TCF-142-RM Series
Quick Installation Guide

Version 6.2, May 2021

Technical Support Contact Information
www.moxa.com/support

P/N: 1802001420644

Overview

Introduction

The TCF-142-RM series fiber converters are slide-in modules that can be installed in the NRack System's rackmount chassis, such as the TRC-190 series. The slide-in module is 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-RM series slide-in modules are used to extend serial transmission distance up to 5 km (TCF-142-M-XX-RM, with multi-mode fiber) or up to 40 km (TCF-142-S-XX-RM, with single-mode fiber).

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.

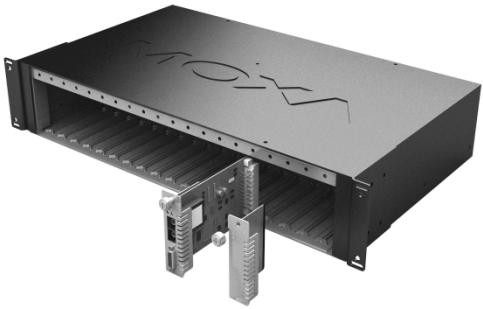
No Configuration Required for Baudrate Settings

The TCF-142-RM slide-in modules work under any baudrate from 50 bps to 921.6 Kbps. The TCF-142-RM slide-in modules simply convert the signal back and forth between serial (RS-232, RS-422, or RS-485) and fiber, and since the TCF-142-RM slide-in modules do not need to interpret the signal, it does not need to know the baudrate of the transmitting device. For this reason, the TCF-142-RM slide-in modules do not have any DIP switches or jumpers for setting the baudrate.

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-RM slide-in modules for "ring mode" by setting DIP switch "SW3" to the "On" position. The Tx port of a particular TCF-142-RM slide-in modules 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 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 or multi-mode models.

Installation



The media converter slide-in module can be hot-swapped, which means the chassis doesn't have to power off or be removed during installation. Align the slide-in module with the chassis installation slot so that the panel fastener screw is at the top of the module. Carefully slide the slide-in module into the slot while aligning the module's circuit board with the installation guide. Ensure the slide-in module is firmly seated inside the chassis. Push in and rotate the attached panel fastener screw clockwise to secure the module to the chassis.

Features

- "Ring" or "Point to Point" transmission
- Extend RS-232/422/485 transmission distance:
  - up to 40 km with single-mode—TCF-142-S-XX-RM slide-in modules series
  - up to 5 km with multi-mode—TCF-142-M-XX-RM slide-in modules series
- Slide-in modules of NRack system
- Decrease signal interference
- Protect against electrical degradation and chemical corrosion
- Support baudrate up to 921.6 Kbps

Package Checklist

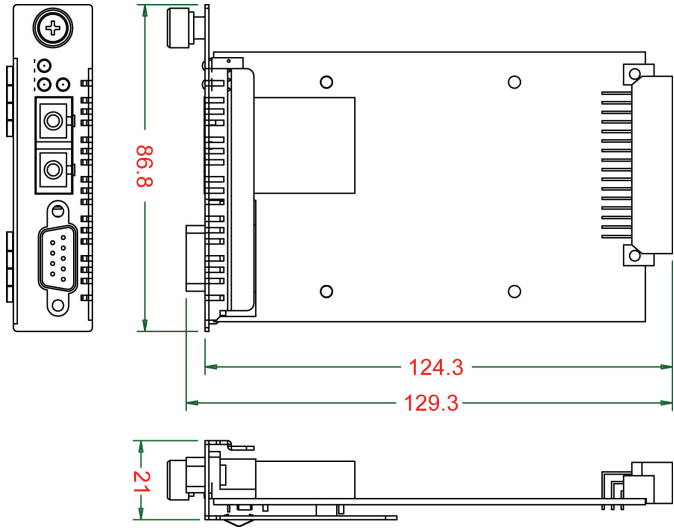
Before installing the TCF-142-RM slide-in module, verify that the package contains the following items:

- TCF-142-RM slide-in module Fiber Converter
- Quick Installation Guide
- Warranty Card

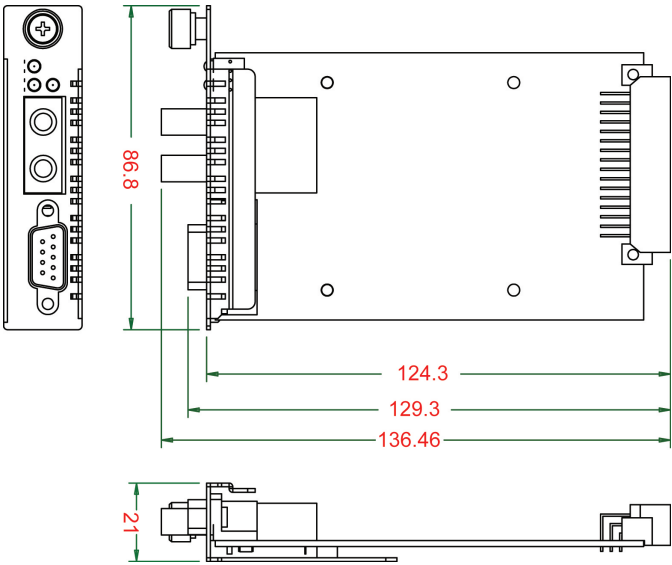
NOTE: Please notify your sales representative if any of the above items are missing or damaged.

Mounting Dimensions (Unit: mm)

TCF-142-SC



TCF-142-ST



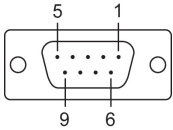
ATTENTION

Electrostatic Discharge Warning!

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

Pin Assignment and Connector

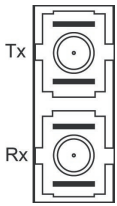
9-pin D-sub Female



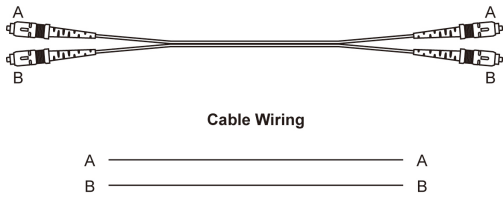
Pin	RS-232	RS-422/485-4w	RS-485-2w
1	–	RxD-(A)	Data-(A)
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	–	TxD-(A)	–
5	GND	GND	GND
6	–	–	–
7	–	–	–
8	–	–	–
9	–	–	–

Fiber Cable

SC-Port Pinouts

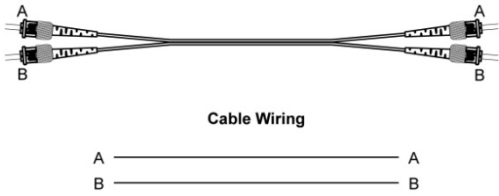


SC-Port to SC-Port Cable Wiring



ST-Port Pinouts

ST-Port to ST-Port Cable Wiring

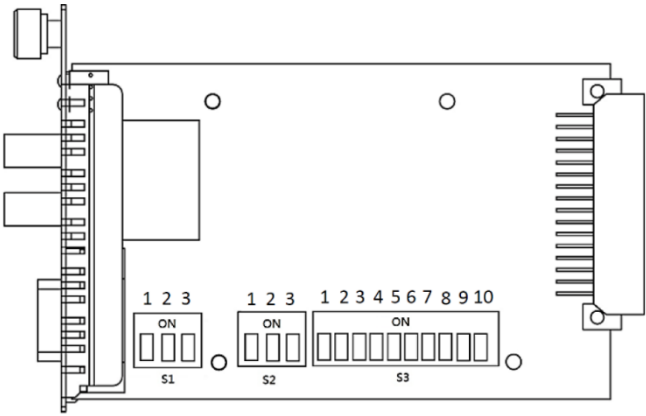


ATTENTION

This is a Class 1 Laser/LED product. Do not stare into the Laser Beam.

Switch Settings

There are three sets of DIP switches on the board. One set for fiber and another for the connector. Following are the settings for the three connector DIP switches.



S1	Pin 1 Pull High	Pin 2 Pull Low	Pin 3 Terminator
150 kilo-ohms	OFF	OFF	-
1 kilo-ohm	OFf	ON (Default)	-
120 ohms (enable)	-	-	ON
120 ohms (disable)	-	-	OFF

ATTENTION

For Fiber Ring Users:

Before you plug the slide-in module into the chassis, make sure the DIP switch settings are correct before inserting the slide-in module into the chassis and connecting the serial and fiber cables. If the Rx LEDs of the converter glow continuously, remove the fiber cable and reconnect.

NOTE "Ring Mode" can only be used for half-duplex applications.

The settings for the RS-485 DIP switches are:

S2	Pin1	Pin 2	Pin 3
RS-232	ON	ON	-
RS-422	ON	OFF	-
RS-485 (4W)	OFF	OFF	-
RS-485 (2W)	OFF	ON	-
Ring	-	-	ON
Point to Point	-	-	OFF

The S3 DIP Switch is located inside the TCF-142-RM. When the TCF-142-RM is in RS-485 mode, use this DIP switch to configure RS-485 data direction control, data format, and baudrate. When the TCF-142-RM is in RS-232/422 mode, the S3 DIP switch cannot affect RS-232/422 communication.

RS-485 Data Direction Control Settings

RS-485 Data Direction Control	S3 Pin 1
Auto Baudrate	OFF
Fixed Baudrate	ON

Data Format Settings

Data Format	S3 Pin 2	S3 Pin 3	S3 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

The serial data format includes one start bit, between five and eight data bits, and one stop bit. A parity bit and an additional stop bit might be included in the format as well.

For example, 8-N-1 is interpreted as eight data bits, no parity bit, and one stop bit. Users need to adjust the DIP switch to set the data format to 10 bits.

Baudrate	S3 Pin 5	S3 Pin 6	S3 Pin 7	S3 Pin 8	S3 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
57600	OFF	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

LED Indicators

There are three LEDs on the front bracket of the TCF-142-RM slide-in modules.

LED	Color	Function
PWR	Green	Steady ON: Power is ON
Fiber Tx	Green	When sending serial data from the fiber port
Fiber Rx	Yellow	When receiving data from the fiber port

Specifications

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
ESD protection	15 KV ESD
Fiber Communication	
Connector type	ST or SC
Distance	Single mode fiber for 40 km Multi-mode fiber for 5 km
Support Cable	
Single mode:	8.3/125, 8.7/125, 9/125 or 10/125 μm
Multimode:	50/125, 62.5/125, or 100/140 μm
Wavelength	Single mode: 1310 nm Multimode: 850 nm
TX Output	Single mode: > -5 dBm Multimode: > -5 dBm
RX Sensitivity	Single mode: -25 dBm Multimode: -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
Storage Temperature	-20 to 75°C (-4 to 185°F), 5 to 95 % RH
Power	
Input Power Voltage	12 VDC
Power Consumption	150 mA @ 12V
Mechanical	
Dimensions (W × D × H)	86.8 × 136.46 × 21 mm
Material	SPCC
Gross Weight	80 g
Regulatory Approvals	
CE	Class A
FCC	Part 15 sub part B Class A
EMS	EN 61000-4-2 (ESD): Contact: 4 kV; Air: 8 kV EN 61000-4-3 (RS): 80 MHz to 1 GHz: 3 V/m EN 61000-4-4 (EFT): Power: 1 kV; EN 61000-4-5 (Surge): Power: 2 kV (AC Power); Power: 1 kV (DC Power). EN 61000-4-6 (CS): 150 kHz to 80 MHz: 3 V/m EN 61000-4-8 (PFMF) EN 61000-4-11 (DIPS)
Free fall	IEC 60068-2-32