

# TCF-90

## Quick Installation Guide

---

**Version 1.0, June 2020**

### **Technical Support Contact Information** **[www.moxa.com/support](http://www.moxa.com/support)**

Moxa Americas:

Toll-free: 1-888-669-2872

Tel: 1-714-528-6777

Fax: 1-714-528-6778

Moxa China (Shanghai office):

Toll-free: 800-820-5036

Tel: +86-21-5258-9955

Fax: +86-21-5258-5505

Moxa Europe:

Tel: +49-89-3 70 03 99-0

Fax: +49-89-3 70 03 99-99

Moxa Asia-Pacific:

Tel: +886-2-8919-1230

Fax: +886-2-8919-1231

Moxa India:

Tel: +91-80-4172-9088

Fax: +91-80-4132-1045



© 2020 Moxa Inc. All rights reserved.

**P/N: 1802000900012**



## Overview

### Introduction

TCF-90 is a compact size, high-speed RS-232 to Optic Fiber converter which handles the extension of RS-232 transmission from simply 15 meters to 5 km (TCF-90-M, multi-mode) or 40 km (TCF-90-S, single-mode) without supplying external power to it. The TCF-90 series is designed to drain the power from the attached serial port. It allows two RS-232 serial devices to connect to each other in full duplex transmission via the reliable optic fiber. Moreover, the TCF-90 isolates the devices from the dangerous ground potential rise, ground loops, and also the electrical EMI/RFI noise. It greatly reduces RF radiation and susceptibility. Data security is also enhanced by almost nonexistent electromagnetic emissions.



### Package Checklist

Before installing the TCF-90, verify that the package contains the following items:

- TCF-90
- USB Power Cord
- Quick Installation Guide

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

### Applications

- Point-to-point data communication
- Factory automation
- Remote serial device control
- Building security automation
- Critical industrial control

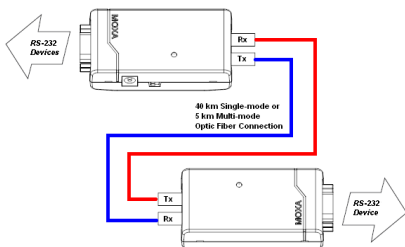
### Specifications

Serial Communications	
Serial Interface	RS-232
RS-232 Signals	TxD, RxD and GND
RS-232 Loopback	RTS to CTS; DTR to DSR and also DCD
Port Types	DB9 Female
Baudrate	300 bps to 115.2 Kbps
Fiber Communications	
Connector Type	ST type

Optic Fiber Interfaces	Multi/Single-mode
Optic Fiber Transmit Distance	TCF-90-S Multi-mode: 40 km TCF-90-M Single-mode: 5 km
Wavelength	TCF-90-S: 1310 nm TCF-90-M: 850 nm
TX Output	Single mode: 0 to -5 dBm Multimode: 0 to -5 dBm
RX Sensitivity	Single mode: 0 to -25 dBm Multimode: 0 to -20 dBm
<b>Environmental</b>	
Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 75°C (-4 to 167°F)
<b>Power</b>	
Ext. Power (jack)	5 to 12 VDC adapters or a USB Power cord (DC +5V)
Serial Power Source	TxD, RTS and DTR; (RTS/DTR ON are recommended)
Power Consumption	5 to 12 VDC 20 mA(max.)
<b>Mechanical</b>	
Dimensions (W × D × H)	42 × 80 × 22 mm
Housing	Plastic (ABS + PC)
Gross Weight	50 ± 5 g
<b>Regulatory Approvals</b>	
EMC	CE, FCC Class B approval
<b>Warranty</b>	
Warranty	5 years

## Typical Applications

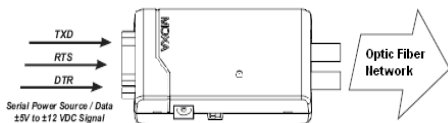
Connecting TCF-90 to the RS-232 devices is simple. At the RS-232 side, it is easy to connect to the host computer or the serial port of a device. The ST type optic fiber connector is designed especially for the inter/intra building applications, security, data communication and also the industrial applications. Typical connection is as follows,



## Serial RS-232 Port Power

The RS-232 port of TCF-90 is designed with a female DB9 socket to connect directly to the host PC, with power drawn from the TxD, RTS, and DTR lines. Although the TCC-80I is able to obtain enough power from the combination of the three Data/Handshake lines regardless of whether the signal is high or low, it is highly recommended to have the "ON" signal on either the RTS or DTR. For those applications that do not

use the handshake lines, a DC jack is provided for connecting a 5 to 12 VDC power supply via a USB power cord or external power adaptor.



## Port Power Dissipation

When installing an RS-232 port-powered TCF-90 converter, pay attention to the power consumption, RS-232 cable length, and the power provided by the serial port. In general, TCF-90 itself derives 70 mW from the power source; a standard COM port on a host PC can provide 70 to 90 mW of power if the TxD, RTS, and DTR lines are connected.

Moreover, the RS-232 cable length should be shorter than 15 m (@ 9600 bps) to ensure that less power is lost from the host/device to the TCF-90. The rest of the supplied power is used for transmitting the Optic fiber signal.

## Serial Port Power Compatibility

There are various kinds of serial ports that use diverse interface chips. The power provided by those ports are not always the same, and some of them do not even have enough power to activate the TCF-90.

Usually, the on-board COM1 and COM2 ports seldom have problems. The table shows the add-on cards and the Serial-to-Ethernet Device Servers that have been well tested as a good power source to drive the TCF-90 when their RTS/DTR is connected and at the "ON" status.

### RTS/DTR is ON

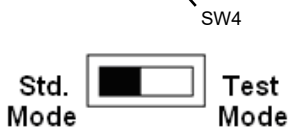
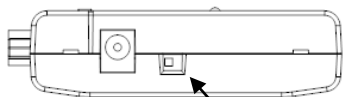
Multiport Serial Board	Serial Device Server
Moxa Smartio CP-118U CP-168U V2 CP-104U V2 CP-102U	Moxa NPort 5110/5210 V2.1 5410 V2.2 5610 V3.0 (or later)
Moxa Smartio CP-118EL Series CP-168EL Series CP-104EL Series	Moxa USB to Serial UPort 1410/1610
	Moxa USB NPort U1110

## LED Port Power Indicator

The best way to ensure the attached serial port does provide enough electricity to the TCF-90 is to check the power indicator LED at the front panel. Attach the TCF-90 to the target RS-232 Port, turn the SW4 at the side to the "Test" mode, it will be so easy to distinguish if the power is OK or not by checking the LED status. ON means OK and in the

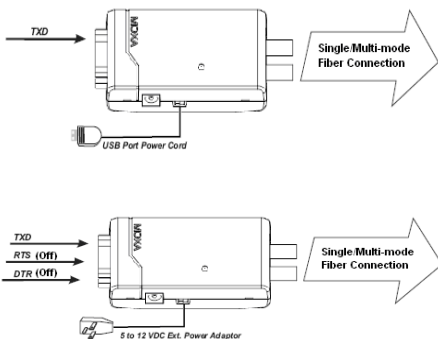
opposite, please attach the external power to the TCF-90 when the LED is OFF.

**NOTE** Please turn the SW4 back to "Std." mode (default) when finishing the test. During the "Test" mode, TCF-90 WILL NOT perform any data transmission.



## Optional External Power

In most circumstances, TCF-90 should be working without ext. power if RTS/DTR is connected. For those application that the host does not have the handshake lines available, or the both RTS/DTR are at "OFF" states in which the interface chip of the attached serial port provides less power than the general ones, an external USB power cord or DC power supply should be used.



In short, performing the "LED Port Power Indicator" test is recommended to verify if the power source is enough.

## Ext. Power Supply

If additional external power is required, TCF-90 is designed to be connected to a standard 5 to 12 VDC power adapter.

## RS-232 Pinouts

The DB9 Female port for the RS-232 signal is shown in the following figure.

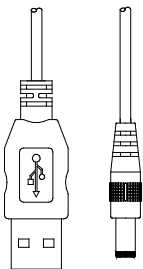
PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

Diagram showing shorted pin groups: pins 1, 2, and 3 are shorted; pins 4, 5, and 6 are shorted; pins 7 and 8 are shorted.

**NOTE** Each group of (RTS, CTS; DTR, DSR and DCD) pins are shorted, freeing users from the hardware flow control cable wiring problem.

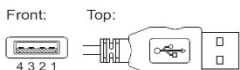
## USB Power Cord

If additional external power is required, TCC-80 is designed to be connected to a standard 5 to 12 VDC Power Supply, or an USB Power Cord "CBL-USBAP-50"

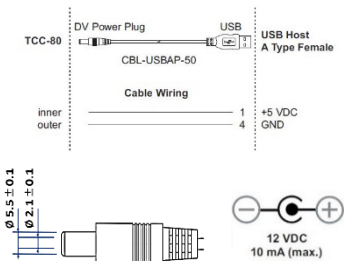


## USB "A" Male Connector

Connector Pinouts	Signals
1	+5 VDC
2	-
3	-
4	GND



TCF-90  
USB Connector



**NOTE** The optical transceiver is a class 1 laser product. The optical transceiver complies with FDA performance standards for laser products, except IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019. In order to meet laser safety requirements, the transceiver shall be operated within the Absolute Maximum Ratings.



### WARNING

All adjustments have been done at the factory before the shipment of devices. No maintenance or user serviceable part is required. Tampering with or modifying the performance of the device will result in a voided product warranty. If any of the controls are adjusted, or any procedures altered other than those specified herein, may result in hazardous radiation exposure.



### WARNING

Class 1 laser products comply with 21 CFR 1040.10 and 1040.11, except for conformance with IEC 60825-1 Ed. 3., as described in laser Notice No.56 dated May 8, 2019.