TCF-142-M(-T), TCF-142-S(-T) RS-232/422/485 to Fiber Converter Quick Installation Guide

Eighth Edition, July 2006

1. Overview

Introduction

The TCF-142 series (Ver. 3.1 or later) converters are equipped with a multiple interface circuit that can handle RS-232, or RS-422/485 serial interfaces, and multi-mode or single-mode fiber. The TCF-142 converters extend serial transmission distance up to 5 km (TCF-142-M, with multi-mode fiber) or up to 40 km (TCF-142-S, with single-mode fiber). The TCF-142 must be configured to transmit a particular serial interface (e.g., RS-232 and RS-485 signals cannot be transmitted at the same time).

Why convert serial to Fiber?

Fiber communication not only extends the communication distance, but also provides many advantageous features.

IMMUNITY FROM ELECTRICAL INTERFERENCE: Fiber is not affected by electromagnetic interference or radio frequency interference. It provides a clean communication path and is immune to cross-talk.

INSULATION: Optical fiber is an insulator; the glass fiber eliminates the need for using electric currents as the communication medium.

SECURITY: Fiber cannot be tapped by conventional electric means and is very difficult to tap into optically. Furthermore, radio and satellite communication signals can be captured easily for decoding.

RELIABILITY & MAINTENANCE: Fiber is immune to adverse temperature and moisture conditions, does not corrode or lose its signal, and is not affected by short circuits, power surges, or static electricity.

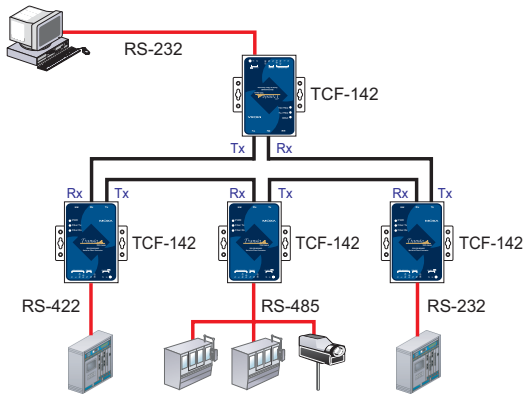
Reverse Power Protection

The Reverse Power Protection feature provides extra protection against accidentally connecting the power cables to the wrong terminal. The converter is designed to detect automatically which power wire is positive and which is negative, and then adjust the power supply accordingly.

Ring Mode

To allow one half-duplex serial device to communicate with multiple half-duplex devices connected to a fiber ring, you should configure the TCF-142 for "ring mode" by setting DIP switch "SW4" to the "On" position. The Tx port of a particular TCF-142 unit connects to the neighboring converter's Rx port to form the ring. Note that when one node transmits a signal, the signal travels around the ring until it returns back to the transmitting unit, which then blocks the signal. Users should ensure that the total fiber ring length is less than 100 km when using TCF-142 series converters.

P/N: 1802001420600



DIP Switch Selectable Terminator

The termination resistor for many products of this type is set by a jumper located inside the product's casing. To disable or change the resistor's strength, the user must open the casing to reset the jumper. MOXA offers a better solution, since TCF-142's termination resistor is set with a DIP Switch located on the outside of the converter's casing.

No Configuration Required for Baudrate Settings

The TCF-142 works under any baudrate from 300 bps to 921.6 Kbps. The TCF-142 simply converts the signal back and forth between serial (RS-232, RS-422, or RS-485) and fiber, and since the TCF-142 does not need to interpret the signal, it does not need to know the baudrate of the transmitting device. For this reason, TCF-142 does not have any DIP switches or jumpers for setting the baudrate.

2. Features

- "Ring" or "Point to Point" transmission
- Extend RS-232/422/485 transmission distance:
  > up to 40 km with single-mode—TCF-142-S
  > up to 5 km with multi-mode—TCF-142-M
- Compact size
- Decrease signal interference
- Protect against electronic degradation and chemical corrosion
- Supports a baudrate up to 921.6 Kbps
- Extended operating temperature from -40 to 75°C (for -T models)

3. Package Checklist

Before installing the TCF-142, verify that the package contains the following items:

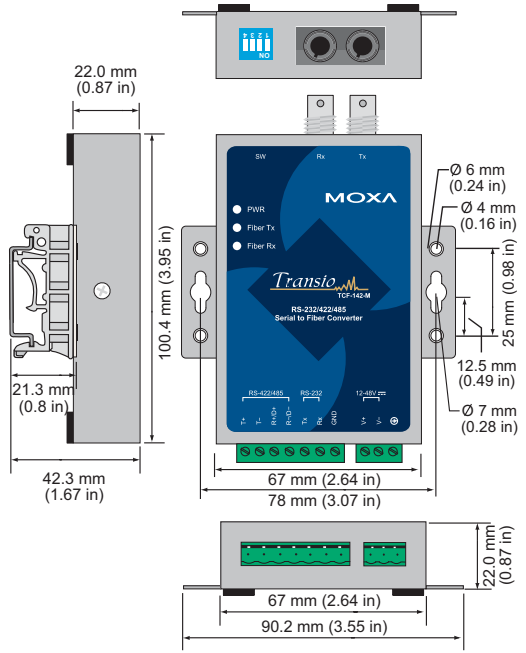
- TCF-142-S or TCF-142-M Fiber Converter
- Quick Installation Guide
- 7-contact terminal block connector
- 3-contact terminal block connector

Notify your sales representative if any of the above items is missing or damaged.

4. Dimensions and Appearance

TCF-142 fiber converters are easy to set up and use. The serial terminal block of one of the converters connects to your computer, the serial terminal block of the other converter connects to your serial device, and the two converters are connected by fiber cable(s).

NOTE **Electrostatic Discharge Warning!**
To protect the product from damage due to electrostatic discharge, we recommend wearing a grounding device when maintaining TCF-142.

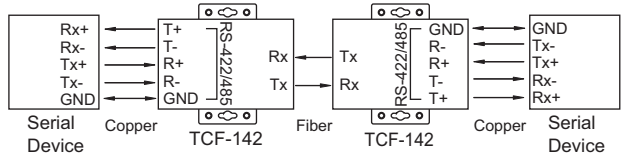


5. Wiring Examples

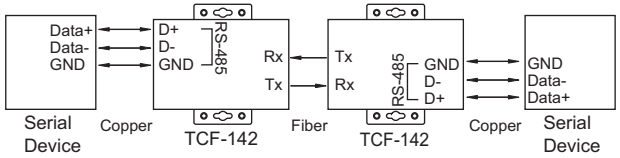
Connecting the Power Supply

Before using the TCF-142, you must first connect the DC power supply to the power supply terminal block located on the bottom side of the TCF-142. The TCF-142 uses a DC power supply.

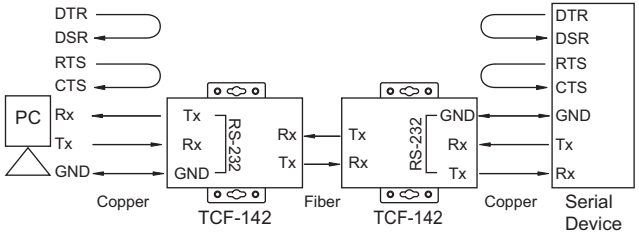
Connecting RS-422 or 4-wire RS-485 Serial Devices



Connecting 2-wire RS-485 Serial Devices

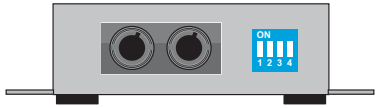


Connecting RS-232 Serial Devices



6. Switch Settings

There are 4 DIP switches on the top end of the TCF-142. SW1 and SW2 are used to set the serial interface. SW3 is used to enable or disable the 120 Ω termination resistor. SW4 is used to enable "Ring" mode or enable "Point to Point" mode.



Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	OFF	OFF
RS-485 4-wire	OFF	OFF
RS-485 2-wire	OFF	ON

Built-in 120 Ω Terminator	SW3
Enable	ON
Disable	OFF
	SW4
Ring mode	ON
Point to Point mode	OFF

ATTENTION

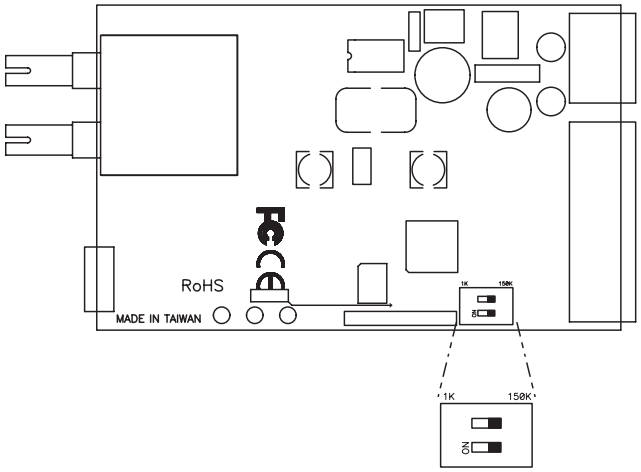
For Fiber Ring Users:

To avoid problems when setting up a fiber ring, each TCF-142 unit making up the ring must be powered down and set to "Ring mode." Next, make sure all cables are connected properly, and then power up all devices connected to the ring. After powering up the TCF-142 units, if the Rx LEDs of the converters glow continuously, power down and then power up ONE of the TCF-142 units in the ring to return the network to normal operation.

NOTE "Ring Mode" can only be sued for half-duplex applications (e.g., RS-485 multi-drop communication).

The DIP switch array called DIP-2 is located inside the TCF-142. DIP-2 has two DIP switches used to adjust the pull high/low resisters.

NOTE: SW1 and SW2 should be set both to ON, or both to OFF.



Pull High/Low Resister	DIP-2 SW1	DIP-2 SW2
150K (default)	OFF	OFF
1K	ON	ON

NOTE When termination is enabled, we recommend using the 1K (ON/ON) setting.

7. LED Description

There are 3 LEDs on the front panel of the TCF-142.

LED	Color	Function
PWR	Red	Steady ON: Power is ON
Fiber Tx	Green	Blinking when fiber is transmitting data
Fiber Rx	Orange	Blinking when fiber is receiving data

8. Specifications

Model Name	TCF-142-S, TCF-142-S-T, TCF-142-M, TCF-142-M-T
Serial Communication	
Signals for RS-232	TxD, RxD, SGND
Signals for RS-422	TxD+, TxD-, RxD+, RxD-, SGND
Signals for 4-wire RS-485	TxD+, TxD-, RxD+, RxD-, SGND
Signals for 2-wire RS-485	Data+, Data-, SGND
Baudrate	300 bps to 921.6 Kbps
Surge protection	15 KV ESD
Fiber Communication	
Connector type	ST
Distance	TCF-142-S: Single mode fiber for 40 km TCF-142-M: Multi mode fiber for 5 km
Support Cable	TCF-142-S: 8.3/125, 8.7/125, 9/125 or 10/125 µm TCF-142-M: 50/125, 62.5/125, or 100/140 µm

Wavelength	TCF-142-S: 1310 nm TCF-142-M: 850 nm
TX Output	TCF-142-S: > -5 dBm TCF-142-M: > -5 dBm
RX Sensitivity	TCF-142-S: -25 dBm TCF-142-M: -20 dBm
Point-to-Point Transmission	Half or Full duplex
Multi-drop Transmission	Half duplex, fiber ring
Environmental	
Operating Temperature	0 to 60°C (32 to 142°F), 5 to 95 % RH
Extended Operating Temperature (for -T models)	-40 to 75°C (-40 to 167°F)
Storage Temperature	-20 to 85°C (-4 to 185°F), 5 to 95 % RH
Power	
Input Power Voltage	12 to 48 VDC *
Power Line Protection	1 KV Burst (EFT), EN61000-4-4 1 KV Surge, EN61000-4-5
Reverse Power Protection	Protects against V+/V- reversal
Over Current Protection	Protects against 2 signals shorted together: 1.1A
Power Consumption	100 mA at 12 VDC
Mechanical	
Dimensions (W × D × H)	67 × 100 × 22 mm 90 × 100 × 22 mm (including ears)
Material	Aluminum (1 mm)
Gross Weight	140g
Regulatory Approvals	
CE	Class B
FCC	Part 15 sub Class B
TÜV	EN 60950
UL	UL 60950
EMI	EN55022 1998, Class B
EMS	EN61000-4-2 (ESD), Criteria A, Level 2 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 2 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2
Free fall	IEC 60068-2-32

WARNING

1. This unit is not meant to be sold to consumers. It will only be shipped to manufacturers or factories.
2. The DC source should come from an external adapter or 12 to 48 VDC source (not from DC mains) by using a transfer device.
3. This unit should be installed or set up by a qualified service person.

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