

SBFTF10xx-26x Stand Alone Media Converter User's Guide

- 10/100 Bridging (4-Port)
- Copper to Fiber
- 10Base-T/100Base-TX to 100Base-FX



The SBFTF10xx-26x 4-port Ethernet/Fast Ethernet bridging media converter connects 10Base-T Ethernet and/or 100Base-TX Fast Ethernet twisted-pair copper network devices to network devices on a 100Base-FX Fast Ethernet fiber network.

Part Number	Copper 10Base-T/100Base-TX	Duplex Fiber-Optic 100Base-FX
SBFTF1011-260	RJ-45 (4 ports) 100 m (328 ft)*	ST, 1300 nm multimode 2 km (1.2 miles)*
SBFTF1013-260	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1300 nm multimode 2 km (1.2 miles)*
SBFTF1014-260	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1310 nm single mode 20 km (12.4 miles)*
SBFTF1015-260 (long haul)	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1310 nm single mode 40 km (24.8 miles)*
SBFTF1016-260 (extra long haul)	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1310 nm single mode 60 km (37.2 miles)*
SBFTF1017-260 (long wavelength)	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1550 nm single mode 80 km (49.7 miles)*

* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation.

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SBFTF10xx-26x

Part Number	Copper	Simplex Fiber-Optic
SBFTF1029-260 **	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1310 nm (TX)/1550 nm (RX) single mode, 20 km (12.4 miles)*
SBFTF1029-261 **	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1550 nm (TX)/1310 nm (RX) single mode, 20 km (12.4 miles)*
SBFTF1029-262 ***	RJ-45 (4 ports) 100 m (328 ft)*	SC, 1310 nm (TX)/1550 nm (RX) single mode, 40 km (24.8 miles)*
SBFTF1029-263 ***	RJ-45 (4 ports) 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

** SBFTF1029-260 and -261 are intended to be installed in the same network where one is the local converter and the other is the remote converter.

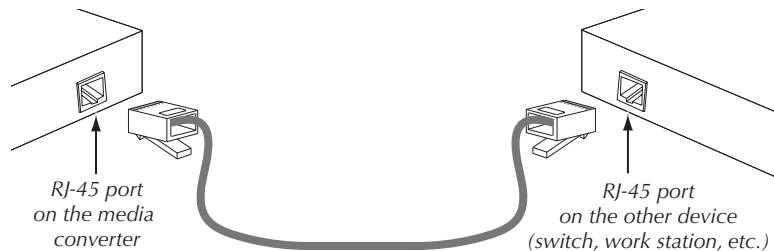
*** SBFTF1029-262 and -263 are intended to be installed in the same network where one is the local converter and the other is the remote converter.

Installation

Connect the Twisted-Pair Copper Cable

1. Locate or build IEEE 803.2™ compliant 10Base-T or 100Base-TX cables with 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 SBFTF10xx-26x 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.).

NOTE: The AutoCross feature allows either MDI (straight-through) or MDI-X (crossover) cable connections to be configured automatically, according to the network conditions.

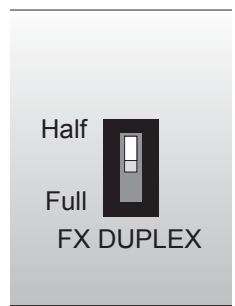


Installation - Continued

Connect the Fiber Cable

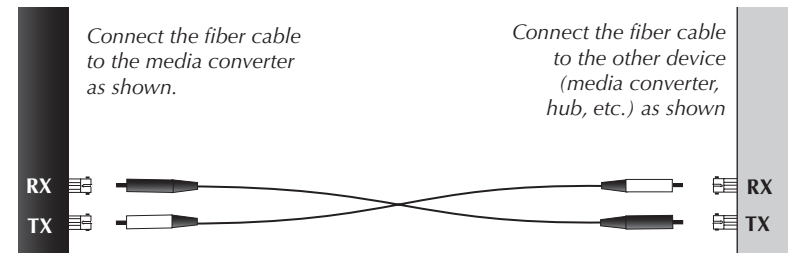
Set the FX DUPLEX switch

- **Up (half-duplex)** - The fiber cable distances are constrained by the 512-Bit Rule (see page 8).
- **Down (full-duplex)** - The fiber cable distances are constrained by the cable requirements (see pages 1 and 2).



Install the Fiber Cable

1. Locate or build IEEE 803.2™ compliant 100Base-FX fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the SBFTF10xx-26x 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.



Power the Media Converter

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

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.

Operation

Status LEDs

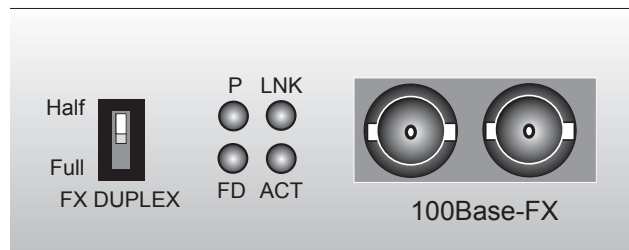
Use the status LEDs to monitor the media converter and the network connections.

P(ower) On = Connection to external AC or DC power.

L(i)NK On = Fiber link connection.

F(ull) D(uplex) On = Full-duplex connection on the fiber link.
Off = Half-duplex connection on the fiber link.

ACT(ivity) Flashing = Fiber network activity.



The **Duplex/Link** and **Speed** LEDs are integrated into each of the RJ-45 ports and are used to monitor each of the twisted-pair copper network connections.

Duplex/Link LED

Amber = A link on the half-duplex twisted-pair copper link.

Flashing Amber = Activity on the half-duplex copper link.

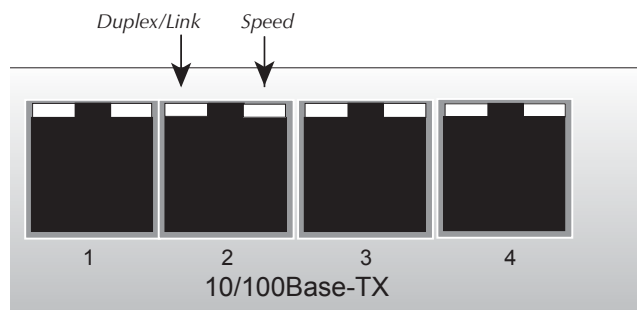
Green = A link on the full-duplex twisted-pair copper link.

Flashing Green = Activity on the full-duplex copper link.

Speed LED

Amber = 10 Mb/s operation.

Green = 100 Mb/s operation.



Operation -- Continued

Product Features

Rate Conversion

The SBFTF10xx-26x media converter allows connection of **10Mb/s** terminal devices on a 10Base-T legacy Ethernet copper network to **100Mb/s** terminal devices on a 100Base-TX Fast Ethernet copper network and/or to **100Mb/s** terminal devices on a 100Base-FX Fast Ethernet fiber network.

Congestion Reduction

The SBFTF10xx-26x media converter does not forward collision signals or error packets from one collision domain to another, improving baseline network performance. In addition, the media converter filters packets destined for local devices, also reducing network congestion.

Full-Duplex Network

In a full-duplex network, maximum cable lengths are determined by the **type of cables** that are used. See pages 1 and 2 for the cable specifications for the different SBFTF10xx-26x 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.

Operation -- Continued

Product Features -- Continued

Auto-Negotiation

The Auto-Negotiation feature allows the SBFTF10xx-26x 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, 100 Mb/s, etc.) 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.

AutoCross™

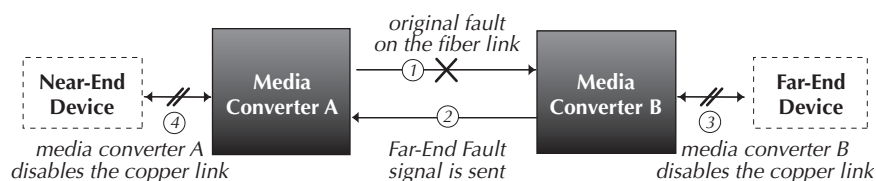
AutoCross feature allows either straight-through (MDI) or crossover (MDI-X) copper cables to be used when connecting to 100Base-TX devices. AutoCross determines the characteristics of the connection and automatically configures the unit to link up, regardless if the copper cable is MDI or MDI-X configuration.

Pause

The Pause feature is used to temporarily suspend data transmission in order to relieve buffer congestion. If a media converter needs some time to clear network congestion, it will send a pause signal to the media converter at the other end, which will wait a predetermined amount of time before re-transmitting the data. This feature reduces data bottlenecks, allows for a more efficient use of the network devices, and prevents the loss of valuable data. This feature reduces data bottlenecks, allows for a more efficient use of the network devices, and prevents the loss of valuable data.

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, which, in turn, disables the link on the copper portion of the network (3) and (4).



Cable Specifications

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

Fiber Cable

Bit Error Rate:	<10 ⁻⁹	
single mode fiber (recommended):	9 μm	
Multimode fiber (recommended):	62.5/125 μm	
Multimode fiber (optional):	100/140, 85/140, 50/125 μm	
SBFTF1011-260	1300 nm multimode	
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	
SBFTF1013-260	1300 nm multimode	
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	
SBFTF1014-260	1310 nm single mode	
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	
SBFTF1015-260 (long haul)	1310 nm single mode	
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	
SBFTF1016-260 (extra long haul)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	
SBFTF1017-260 (long wave length)	1550 nm single mode	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	
SBFTF1029-260	1310 nm (TX) / 1550 nm (RX) simplex	
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	
SBFTF1029-261	1550 nm (TX) / 1310 nm (RX) simplex	
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	
SBFTF1029-262	1310 nm (TX) / 1550 nm (RX) simplex	
SBFTF1029-263	1550 nm (TX) / 1310 nm (RX) simplex	
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 meets Class I Laser safety requirements per IEC-825/CDRH standards and complies with 21 CFR1040.10 and 21CFR1040.11.

Cable Specifications -- Continued

Copper Cable

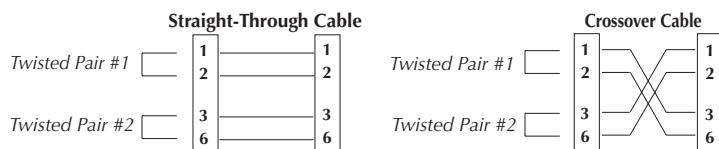
Category 3: (Minimum requirement for 10 Mb/s operation)

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

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

Gauge	24 to 22 AWG
Attenuation	22.0 dB /100m @ 100 MHz
Maximum Cable Distance	100 meters

- Both straight-through or crossover twisted-pair cable may be used.
- Shielded (STP) or unshielded (UTP) twisted-pair cable 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.



Technical Specifications

For use with Transition Networks Model SBFTF10xx-26x or equivalent.

Standards	IEEE 802.3™ 2003
Data Rate	10 Mb/s, 100 Mb/s
Dimensions	7.29" x 4.34" x 1.2" (185 x 110 x 30 mm)
Weight	1.4 lbs. (0.6 kg) (approximate)
Power Consumption	4.95 watts
Power Supply	12 VDC, 1.25 Amp (minimum) The external power supply provided with this product is UL listed by the power supply's manufacturer.
MTBF	48,000 hours (MIL217F2 V5.0) (MIL-HDBD-217F) 129,000 hours (Bellcore7 V5.0)
Packet Size:	Memory: 128 Kbytes (1 Mbit) Maximum packet size: 1536 bytes Unicast MAC addresses: 2K
Environment	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
Warranty	Lifetime

*Manufacturer's rated ambient temperature.

The information in this user's guide is subject to change. For the most up-to-date information on the SBFTF10xx-26x media converter, view the user's guide on-line at: www.transition.com.

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.

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 “P” (power) LED illuminated?

NO

- Is the power cord properly installed in the media converter and at the external power source?
- Does the external power source provide power?
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

YES

- Proceed to step 2.

2. Is the “FD” (fiber duplex) 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 remote 100Base-FX device.
- The media converter is set for half-duplex mode. If the mode is not correct, set the “FX DUPLEX” switch to the **down (full-duplex)** setting. Next, disconnect and reconnect the fiber cable to restart the initialization process.

YES

- The media converter is set for full-duplex mode. If the mode is not correct, set the “FX DUPLEX” switch to the **up (half-duplex)** setting. Next, disconnect and reconnect the fiber cable to restart the initialization process.
- Proceed to step 3.

3. Is the “LNK” (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 remote 100Base-FX device.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 4.

Troubleshooting -- Continued

4. Is the “Duplex/Link” LED illuminated on a twisted-pair copper port?

NO

- Check the copper cables of that port for proper connection.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Amber = The media converter has selected half-duplex mode.
- Green = The media converter has selected full-duplex mode.
- If the mode is not correct, disconnect and reconnect the twisted pair cable to restart the initialization process.
- Proceed to step 5.

5. Is the “Speed” LED illuminated on a twisted-pair copper port?

NO

- Check the copper cables of that port for proper connection.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Amber = The media converter has selected 10Mb/s operation.
- Green = 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 Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

Contact Us

Technical support is available 24 hours a day.

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

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

Chat live via the Web with Transition Networks Technical Support. Log onto **www.transition.com** and click the **Transition Now** link.

Transition Networks provides seminars via live web-based training. Log onto **www.transition.com** and click the **Learning Center** link.

Ask a question anytime by sending an e-mail to our technical support staff. **techsupport@transition.com**

Transition Networks; 6475 City West Parkway; Minneapolis, MN 55344; USA
 telephone: 952-941-7600
 toll free: 800-526-9267
 fax: 952-941-2322

Compliance Information

CISPR22/EN55022 Class A & B + EN55024; CE Mark

FCC Regulations

This equipment has been tested and found to comply with the limits for a Class A & B 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&B 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&B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.



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.

	
Declaration of Conformity	
Name of Mfg:	Transition Networks 6475 City West Parkway, Minneapolis MN 55344 USA
Model:	SBFTF10xx-26x Series Media Converters
Part Number(s):	SBFTF1011-260, SBFTF1013-260, SBFTF1014-260, SBFTF1015-260, SBFTF1016-260, SBFTF1017-260, SBFTF1029-260, SBFTF1029-261, SBFTF1029-262, SBFTF1029-263
Regulation:	EMC Directive 89/336/EEC
Purpose: To declare that the SBFTF10xx-26x to which this declaration refers is in conformity with the following standards. CISPR 22: 1993; EN 55022:1998 Class A & B; EN 55024:1998; FCC Part 15 subpart B; CFR 21 subpart J	
<i>I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).</i>	
 Stephen Anderson, Vice-President of Engineering	February 17, 2003 Date

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