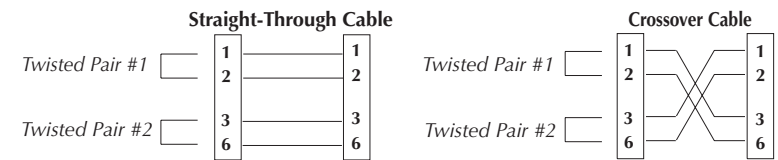
**Category 3:** (minimum requirement for 10 Mb/s operation)

Gauge 24 to 22 AWG  
Attenuation 11.5 dB/100m @ 5-10 MHz

**Category 5:** (minimum requirement for 100 Mb/s operation)

Gauge 24 to 22 AWG  
Attenuation 22.0 dB /100m @ 100 MHz

- Straight-through (MDI) or crossover (MDI-X) cable may be used.
- Shielded (STP) or unshielded twisted-pair (UTP) may be used.
- Pins 1&2 and 3&6 are the two active pairs in an Ethernet 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.



## 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 (recommended):	9 μm	
Multimode fiber (recommended):	62.5/125 μm	
Multimode fiber (optional):	100/140, 85/140, 50/125 μm	

#### SBFTF1011-150

Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	

#### SBFTF1013-150

Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	

#### SBFTF1014-150

Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dB	

#### SBFTF1015-150

Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	26.0 dB	

#### SBFTF1018-150

Fiber-optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber-optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	

#### SBFTF1029-150, SBFTF1029-151

Fiber-optic Transmitter Power:	min: -13.0 dBm	max: -6.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.0 dBm	max: -3.0 dBm
Link Budget:	19.0 dB	

#### SBFTF1029-152, SBFTF1029-153

Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -33.0 dBm	max: -3.0 dBm
Link Budget:	25.0 dB	

**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.**

## Technical Specifications

For use with Transition Networks Model SBFTF10xx-15x or equivalent.

<b>Standards</b>	IEEE 802.3™
<b>Data Rate:</b>	10 Mb/s, 100 Mb/s
<b>Dimensions</b>	3.25" x 4.7" x 1" (86 mm x 119 mm x 22 mm)
<b>Weight</b>	10 oz. (283 g) (approximate)
<b>Power Consumption:</b>	4.0 W
<b>Power Supply</b>	12VDC, 0.8 A (N. America, Europe, Japan, UK) 12VDC, 1.25 A (N.Z., Australia, Latin Am., S. Africa) The external power supply provided with this product is UL listed by the power supply's manufacturer.
<b>Packet Size:</b>	Unicast MAC addresses: 1K Maximum packet size: 1522 bytes Memory: 128K bytes (1 Mbit)
<b>MTBF</b>	48,000 hours (MIL217F2 V5.0) (MIL-HDBK-217F) 129,000 hours (Bellcore7 V5.0)
<b>Environment</b>	Tmra*: 0 to 50°C (32 to 122°F) Storage Temp: -20 to 85°C (-4 to 185°F) Humidity: 5 to 95%, non condensing Altitude: 0 to 10,000 feet
<b>Warranty</b>	Lifetime

\*Manufacturer's rated ambient temperature.

Product is certified by the manufacturer to comply with DHHS Rule 21/CFR, Subchapter J applicable at the date of manufacture.

**CAUTION:** Visible and invisible laser radiation when open. Do not stare into the beam or view directly with optical instruments.

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

### Optional Accessories (sold separately)

Part Number	Description
SPS-1872-SA	Optional External Power Supply; 18-72VDC Stand-Alone Output: 12.6VDC, 1.0 A
SPS-1872-PS	Optional External Power Supply; 18-72VDC Piggy-back; Output: 12.6VDC, 1.0 A
E-MCR-04	12-Slot Media Converter Rack w/ universal internal power supply
WMBL	Optional Wall Mount Brackets; Length: 4.0 in. (102 mm)
WMBV	Optional Vertical Mount Bracket; Length: 5.0 in. (127 mm)
WMBD	Optional DIN Rail Mount Bracket; Length: 5.0 in. (127 mm)
WMBD-F	Optional DIN Rail Mount Bracket (flat); Length: 3.3in. (84 mm)

## Troubleshooting

If the media converter fails, isolate and correct the failure 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? (See "Power Supply" on page 9.)
- Is the power adapter properly installed in the media converter and in the outlet?
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

#### YES

- Proceed to step 2.

### 2. Is the TLNK (twisted-pair link) LED illuminated?

#### NO

- Check the copper cables for proper connection and pin assignment.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

#### YES

- Proceed to step 3.

### 3. Is the FLNK (fiber-pair link) LED illuminated?

#### NO

- Check the fiber cables for proper connection.
- Verify that the TX and RX cables are connected to the RX and TX ports, respectively, on the 100Base-FX device.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

#### YES

- Proceed to step 4.

### 4. Is the TSPD (twisted-pair speed) LED illuminated?

#### NO

- Check the copper cables for proper connection.
- Off = The media converter has selected 10Mb/s operation.
- If the speed is not correct, disconnect and reconnect the twisted pair cable to restart the initialization process.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

#### YES

- On = The media converter has selected 100Mb/s operation.
- If the speed is not correct, disconnect and reconnect the twisted pair cable to restart the initialization process.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

## Contact Us

### Technical Support

Technical support is available 24 hours a day.

US and Canada: **1-800-260-1312**

International: **00-1-952-941-7600**

### Transition Now

Chat live via the Web with Transition Networks Technical Support.

Log onto **www.transition.com** and click the **Transition Now** link.

### Web-Based Seminars

Transition Networks provides seminars via live web-based training.

Log onto **www.transition.com** and click the **Learning Center** link.

### E-Mail

Ask a question anytime by sending an e-mail to our technical support staff.

**techsupport@transition.com**

### Address

Transition Networks

6475 City West Parkway, Minneapolis, MN 55344, USA

telephone: 952-941-7600, toll free: 800-526-9267, fax: 952-941-2322

TRANSITION networks		Declaration of Conformity
Name of Mfg:	<b>Transition Networks</b>	6475 City West Parkway, Minneapolis MN 55344 USA
Model:	<b>SBFTF10xx-15x Series Media Converters</b>	
Part Number(s):	<b>SBFTF1011-150, SBFTF1013-150, SBFTF1014-150, SBFTF1015-150, SBFTF1018-150, SBFTF1029-150, SBFTF1029-151, SBFTF1029-152, SBFTF1029-153</b>	
Regulation:	<b>EMC Directive 89/336/EEC</b>	
Purpose:	To declare that the <b>SBFTF10xx-15x</b> to which this declaration refers is in conformity with the following standards.	
	EMC-CISPR 22:1985 Class A; EN 55022:1988 Class A; FCC Part 15 subpart B; 22 CFR subpart J	
	<i>I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).</i>	
	<i>Stephen Anderson</i>	<u>August 8, 2002</u>
	Stephen Anderson, Vice-President of Engineering	Date

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# Compliance Information

CISPR22/EN55022 Class A

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.



**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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