TCF-142 Series
Quick Installation Guide

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Technical Support Contact Information
www.moxa.com/support

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P/N: 1802001420628

Overview

Introduction

TCF-142 series converters are equipped with a multiple interface circuit that can handle RS-232, RS-422, and RS-485 serial interfaces, as well as multi-mode or single-mode fiber. TCF-142 converters are used to 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. You cannot transmit both RS-232 and RS-485 signals 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.

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.

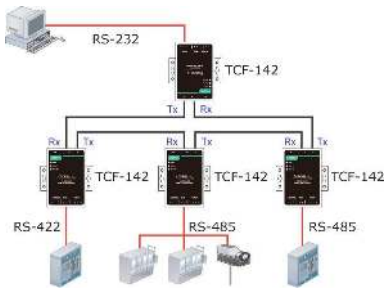
Reverse Power Protection

The Reverse Power Protection feature provides extra protection against accidentally connecting the power cables to the wrong terminal. The converter automatically detects which power wire is positive and which is negative.

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 on 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 either single-mode models (TCF-142-S) or multi-mode models (TCF-142-M).



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.

NOTE "Ring Mode" can only be used with half-duplex applications (i.e., RS-485 multi-drop communication).

DIP Switch Selectable Terminator

The 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 is compatible with any baudrate from 50 bps to 921.6 kbps. The TCF-142 automatically converts the signal back and forth between serial (RS-232, RS-422, or RS-485) and fiber, and does not need to interpret the signal or the baudrate of the transmitting device. For this reason, the TCF-142 does not have any DIP switches or jumpers for setting the baudrate.

Features

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

Package Checklist

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

- 1 TCF-142 media converter
- Power jack to 3-pin terminal block adaptor
- Stick-on pads
- Quick installation guide (printed)
- Warranty card

NOTE: Please notify your sales representative if any of the above items are missing or damaged.

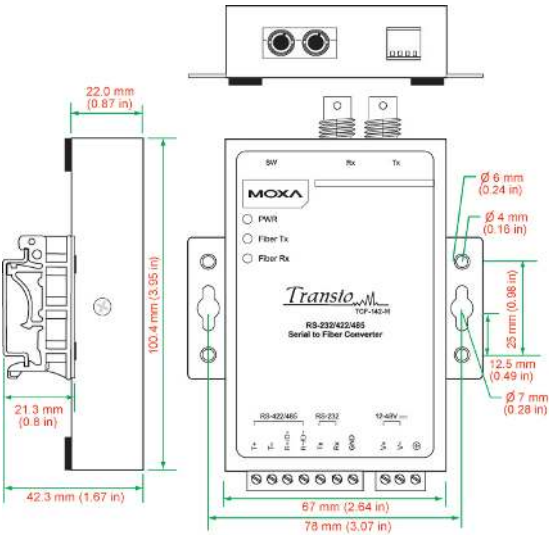
Dimensions and Appearance

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).

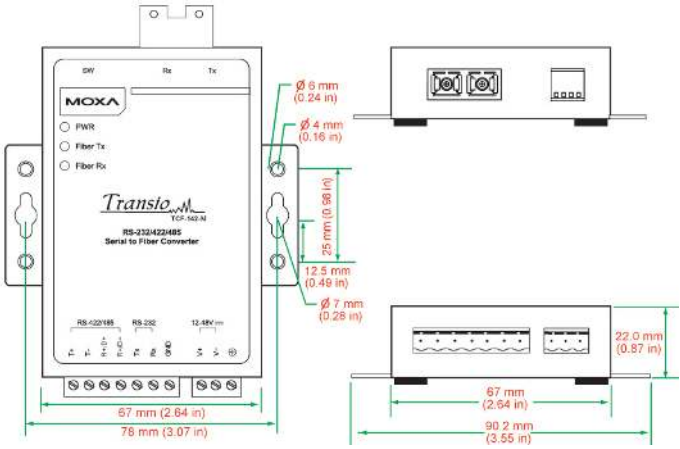
NOTE Electrostatic Discharge Warning!

To protect the product from damage due to electrostatic discharge, we recommend wearing a grounding device when handling your TCF-142.

TCF-142-M/S-ST



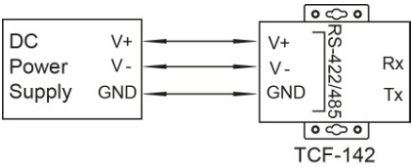
TCF-142-M/S-SC



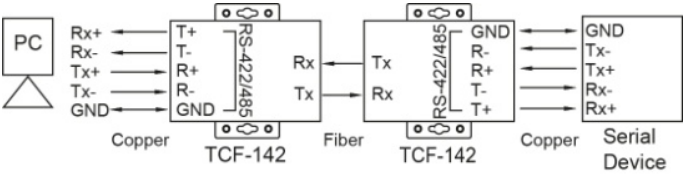
Wiring Examples

Connecting the Power Supply

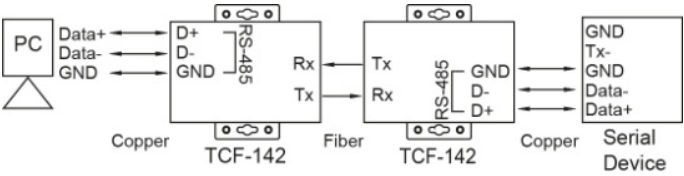
Before using the TCF-142, first connect the DC power supply to the power supply terminal block located on the TCF-142's bottom panel.



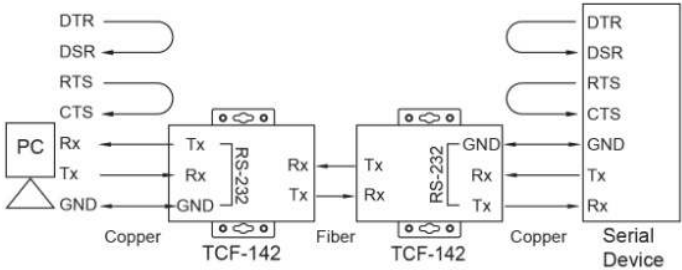
Connecting RS-422 and 4-wire RS-485 Serial Devices



Connecting 2-wire RS-485 Serial Devices



Connecting an RS-232 Serial Device to a PC



Switch Settings

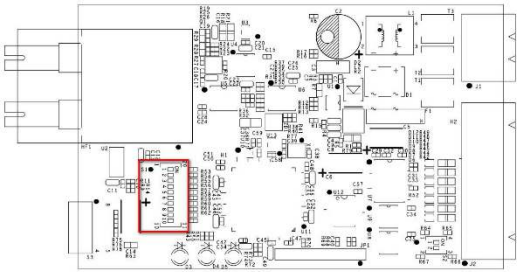


Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	ON	ON
RS-485 4-wire	OFF	OFF
RS-485 2-wire	OFF	ON

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

NOTE This switch setting is used for product revision 3.2 or later; for previous revisions, refer to the label on the product's rear panel for the correct information.

The S1 DIP Switch is located inside the TCF-142. When the TCF-142 is in RS-485 mode, use this DIP switch to configure RS-485 data direction control, data format, and baudrate. When the TCF-142 is in RS-232/422 mode, the S1 DIP switch cannot affect RS-232/422 communication.



RS-485 Data Direction Control Settings

RS-485 Data Direction Control	S1 Pin 1
Auto Baudrate	OFF
Fixed Baudrate	ON

Data Format Settings

Data Format	S1 Pin 2	S1 Pin 3	S1 Pin 4
7 Bits	OFF	ON	ON
8 Bits	ON	OFF	ON
9 Bits	OFF	OFF	ON
10 Bits	ON	ON	OFF
11 Bits	OFF	ON	OFF
12 Bits	ON	OFF	OFF

Baudrate Settings

Baudrate	S1 Pin 5	S1 Pin 6	S1 Pin 7	S1 Pin 8	S1 Pin 9
50	OFF	ON	ON	ON	ON
75	ON	OFF	ON	ON	ON
110	OFF	OFF	ON	ON	ON
134.5	ON	ON	OFF	ON	ON
150	OFF	ON	OFF	ON	ON
300	ON	OFF	OFF	ON	ON
600	OFF	OFF	OFF	ON	ON
1200	ON	ON	ON	OFF	ON
1800	OFF	ON	ON	OFF	ON
2400	ON	OFF	ON	OFF	ON
4800	OFF	OFF	ON	OFF	ON
7200	ON	ON	OFF	OFF	ON
9600	OFF	ON	OFF	OFF	ON
19200	ON	OFF	OFF	OFF	ON
38400	OFF	OFF	OFF	OFF	ON

Baudrate	S1 Pin 5	S1 Pin 6	S1 Pin 7	S1 Pin 8	S1 Pin 9
57600	ON	ON	ON	ON	OFF
115200	OFF	ON	ON	ON	OFF
230400	ON	OFF	ON	ON	OFF
460800	OFF	OFF	ON	ON	OFF
921600	ON	ON	OFF	ON	OFF

The S2 DIP switch is located inside the TCF-142. This switch is used to configure the pull high/low resistors. Note that S2 Pin 1 and Pin 2 must both be configured to ON or both must be configured to OFF.

Pull High/Low Resistor	S2 Pin 1*	S2 Pin 2*
150K	OFF	OFF
1K (default)	ON	ON

* These DIP switches are located inside the TCF-142.

NOTE We recommend setting S2 Pin 1 and Pin 2 to the 1K option (ON/ON) when termination is enabled.

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

Specifications

Model Names	TCF-142-M-ST	TCF-142-M-ST-T
	TCF-142-M-SC	TCF-142-M-SC-T
	TCF-142-S-ST	TCF-142-S-ST-T
	TCF-142-S-SC	TCF-142-S-SC-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	50 bps to 921.6 kbps	
Surge protection	15 kV ESD	
Fiber Communication		
Connector type	ST or SC	
Distance	TCF-142-S series: Single mode fiber for 40 km TCF-142-M series: Multi mode fiber for 5 km	
Cable Specifications	TCF-142-S series: 8.3/125, 8.7/125, 9/125 or 10/125 µm TCF-142-M series: 50/125, 62.5/125, or 100/140 µm	
Wavelength	TCF-142-S series: 1310 nm TCF-142-M series: 850 nm	
TX Output	TCF-142-S series: > -5 dBm TCF-142-M series: > -5 dBm	

RX Sensitivity	TCF-142-S series: -25 dBm TCF-142-M series: -20 dBm
Point-to-Point Transmission	Half or Full duplex
Ring Transmission	Half duplex
Environmental Limits	
Operating Temperature	0 to 60°C (32 to 140°F), 5 to 95 % RH
Extended Operating Temperature (T models)	-40 to 75°C (-40 to 167°F)
Storage Temperature	-40 to 75°C (-40 to 167°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	140 mA at 12 VDC 67.7 mA at 24 VDC 28.7 mA at 48 VDC
Physical Characteristics	
Dimensions	67 x 100 x 22 mm 90 x 100 x 22 mm (including ears)
Material	Aluminum (1 mm)
Gross Weight	320 g
Regulatory Approvals	
EMC	CE, FCC (Class A)
LVD	EN 60950-1
Safety	UL 60950-1
EMI	FCC Part 15 Subpart B Class B, EN 55032 Class B
EMS	EN61000-4-2 (ESD), Criteria B, Level 2 EN61000-4-3 (RS), Criteria B, Level 2 EN61000-4-4 (EFT), Criteria B, Level 2 EN61000-4-5 (Surge), Criteria B, Level 2 EN61000-4-6 (CS), Criteria B, Level 2