MOXA

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

Fourth Edition, December 2004

1. Overview

Introduction

TCF-142 series 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. TCF-142 converters are used to extend serial transmission distance up to 2 km (TCF-142-M, with multi-mode fiber) or up to 20 km (TCF-142-S, with single-mode fiber). TCF-142 must be configured to transmit a particular serial interface. I.e., 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 onto 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.

DIP Switch Selectable Terminator

For many products of this type, the termination resistor is set by a jumper located inside the product's casing, so that the user must open the casing to disable or change the resistor's strength. 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.

Auto Baud Rate Detection

TCF-142 incorporates a method for automatically detecting the serial signal's baud rate by hardware. This is an extremely convenient feature for the user. Even if a device's baud rate changes, the signal will still be transmitted through the converter without problem.

2. Features

- Extend RS-232/422/485 transmission distance:
  > up to 20 km with Single-mode—TCF-142-S
  > up to 2 km with Multi-mode—TCF-142-M
- Plug & Play
- Compact size
- Decrease signal interference
- Protect against electronic degradation and chemical corrosion
- Baud rate up to 230.4 Kbps

3. Package Checklist

Before installing 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. In general, you must purchase two TCF-142 converters. The serial terminal block of one of the converters connects to your computer, and the serial terminal block of the other converter connects to your serial device.

NOTE **Hot-Swappability**

TCF-142-S and TCF-142-M are hot-swappable. You may plug and un-plug the signal cables and wires when the converter is under power.

Electrostatic Discharge Warning!

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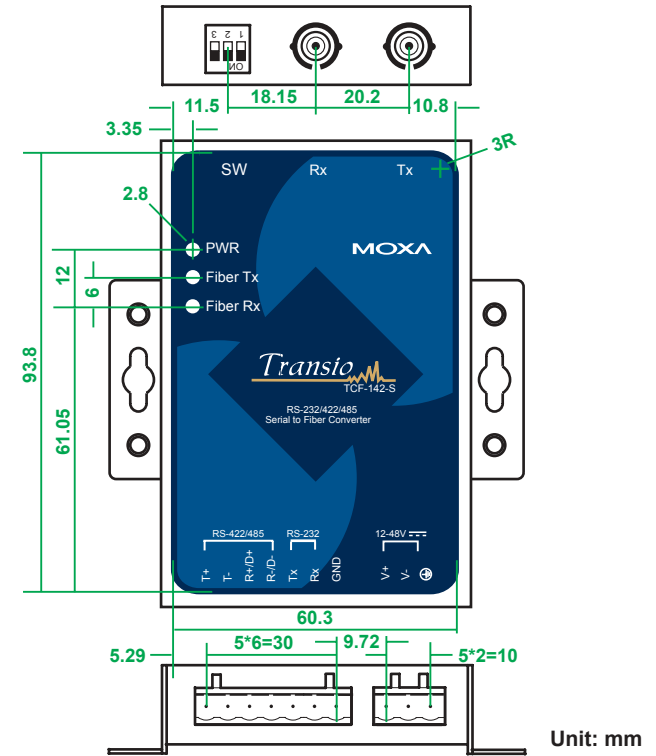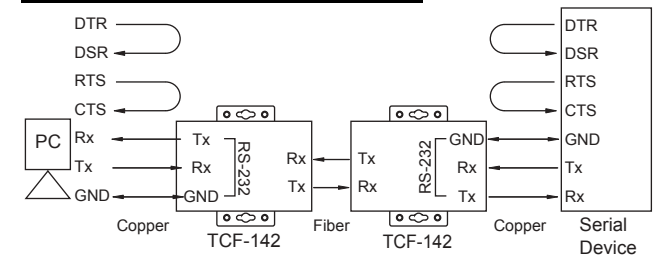

Unit: mm
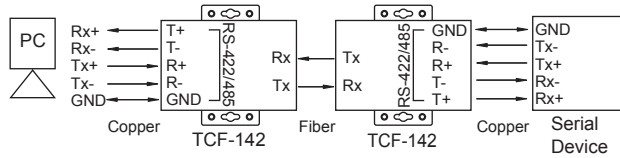
5. Wiring Examples

Connecting the Power Supply

Before using the TCF-142, you need to connect the power supply. To do so, connect the power supply to the power supply terminal block located on the bottom side of TCF-142. TCF-142 uses a DC power supply.

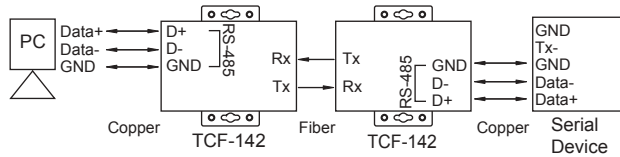### Connecting an RS-232 Serial Device to a PC

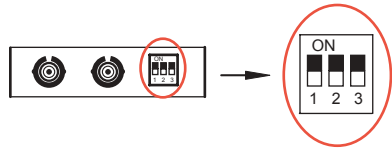## Connecting an RS-422 or 4-wire RS-485 Serial Device to a PC

Connecting a 2-wire RS-485 Serial Device to a PC

6. Switch Settings

There are 3 DIP switches on the top end of TCF-142. SW1 and SW2 are used to set the serial interface. SW3 is used to enable or disable the 120Ω termination resistor.
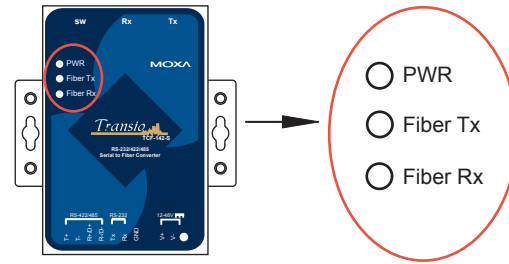

Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	OFF	OFF
RS-485 4-wire	OFF	OFF
RS-485 2-wire	OFF	ON

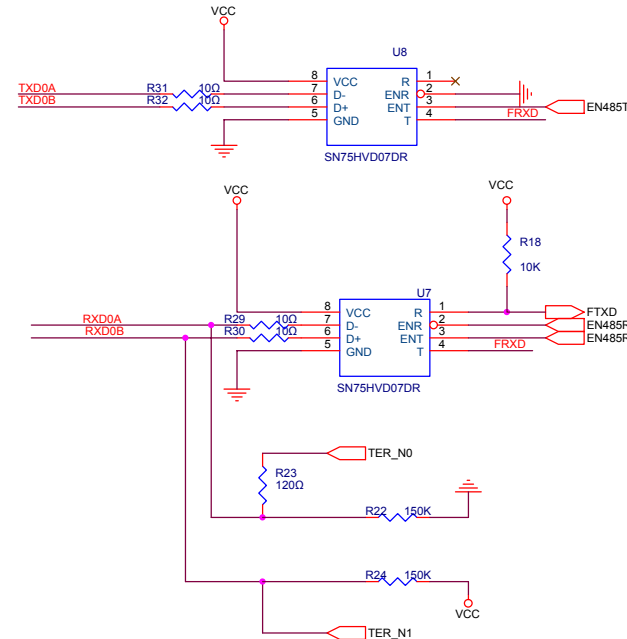| Built-in 120 Ω Terminator	SW3
Enable	ON
Disable	OFF

7. LED Description

There are 3 LEDs on the front panel of 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. RS-422/485 Circuit Diagram

9. Specifications

Model Name	TCF-142-S, TCF-142-M
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
Baud Rate	300 bps to 230.4 Kbps
Surge protection	15 KV ESD

Fiber Communication	
Connector type	ST
Distance	TCF-142-S: Single mode fiber for 20 km TCF-142-M: Multi mode fiber for 2 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

Wave length	TCF-142-S: 1310 nm TCF-142-M: 820 nm
Min.TX Output	TCF-142-S: -9 dBm TCF-142-M: -16 dBm
Max.TX Output	TCF-142-S: -6 dBm TCF-142-M: -7 dBm
Environmental	
Operating Temperature	0 to 60°C (32 to 142°F), 5 to 95 % RH
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	TCF-142-M: 70 mA at 12 VDC TCF-142-S: 145 mA at 12 VDC
Mechanical	
Dimensions (WxDxH)	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