



## User's Guide

### SPSVT26xx-10x

#### Stand Alone Media Converter

- **High-Speed Serial**
- **V.35/X.21/RS449/RS530/RS232**
- **Copper to Fiber**

Transition Networks **SPSVT26xx-10x** series high-speed serial copper-to-fiber media converter connect V.35, X.21, RS-449, RS-530, or RS-232 signals on

copper cable, at speeds up to 10 Mb/s, through a universal 26-pin serial interface connector to fiber-optic cable. Transition Networks also supplies cables for connecting network equipment to the SPSVT26xx-10x series media converter.

Part Number	Port One - Copper	Port Two - Duplex Fiber-Optic
<b>SPSVT2611-100</b>	Universal 26-pin serial interface*	ST, 1300 nm multimode 2 km (1.2 miles)**
<b>SPSVT2613-100</b>	Universal 26-pin serial interface*	SC, 1300 nm multimode 2 km (1.2 miles)**
<b>SPSVT2614-100</b>	Universal 26-pin serial interface*	SC, 1310 nm single mode 20 km (12.4 miles)**
<b>SPSVT2615-100</b>	Universal 26-pin serial interface*	SC, 1310 nm single mode 40 km (24.9 miles)**
<b>SPSVT2616-100</b>	Universal 26-pin serial interface*	SC, 1310 nm single mode 60 km (37.3 miles)**
<b>SPSVT2617-100</b>	Universal 26-pin serial interface*	SC, 1550 nm single mode 80 km (49.7 miles)**

\* For typical maximum cable distance, see the chart on page 3.

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

The **chassis version** of this media converter is CPSVT26xx-10x. For more information, see the user's guide for the CPSVT26xx-10x on-line at [www.transition.com](http://www.transition.com)

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## SPSVT26xx-10x

Part Number	Port One - Copper	Port Two - Single Fiber-Optic
SPSVT2629-100	Universal 26-pin serial interface*	SC, single mode 1310 TX / 1550nm RX 20 km (12.4 miles)**
SPSVT2629-101	Universal 26-pin serial interface*	SC, single mode 1550 TX / 1310nm RX 20 km (12.4 miles)**
The SPSVT2629-100 and the -101 are intended to be installed in the same network where one is the local converter and the other is the remote converter.		
SPSVT2629-102	Universal 26-pin serial interface*	SC, single mode 1310 TX / 1550nm RX 40 km (24.8 miles)**
SPSVT2629-103	Universal 26-pin serial interface*	SC, single mode 1550 TX / 1310nm RX 40 km (24.8 miles)**
The SPSVT2629-102 and the -103 are intended to be installed in the same network where one is the local converter and the other is the remote converter.		

\* For typical maximum cable distance, see the chart on page 3.

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

### 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 (includes universal internal power supply) 17 x 15 x 5 in. (432 x 381 x 127 mm)
WMBL	Optional Wall Mount Brackets; 4.0 in. (102 mm)
WMBV	Optional Vertical Mount Bracket; 5.0 in. (127 mm)
WMBD	Optional DIN Rail Mount Bracket; 5.0 in. (127 mm)
WMBD-F	Optional DIN Rail Mount Bracket (flat); 3.3in. (84 mm)

## Cable Options

### Supported Cable Options

The table below lists the interface standards and the cable options that are supported for the SPSVT26xx-10x media converter.

Each cable (available from Transition Networks) is **3 meters** in length and has a **male universal 26-pin serial** connector at one end. The connector at the other end is listed in the table.

Part Number	Function	Connector Type
35DTE-3	V.35 DTE	34-pin Rectangular Male
35DCE-3	V.35 DCE	34-pin Rectangular Female
21DTE-3	X.21 DTE	15-pin D-sub Male
21DCE-3	X.21 DCE	15-pin D-sub Female
232DTE-3	RS-232 DTE	25-pin D-sub Male
232DCE-3	RS-232 DCE	25-pin D-sub Female
449DTE-3	RS-449 DTE	37-pin D-sub Male
449DCE-3	RS-449 DCE	37-pin D-sub Female
530DTE-3	RS-530 DTE	25-pin D-sub Male
530DCE-3	RS-530 DCE	25-pin D-sub Female

### Maximum Cable Lengths

The table below lists the recommended maximum cable lengths for each of the cable options at various data rates.

Data Rate:	V.35, RS-449, or RS-530	X.21	RS232C
10 Mb/s	10 m (35 ft.)	N/A	N/A
6 Mb/s	19 m (65 ft.)	N/A	N/A
2 Mb/s	45 m (150 ft.)	15 m (50 ft.)	N/A
1 Mb/s	90 m (300 ft.)	30 m (100 ft.)	N/A
512 Kb/s	180 m (600 ft.)	60 m (200 ft.)	N/A
256 kb/s	365 m (1200 ft.)	120 m (400 ft.)	N/A
128 Kb/s	730 m (2400 ft.)	240 m (800 ft.)	N/A
56 Kb/s	910 m (3000 ft.)	480 m (1600 ft.)	3 m (10 ft.)
1.2 Kb/s	910 m (3000 ft.)	910 m (3000 ft.)	15 m (50 ft.)

N/A = Not Applicable. The rates are not specified for the interface in question.

## Installation

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

### Set the Terminal Timing Switch

The 16-position terminal timing switch, located on the side of the media converter, allows the network administrator to configure the media converter for various network conditions.

To set the terminal timing switch, insert a small, flat-blade screwdriver or a similar device into the recessed arrow on the switch. Gently rotate the switch to the position required for the site installation.



This table lists the conditions for each setting of the terminal timing switch:

0 - TT = Receive CLK	8 - 768 Kb/s
1 - 56 Kb/s	9 - 1024 Kb/s
2 - 64 Kb/s	A - 1544 Kb/s
3 - 112 Kb/s	B - 2048 Kb/s
4 - 128 Kb/s	C - 3072 Kb/s
5 - 256 Kb/s	D - 4096 Kb/s
6 - 384 Kb/s	E - 6144 Kb/s
7 - 512 Kb/s	F - Asynchronous Mode*

\* Setting "F" overrides the software mode (see page 6) and sets the media converter to asynchronous mode.

## Installation -- Continued

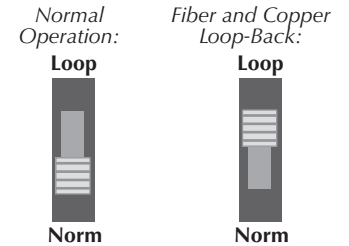
### Set the Loop-Back Switch

The loop-back switch is located on the front panel of the media converter and is used to debug network faults. (See page 14 in the "Troubleshooting" section for examples.)

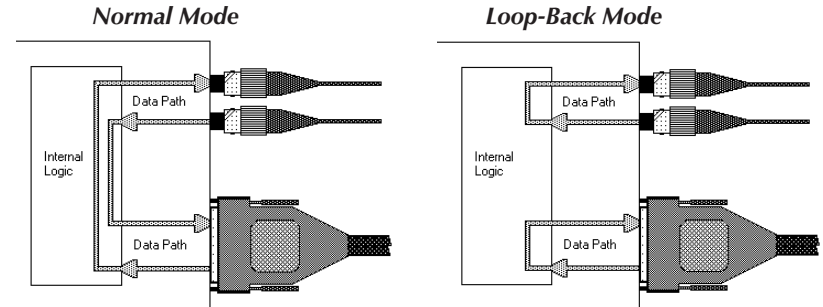
To set the switch, use a small flatblade screwdriver or a similar device.

**Norm** Set the switch to "Norm" for normal operation.

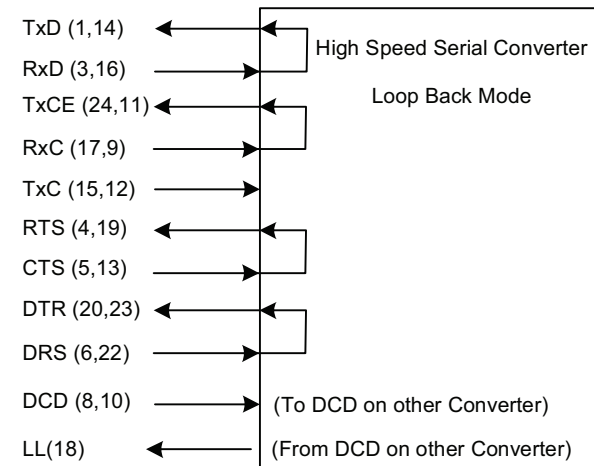
**Loop** Set the switch to "Loop" to enable both fiber and copper loop-back.



The two drawings below illustrate the data path for both normal mode and loop-back mode:



The drawing below indicates the data path during loop-back mode for each of the pins on the copper 26-pin connector.



## Installation -- Continued

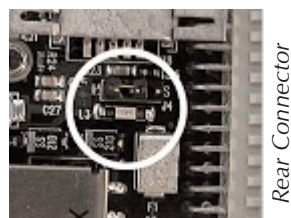
### Set the Jumpers

The SPSVT26-10x has three jumpers located on the circuit board inside the media converter housing. To set any of the three jumpers:

1. Using a small screwdriver, remove the four (4) screws that secure the cover and carefully remove the cover from the media converter.
2. Locate the jumper(s) on the circuit board. (See pages 6 and 7.)
3. Using small needle-nosed pliers or similar device, move the jumper(s) to the desired position(s). (See pages 6 and 7.)
4. Carefully replace the cover on the media converter and replace the four (4) screws that secure the cover to the media converter.

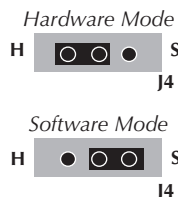
### Hardware/Software Jumper (J4)

The Hardware/Software jumper (J4) is located on the circuit board and is the jumper that is nearest the rear connector of the media converter (see the photo to the right).



**Hardware** The terminal timing switch controls the terminal timing function. The loop-back switch controls the loop-back function.

**Software** The terminal timing switch and the loop-back switch are disabled. These two functions are controlled by the most-recently saved, on-board microprocessor settings.



**NOTE:** Setting the terminal timing switch to “F” overrides the software mode and sets the media converter to asynchronous mode. (See page 4.)

### Remote Management

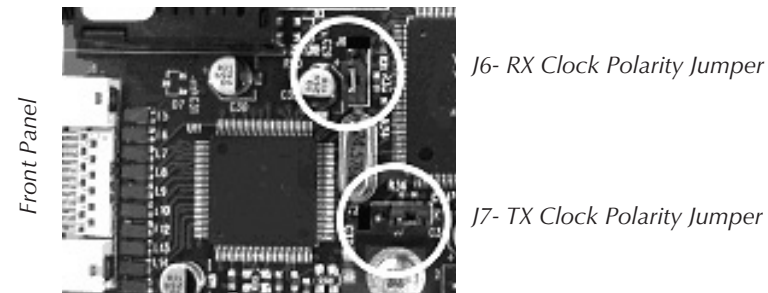
The SPSVT26xx-10x stand-alone media converter can be remotely managed by the **CPSVT26xx-10x**, the chassis version of the media converter.

For example, a local CPSVT2611-100 converter (that is installed in a managed Transition Networks *PointSystem*™ chassis) is connected, via fiber, to a remote SPSVT2611-100 converter. An example of a managed **single-fiber** network has a local CPSVT2629-100 converter connected, via fiber, to a remote SPSVT2629-101.

**NOTE:** In a managed network, both the local and remote media converters must be set to “software” mode (see above).

For more information, see the SNMP section in the CPSVT26xx-10x user’s guide on-line at: [www.transition.com](http://www.transition.com).

## Installation -- Continued

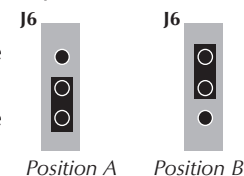


### Receive (RX) Clock Polarity Jumper (J6)

The RX Clock Polarity jumper (J6), located near the front panel of the circuit board, selects the polarity of the receive clock.

**Position A** The receive data is sampled on the *rising* edge of the receive clock.

**Position B** The receive data is sampled on the *falling* edge of the receive clock.

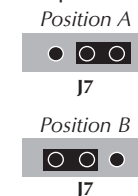


### Transmit (TX) Clock Polarity Jumper (J7)

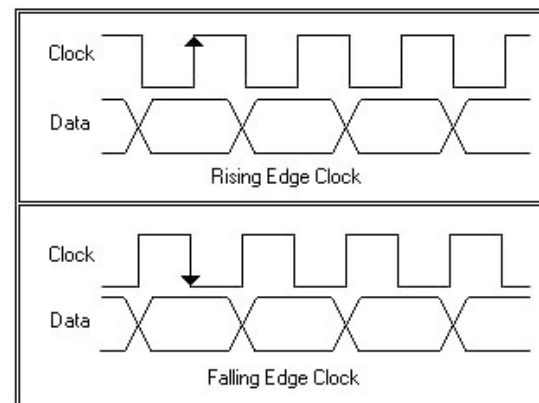
The TX Clock Polarity jumper (J7), also located near the front panel of the circuit board, selects the polarity of the transmit clock.

**Position A** The transmit data is sampled on the *rising* edge of the receive clock.

**Position B** The transmit data is sampled on the *falling* edge of the receive clock.



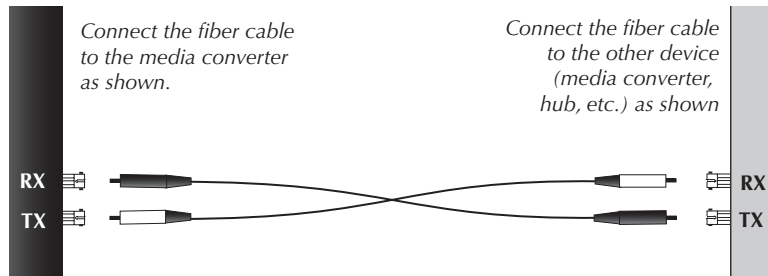
This drawing illustrates “rising edge” and “falling edge” for clock polarity.



## Installation -- Continued

### Install the Fiber Cable

1. Locate or build fiber optic cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the SPSVT26xx-10x 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.



### Install the Copper Cable

1. Connect the high-speed serial cable to the media converter by connecting the cable's copper connector to the converter's copper port.
2. Ensure that the cable screwlocks are tightened securely. Failure to observe this caution could cause data transfer to fail.
3. Connect the other end of the high-speed serial cable to the other network device (cable router, CSU, etc.).

## Installation -- Continued

### Power the Media Converter

#### AC

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.

#### DC

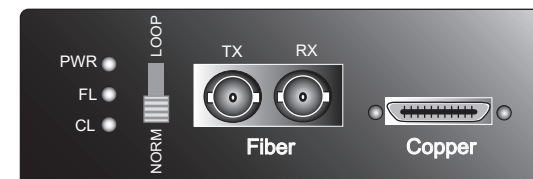
Consult the user's guide for the Transition Networks SPS1872-xx DC external power supply for powering the media converter.

## Operation

### Status LEDs

Use the status LEDs to monitor the SPSVT26xx-10x media converter operation in the network.

- |            |            |   |
|------------|------------|---|
| <b>PWR</b> | (on)       | The media converter is connected to external power. |
| <b>FL</b>  | (on)       | The fiber link is up.                               |
|            | (flashing) | The fiber link is in loop-back mode.                |
| <b>CL</b>  | (on)       | The copper link is up.                              |
|            | (flashing) | The copper link is in loop-back mode.               |
- (In asynchronous mode, the CL LED may flash if the data rates fall below 300 cycles per second.)



## Cable 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

<b>SPSVT2611-100</b>	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

<b>SPSVT2613-100</b>	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

<b>SPSVT2614-100</b>	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

<b>SPSVT2615-100</b>	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

<b>SPSVT2616-100</b>	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

<b>SPSVT2617-100</b>	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

<b>SPSVT2629-100</b>	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

<b>SPSVT2629-101</b>	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

<b>SPSVT2629-102</b>	1310 nm (TX) / 1550 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

<b>SPSVT2629-103</b>	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

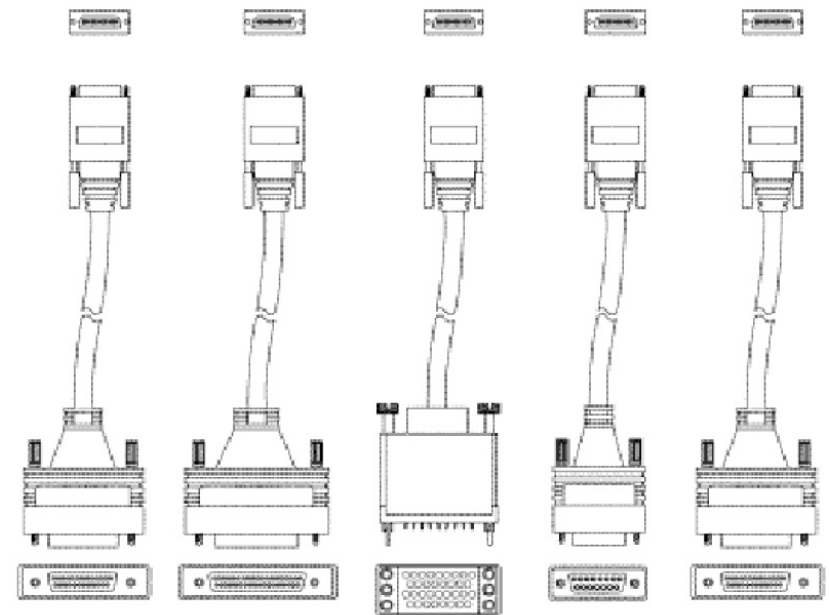
**The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.**

## Cable Specifications -- Continued

### Copper Cable

- Copper twisted-pair, 28 AWG, 120 Ohm, 12 pf/foot capacitance (max)
- Nominal DC resistance: 65.0 ohms per 1000 feet (each conductor)
- Shield type: Aluminum Foil-Polyester Tape/Braid Shield with drain wire
- Standard Cable length: 3 m (10 ft.)

The five high-speed serial cables (available from Transition Networks) that are compatible with the 26-pin copper port on the SPSVT26xx-10x media converter are pictured below.



RS-232

RS-449

V.35

X.21

RS-530

**NOTE:** Please refer to the cable specifications documentation on-line at [www.transition.com](http://www.transition.com).

## Technical Specifications

For use with Transition Networks Model SPSVT26xx-10x or equivalent

<b>Standards:</b>	V.35, RS-530, RS-449, RS-232, X.21
<b>Data Rate:</b>	1.2 Kb/s to 10 Mb/s
<b>Dimensions:</b>	3.25" x 1.0" x 4.8" (82mm x 25mm x 122mm)
<b>Weight:</b>	10 oz. (283 g) (approximate)
<b>Power Consumption:</b>	5.0 Watts
<b>MTBF (w/ power supply):</b>	47,739 hours ( <i>MIL217F2 V5.0</i> ) ( <i>MIL-HDBK-217F</i> ) 129,217 hours ( <i>Bellcore7 V5.0</i> )
<b>Power Supply:</b>	12VDC, 1.25A, 100-240 VAC (~1.0A), 15W max (UL Listed, C-UL Listed, 6D44 E170507)
<b>Environment:</b>	Tmra*: 0 to 50°C (32 to 122°F) Storage Temperature: -15 to 65°C (5 to 149°F) Humidity: 10 to 90%, non condensing Altitude: 0 to 10,000 feet
<b>Warranty:</b>	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 SPSVT26xx-10x media converter, see the user's guide on-line at [www.transition.com](http://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 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 fault by determining the answers to the following questions and then taking the indicated action:

### 1. Is the PWR LED on the media converter illuminated?

**NO**

- Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
- Is the power adapter installed in the converter and in the outlet?
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

**YES**

- Proceed to step 2.

### 2. Is the CL LED on the media converter illuminated?

**NO**

- Are the copper cables connected properly?
- Is the device attached to the media converter via the copper cable working properly?
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

**YES**

- Proceed to step 3.

### 3. Is the FL LED on the media converter 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.
- Are both media converters (connected via the fiber cables) in the same mode (synchronous or asynchronous)?
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

**YES**

- Proceed to step 4.

### 4. Are the CL and FL LEDs on the media converter flashing (indicating loop-back mode)?

**NO**

- Disable the loop-back function. In hardware mode, set the loop-back switch to NORM (normal). In software mode, click "disable" in the loop-back function.
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

**YES**

- Proceed to step 5.

### 5. Is data transfer failing?

**YES**

- Are the clock input and output polarity correct?
- Are the correct copper cables installed for the data format?
- Is the mode on the other device correct (synchronous/asynchronous)?
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

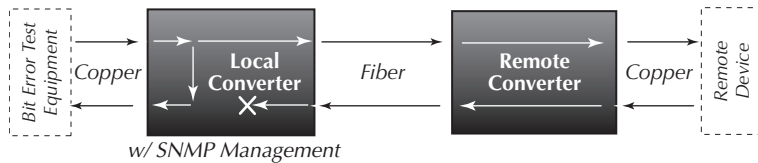
**NO**

- Proceed to step 6.

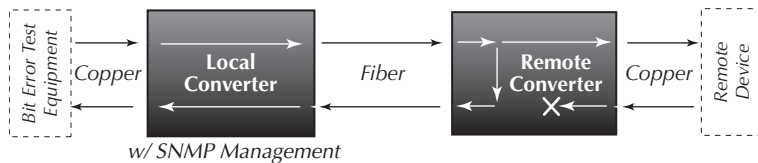
## 6. Is data transfer failing?

### YES

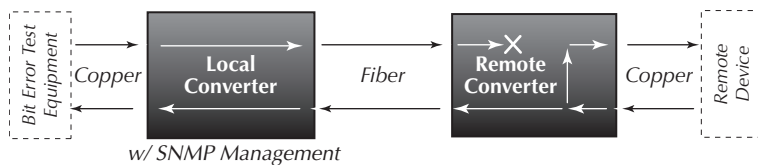
- Verify the local copper connection by starting a **local copper** loop-back (hardware mode: set the loop-back switch on the local media converter to “loop”, software mode: enter the local copper loop-back command) and then use a bit error test unit to run a bit error test.



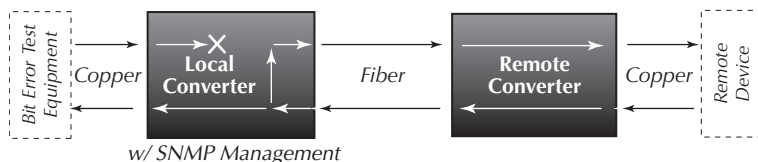
- Verify the local fiber connection by starting a **remote fiber** loop-back (hardware mode: set the loop-back switch on the remote media converter to “loop”, software mode: enter the remote fiber loop-back command) and then use a bit error test unit to run a bit error test.



- Verify the remote copper connection by starting a **remote copper** loop-back (hardware mode: set the loop-back switch on the remote media converter to “loop”, software mode: enter the remote copper loop-back command) and then use a bit error test unit to run a bit error test.



- Verify remote fiber connection by starting a **local copper** loop-back (hardware mode: setting the loop-back switch on the local media converter to “loop”, software mode: enter the local fiber loop-back command) and then use a bit error test unit to run a bit error test.



- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

### NO

- Contact Tech Support: 800-260-1312, Int'l: 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, U.S.A.

telephone: 952-941-7600

toll free: 800-526-9267

fax: 952-941-2322



### Declaration of Conformity

Name of Mfg: **Transition Networks**  
6475 City West Parkway, Minneapolis MN 55344 U.S.A.

Model: **SPSVT26xx-10x Series Media Converters**  
Part Number(s): **SPSVT2611-100, SPSVT2613-100, SPSVT2614-100, SPSVT2615-100, SPSVT2616-100, SPSVT2617-100, SPSVT2629-100, SPSVT2629-101, SPSVT2629-102, SPSVT2629-103**

Regulation: **EMC Directive 89/336/EEC**

Purpose: To declare that the **SPSVT26xx-10x** to which this declaration refers is in conformity with the following standards.

CISPR 22:1993; EN 55022:1998+A1:2000 Class A; EN 55024: 1998; FCC Part 15 Subpart B; 21CFR subpart J; EN 61000-3-2:1995:A14:2000; EN 61000-3-3:1995

**I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).**

*Stephen Anderson*  
Stephen Anderson, Vice-President of Engineering

August 1, 2007  
Date

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# Compliance Information

CISPR22/EN55022 Class A + EN55024

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.

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