TCF-90 Series

Port-powered RS-232 to fiber converters

- Use either external power or power over serial
- Extends RS-232 transmission up to:
  - 40 km with single-mode—TCF-90-S
  - 5 km with multi-mode—TCF-90-M
- Reduces signal interference
- Protects against electrical interference or chemical corrosion
- Compact size

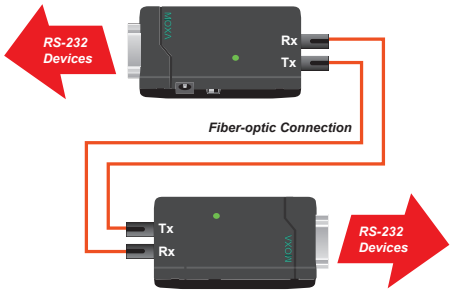
Specifications

The TCF-90 is a compact media converter that transmits RS-232 signals over optical fiber. Power is derived from either the serial port or an external power source. The TCF-90 extends RS-232 transmission up to 5 km with multi-mode fiber, or up to 40 km with single-mode fiber. A pair of TCF-90 converters can be used to connect two RS-232 devices with optical fiber in full-duplex mode. The optical fiber isolates the data signals from dangerous increases in ground potential, ground loops, and electrical EMI/RFI noise, and it enhances data security by eliminating the harmful effects of RF radiation and susceptibility to electromagnetic radiation.

Self-powered RS-232 to Optical Fiber

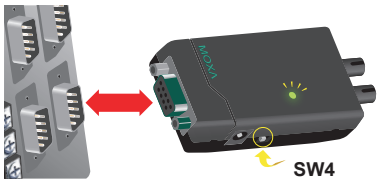
Connecting RS-232 devices to the TCF-90 is easy. The ST-type optical-fiber connector is designed especially for data communication applications that transmit data either between or within buildings. The TCF-90 can be used for industrial applications and for applications that require secure data transfer.

The RS-232 port on the TCF-90 uses a DB9 female socket to connect directly to the host PC, with power drawn from the TxD, RTS, and DTR lines. Although the TCF-90 can obtain enough power from the three data/handshake lines, whether the signal is high or low, we strongly recommend setting either the RTS or DTR signal to ON.



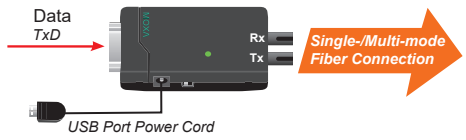
LED Port Power Indicator

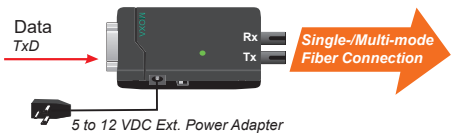
It's easy enough to use a multimeter to test if the serial device is supplying the TCF-90 with enough power through the serial connection, but why bother when the TCF-90 can do the testing for you? Connect the TCF-90 to the device's RS-232 port and set the SW4 switch to Test mode. If the port power LED indicator lights up, the TCF-90 is receiving enough power. If the LED does NOT light up, you will need to attach an external power source to the TCF-90.



Optional External Power Source

In most circumstances, the TCF-90 should be able to operate without using an external power source. However, an external USB power cord or DC power supply can be used in situations where the handshake lines are not available, both the RTS/DTR signals are set to OFF, or the attached device's serial interface chip provides less power than required.





Specifications

Optical-Fiber Side

Fiber Connector: ST

Fiber Cable Requirements:

Low-Speed Fiber Module		Multi-Mode	Single-Mode
Fiber Cable Requirements		50/125 µm, 800 MHz 62.5/125 µm, 500 MHz	G.652
Typical Distance		5 km	40 km
Wave-length	Typical (nm)	850	1310
	TX Range (nm)	840 to 860	1290 to 1330
	RX Range (nm)	800 to 900	1100 to 1650
Optical Power	TX Range (dBm)	0 to -5	0 to -5
	RX Range (dBm)	0 to -20	0 to -25
	Link Budget (dB)	15	20
	Dispersion Penalty (dB)	1	1

Note: When using a power meter to measure the fiber TX power, set the baudrate to 9,600 bps and send data (00, …, 0h) to the serial converter's serial port.

RS-232 Side

Connector: DB9 female

Signals:

RS-232 Tx, Rx, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)

Baudrate: 300 bps to 115.2 kbps

Physical Characteristics

Housing: ABS + PC

Dimensions: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)

Weight: 150 g (0.33 lb)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -20 to 75°C (-4 to 167°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Source of Input Power: RS-232 port (TxD, RTS, DTR) or power input jack

Input Voltage: 5 to 12 VDC

Input Current: 20 mA @ 5 VDC (with termination disabled)

Standards and Certifications

Safety: UL 60950-1

EMC: EN 55032/24

EMI: CISPR 32, FCC Part 15B Class B

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: 0.5 kV; Signal: 0.5 kV

EN 61000-4-5 (Surge): Power: 2 kV; Signal: 1 kV

EN 61000-4-6 (CS): 150 kHz to 80 MHz: 3 V/m

EN 61000-4-8 (PFMF)

Green Product: RoHS, CRoHS, WEEE

MTBF (mean time between failures)

Time: 2,272,562 hrs

Standard: MIL-HDBK-217F

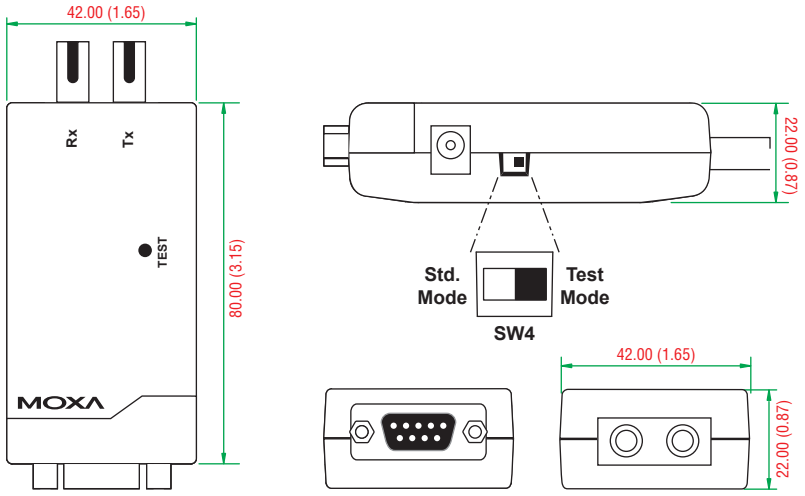
Warranty

Warranty Period: 5 years

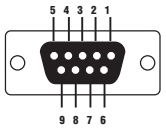
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



DB9 female connector



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

Ordering Information

Available Models

TCF-90-M: Port-powered RS-232 to multi-mode optical-fiber converter with ST connector for 5 km transmission

TCF-90-S: Port-powered RS-232 to single-mode optical-fiber converter with ST connector for 40 km transmission

Note: Models with SC/FC connectors or a 60 km range are available by request.

Optional Accessories (can be purchased separately)

Power Adapter: See Appendix A for details

CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist

- 1 TCF-90 series media converter
- USB power cord, 50 cm
- Quick installation guide
- Warranty card