



Media Converters

Product Selection Guides

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Media Converters



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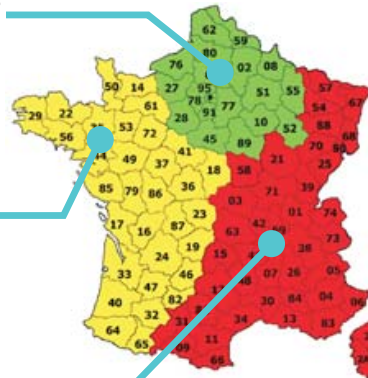
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Votre interlocuteur



Groupe **2AR**

Serial-to-Fiber Converter Selection Guide



	TCF-142-M-SC/ 142-M-SC-T	TCF-142-M-ST/ 142-M-ST-T	TCF-142-S-SC/ 142-S-SC-T	TCF-142-S-ST/ 142-S-ST-T	TCF-90-M	TCF-90-S
RS-232/422/485 Side						
Connector	Terminal Block				DB9 female	
RS-232 Signals	Tx, Rx, GND				Tx, Rx, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)	
RS-422/485-4w Signals	TxD+, TxD-, RxD+, RxD-, GND				---	---
RS-485-2w Signals	Data+, Data-, GND	Data+, Data-, GND	Data+, Data-, GND	Data+, Data-, GND	---	---
Baudrate	300 bps to 921.6 Kbps					
15 KV ESD Protection	√	√	√	√	√	√
Optical Fiber Side						
Fiber Connector	SC	ST	SC	ST	ST	ST
Single-mode	---	---	√	√	---	√
Multi-mode	√	√	---	---	√	---
Cable Requirements	50/125, 62.5/125, or 100/140 μm		8.3/125, 8.7/125, 9/125, or 10/125 μm		50/125, 62.5/125, or 100/140 μm	8.3/125, 8.7/125, 9/125, or 10/125 μm
Transmission Distance	5 km		40 km		5 km	40 km
Wavelength	820 nm		1310 nm		850 nm	1310 nm
Tx Output	> -5 dBm					
Rx Sensitivity	-20 dBm		-25 dBm		-20 dBm	-24 dBm
Point-to-Point Transmission			Half-duplex or full-duplex		√	√
Ring Transmission	Half-duplex				√	√
Physical Characteristics						
Case	Aluminum (1 mm)				ABS + PC	
Dimensions	67 x 100 x 22 mm (2.64 x 3.94 x 0.87 in)				42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)	
Environmental Limits						
Operating Temperature	Standard Models: 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)				0 to 60°C (32 to 140°F)	
Operating Humidity	5 to 95% RH				5 to 95% RH	
Storage Temperature	-40 to 85°C (-40 to 185°F)				-20 to 75°C (-14 to 167°F)	
Power Requirements						
Source of Input Power	Detachable terminal				RS-232 port (TxD signal) or power input jack	
Input Voltage	12 to 48 VDC					
Power Consumption	140 mA @ 12 V				20 mA @ 5 V (with termination disabled)	
Power Line Protection	Burst: 2 KV Surge: 2 KV				√	√
Voltage Reversal Protection	Protects against V+/V- reversal				√	√
Over Current Protection	1.1 A (protects against two signals shorted together)				√	√
Regulatory Approvals						
UL/CUL	UL60950-1				√	√
CE	√	√	√	√	Class B	
TÜV	EN60950-1				√	√
FCC	Part 15 Subclass B				Class B	
EMI	EN55022 1998, Class B				√	√
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-11 (DIPS) [Criteria A, Level 2]				√	√
Reliability						
Warranty	5 years (see www.moxa.com/warranty)					

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Media Converters > Serial-to-Fiber Converter Selection Guide

Serial-to-Serial Converter Selection Guide



	TCC-100	TCC-100I	TCC-80-DB9	TCC-80	TCC-80I-DB9	TCC-80I
RS-232 Side						
Connector: DB9 female	DB9 female					
Signals: RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND	Signals: RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND		Signals: RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)			
RS-422/485 Side						
Connector	DB9 male		DB9 male	Terminal Block	DB9 male	Terminal Block
Signals (interface selected by DIP switch)	RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w Signals: Data+, Data-, GND					
ADDC®	---	---	√	√	√	√
Serial Transmission						
Baudrate	300 bps to 921.6 Kbps		300 bps to 115.2 Kbps			
15 KV ESD Protection	√	√	√	√	√	√
Optical Isolation Protection	---	2 KV	---	---	2.5 KV	---
Pull High Resistance of 1k ohm	√	√	√	√	√	√
Pull Low Resistance of 150k ohm	√	√	√	√	√	√
Physical Characteristics						
Case	Aluminum		ABS + PC			
Weight	148 ± 5 g		50 ± 5 g			
Dimensions	67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)		42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)			
Environmental Limits						
Operating Temperature	20 to 60°C (-4 to 140°F)	20 to 60°C (-4 to 140°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)	0 to 60°C (32 to 140°F)
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 85°C (-14 to 176°F)	-20 to 85°C (-14 to 176°F)	-20 to 85°C (-14 to 176°F)	-20 to 85°C (-14 to 176°F)	-20 to 85°C (-14 to 176°F)	-20 to 85°C (-14 to 176°F)
Power Requirements						
Power over RS-232	√	√	√	√	√	√
Power Jack	√	√	√	√	√	√
Input Voltage	12 to 48 VDC		5 to 12 VDC			
Power Consumption	300 mA @ 12 V	400 mA @ 12 V	20 mA @ 5 V (with termination disabled)			
Power EFT/ Surge Protection	√	√	---	---	---	---
Voltage Reversal Protection	√	√	---	---	---	---
Over Current Protection	√	√	---	---	---	---
Regulatory Approvals						
CE, FCC	Class B					
Warranty						
Warranty	5 years (see www.moxa.com/warranty)					

Serial Repeater and Isolator Selection Guide



	TCC-120	TCC-120I	TCC-82
Serial Communication			
Connectors	Terminal Block on both ends		DB9 male and DB9 female
Baudrate	300 bps to 230.4 Kbps		300 bps to 115.2 Kbps
Signals	RS-422/485-4w: TxD+, TxD-, RxD+, RxD- RS-485-2w: Data+, Data-		RS-232: TxD, RxD, RTS, CTS (Loop-back wiring: DTR to DSR and DCD)
ADDC®	√	√	---
15 KV ESD Protection	√	√	√
Optical Isolation Protection	---	2 KV	4 KV
Physical Characteristics			
Case	Aluminum		ABS
Weight	148 ± 5 g		60 ± 5 g
Dimensions	67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)		42 x 80 x 23.6 mm (1.65 x 3.15 x 0.93 in)
Environmental Limits			
Operating Temperature	-20 to 60°C (-4 to 140°F)		0 to 60°C (32 to 140°F)
Operating Humidity	5 to 95% RH		
Storage Temperature	-20 to 85°C (-14 to 176°F)		
Power Requirements			
Power over RS-232	√	√	√
Power Jack	√	√	√
Input Voltage	12 to 48 VDC		5 to 12 VDC
Power Consumption	98 mA @ 12 V, 1.18 W	234 mA @ 12 V, 2.81 W	20 mA @ 5 V
Voltage Reversal Protection	√	√	---
Over Current Protection	√	√	---
Regulatory Approvals			
CE, FCC	Class B		
Warranty			
Warranty	5 years (see www.moxa.com/warranty)		

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Media Converters > Serial Repeater and Isolator Selection Guide



TCF-142 Series

RS-232/422/485 to optical fiber media converters



- > “Ring” and “Point-to-Point” transmission
- > Profibus and GE Genius bus compatible models available
- > Extends RS-232/422/485 transmission up to:
 - 40 km with single-mode—TCF-142-S
 - 5 km with multi-mode—TCF-142-M
- > Compact size
- > Decreases signal interference
- > Protects against electrical interference and chemical corrosion
- > Supports baudrates of 300 bps to 921.6 Kbps (can be upgraded to 20 Mbps)
- > Wide temperature models available (-40 to 75°C)



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 Media Converters > TCF-142 Series

Introduction

The TCF-142 media converter 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. TCF-142 converters are used to extend serial transmission 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 can be configured to convert either RS-232 signals, or RS-422/485 signals, but not both at the same time.

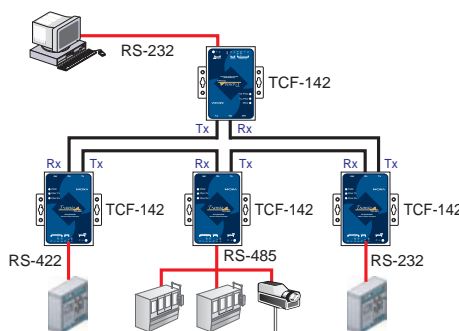
Automatic Baudrate Detection

The TCF-142 can automatically detect the serial baudrate. This is an extremely convenient feature. Even if a device's baudrate is changed,

the signal will still be transmitted through the media converter without any data loss.

Ring Operation

The TCF-142 can be used to connect serial devices to a fiber ring. To form the ring, connect the Tx port of one TCF-142 to the Rx port of a neighboring converter. Once the ring is set up, simply use the DIP switches to configure the TCF-142 converters for “ring mode.” 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. With the TCF-142, you can set up fiber rings that have a total circumference of up to 100 km.



Automatic Data Direction Control (ADDC®)

ADDC® is a patented hardware data flow solution developed by Moxa to handle RS-485 data direction control. ADDC® senses and controls

RS-485 data direction automatically, making it unnecessary to use the hand shaking signal.

Specifications

RS-232/422/485 Side

Connector: Terminal Block

RS-232 Signals: Tx, Rx, GND

RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND

RS-485-2w Signals: Data+, Data-, GND

Baudrate: 300 bps to 921.6 Kbps

ESD Protection: 15 KV for all signals

Optical Fiber Side

Fiber Connector: SC or ST

Cable Requirements:

Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm

Multi-mode: 50/125, 62.5/125, or 100/140 μm

Transmission Distance:

Single-mode: 40 km

Multi-mode: 5 km

Wavelength:

Single-mode: 1310 nm

Multi-mode: 820 nm

Tx Output:

Single-mode: > -5 dBm

Multi-mode: > -5 dBm

Rx Sensitivity:

Single-mode: -25 dBm

Multi-mode: -20 dBm

Point-to-Point Transmission: Half-duplex or full-duplex

Ring Transmission: Half-duplex

Physical Characteristics

Case: Aluminum (1 mm)

Dimensions:

Without ears: 67 x 100 x 22 mm (2.64 x 3.94 x 0.87 in)

With ears: 90 x 100 x 22 mm (3.54 x 3.94 x 0.87 in)

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements

Input Voltage: 12 to 48 VDC

Power Consumption: 140 mA @ 12 V

Power Line Protection:

2 KV Burst (EFT), EN61000-4-4

2 KV Surge, EN61000-4-5

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: 1.1 A (protects against two signals shorted together)

Regulatory Approvals

UL/CUL: UL60950-1

TÜV: EN60950-1

FCC: Part 15 Subclass B

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

EN61000-4-11 (DIPS), Criteria A, Level 2

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

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Media Converters > TCF-142 Series

Dimensions

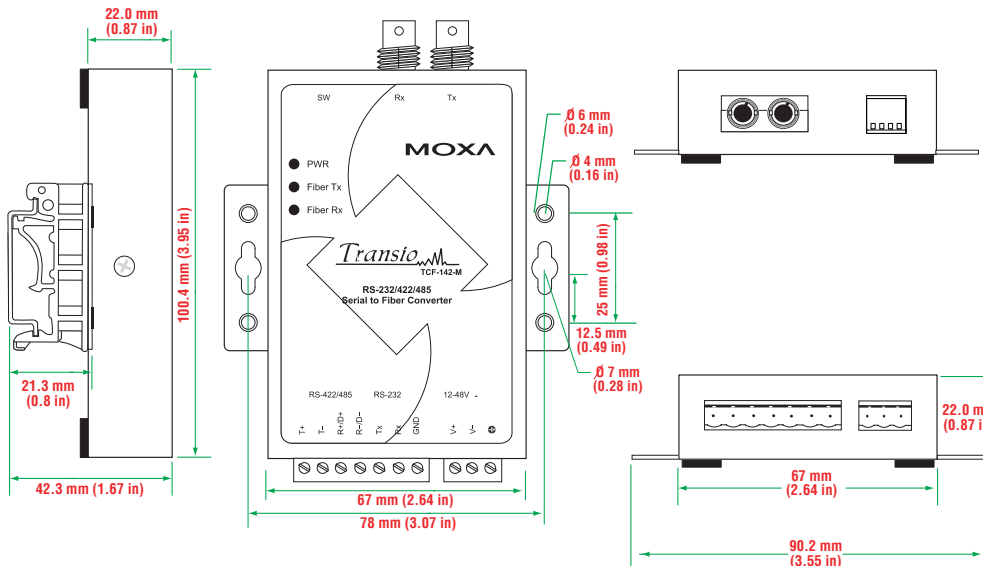
DIP Switch Settings

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

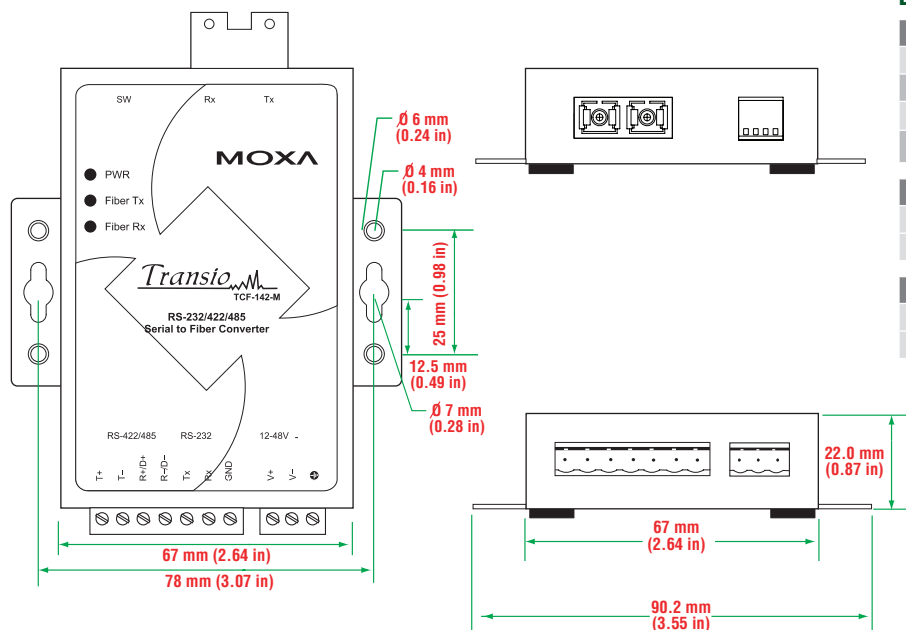
Built-in 120-ohm Terminator	SW3
Enable	ON
Disable	OFF

Fiber Mode	SW4
Ring mode	ON
Point-to-Point mode	OFF

TCF-142-M/S-ST



TCF-142-M/S-SC



DIP Switch Settings

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

Built-in 120-ohm Terminator	SW3
Enable	ON
Disable	OFF

Fiber Mode	SW4
Ring mode	ON
Point-to-Point mode	OFF

Ordering Information

Available Models

TCF-142-M-SC: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector

TCF-142-M-ST: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector

TCF-142-S-SC: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector

TCF-142-S-ST: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector

TCF-142-M-SC-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C temperature range

TCF-142-M-ST-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C temperature range

TCF-142-S-SC-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C temperature range

TCF-142-S-ST-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C temperature range

Optional Accessories (can be purchased separately)

Multimode Optical Fiber Patch Cords: SC to SC, ST to ST, and SC to ST cords (see page A-14 for details)

Package Checklist

- TCF-142 media converter
- Power jack to 3-pin terminal block adaptor
- Quick Installation Guide (printed)
- Warranty Card

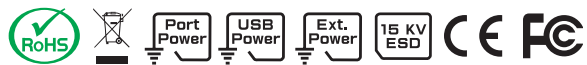


TCF-90 Series

Port-powered RS-232 to optical fiber media 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
- > 15 KV ESD protection for serial signals
- > Baudrates up to 115.2 Kbps
- > Compact size



Introduction

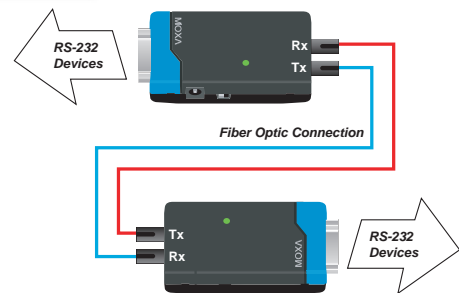
The TCF-90 is a compact media converter that transmits RS-232 signals over optical fiber. Power is derived from either the serial port or an external power source. The TCF-90 extends RS-232 transmission up to 5 km with multi-mode fiber, or up to 40 km with single-mode fiber. A pair of TCF-90 converters 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 enhances data security by eliminating the harmful effects of RF radiation and susceptibility to electromagnetic radiation.

Self-powered RS-232 to Optical Fiber

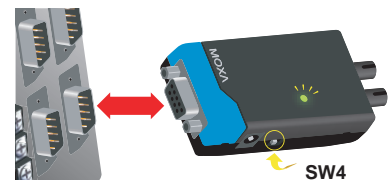
Connecting RS-232 devices to the TCF-90 is easy. The ST-type optical fiber connector is designed especially for data communication applications that transmit data either between or within buildings. The TCF-90 can be used for industrial applications and for applications that require secure data transfer.

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 Tx, D, and R 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.



Patented LED Port Power Indicator

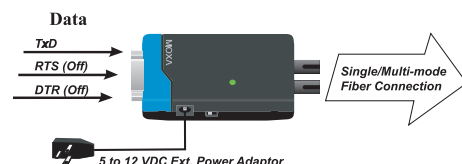
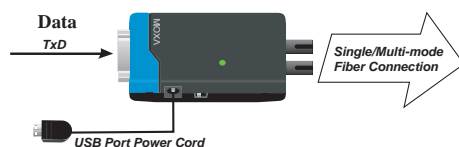
It's easy enough to use a multimeter to test if the serial device is supplying the TCF-90 with enough power through the serial connection, but why bother when the TCF-90 can do the testing for you? Connect the TCF-90 to the device's RS-232 port and set the SW4 switch to Test mode. If the patented port 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

Serial Communication

Connector: DB9 female
RS-232 Signals: Tx, Rx, GND
 (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)
Baudrate: 300 bps to 115.2 Kbps

Optical Fiber Side

Fiber Connector: ST
Cable Requirements:
 Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm
 Multi-mode: 50/125, 62.5/125, or 100/140 μm
Transmission Distance:
 Single-mode: 40 km
 Multi-mode: 5 km
Wavelength:
 Single-mode: 1310 nm
 Multi-mode: 850 nm
Tx Output:
 Single-mode: > -5 dBm
 Multi-mode: > -5 dBm
Rx Sensitivity:
 Single-mode: -24 dBm
 Multi-mode: -20 dBm

Physical Characteristics

Case: ABS + PC
Dimensions: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements

Source of Input Power: RS-232 port (Tx/D signal) or power input jack
Input Voltage: 12 to 48 VDC

Power Consumption: 20 mA @ 5 V (with termination disabled)

Regulatory Approvals

CE: Class B

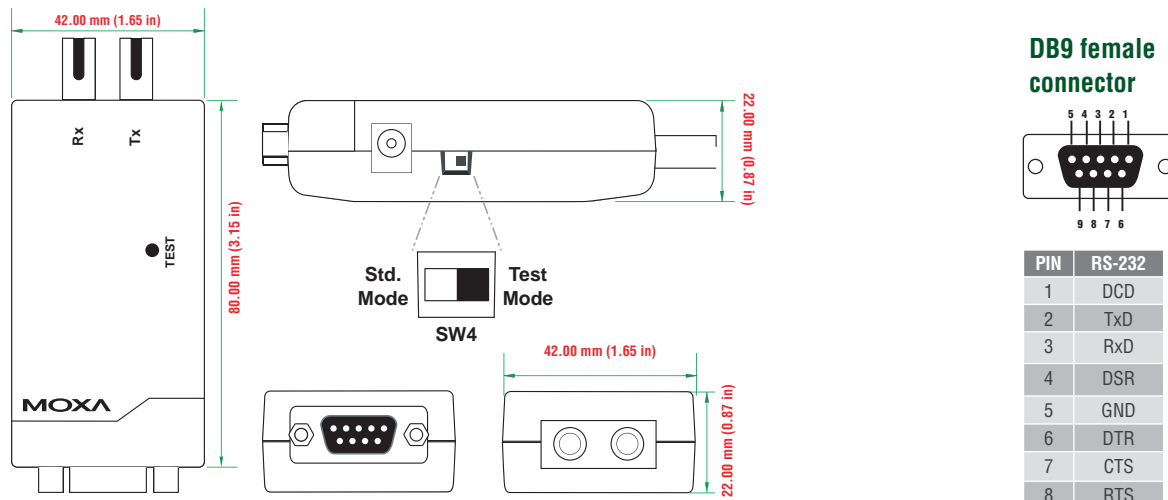
FCC: Class B

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions



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 Adaptor

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

Multimode Optical Fiber Patch Cords: SC to SC, ST to ST, and SC to ST cords (see page A-14 for details)

Package Checklist

- TCF-90 media converter
- USB power cord (50 cm)
- Quick Installation Guide
- Warranty Card



TCC-100/100I

Industrial RS-232 to RS-422/485 converters with 2 KV isolation protection



- > RS-232 to RS-422 conversion with RTS/CTS support
- > RS-232 to 2-wire or 4-wire RS-485 conversion
- > 2 KV isolation protection (TCC-100I)
- > Wall and DIN-rail mounting
- > Plug-in terminal block for easy RS-422/485 wiring
- > LED indicators for power, Tx, Rx
- > -20 to 60°C operating temperature

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



Introduction

The TCC-100 and TCC-100I are RS-232 to RS-422/485 converters that increase networking capability by extending the RS-232 transmission distance. Both converters have a superior industrial-grade design

that includes DIN-rail mounting, terminal block wiring, external terminal block for power, and optical isolation (TCC-100I only). The TCC-100/100I are ideal solutions for converting RS-232 signals to RS-422/485 in critical industrial environments.

Specifications

RS-232 Side

Connector: DB9 female

Signals:

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

RS-422/485 Side

Connector: Terminal Block

Signals (interface selected by DIP switch):

RS-422: TxD+, TxD-, RxD+, RxD-, GND

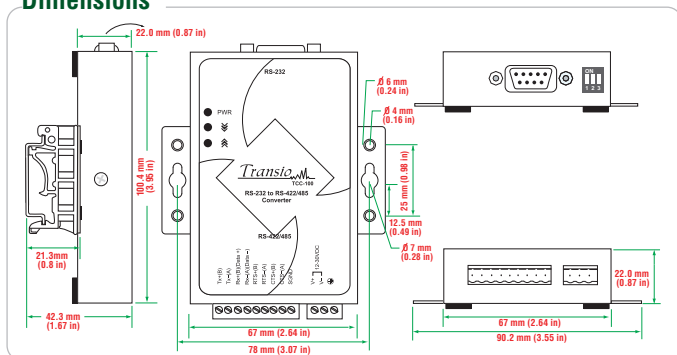
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND

RS-485-2w Signals: Data+, Data-, GND

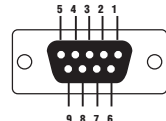
Serial Transmission

Baudrate: 300 bps to 921.6 Kbps

Dimensions



DB9 female connector



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

ESD Protection: 15 KV

Optical Isolation Protection: 2 KV (TCC-100I)

Physical Characteristics

Case: Aluminum

Weight: 148 ± 5 g

Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)

Environmental Limits

Operating Temperature: -20 to 60°C (-4 to 140°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 85°C (-14 to 176°F)

Power Requirements

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

Input Voltage: 12 to 48 VDC

Power Consumption:

TCC-100: 300 mA @ 12 V

TCC-100I: 400 mA @ 12 V

Power EFT/ Surge Protection: 2 KV

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: Protects against two signals shorted together

Regulatory Approvals

CE: Class B

FCC: Class B

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Package Checklist

- TCC-100 or TCC-100I media converter
- DK-35A: DIN-rail mounting kit
- Power jack to 3-pin terminal block adaptor
- Quick Installation Guide (printed)
- Warranty Card

Ordering Information

Available Models

TCC-100: RS-232 to RS-422/485 converter

TCC-100I: RS-232 to RS-422 converter with optical isolation



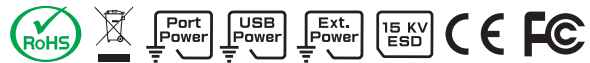
TCC-80

Port-powered RS-232 to RS-422/485 converter



- > External power source supported but not required
- > Compact size
- > Converts RS-422, and both 2-wire and 4-wire RS-485
- > RS-485 automatic data direction control
- > Automatic baudrate detection
- > 15 KV serial ESD protection
- > Built-in 120-ohm termination resistors

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



Introduction

The TCC-80 provides complete signal conversion between RS-232 and RS-422/485, without requiring an external power source. It supports both half duplex 2-wire RS-485 and full duplex 4-wire RS-422/485, either of which can be converted between RS-232's TxD and RxD lines. In addition, the TCC-80's 15 KV ESD protection guards against damage from electrostatic discharge.

Automatic data direction control is also provided for RS-485, in which the RS-485 driver is enabled automatically when the circuitry senses the TxD output from the RS-232 signal. This means that no programming effort is required to control the transmission direction of the RS-485 signal.

Port Power over RS-232

The RS-232 port of the TCC-80 is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD, RTS, or DTR line. Regardless of whether the signal is high or low, the TCC-80 can obtain enough power from the data/handshake line. However, external power can be used if the handshake line is not available, if the serial cable is too long, or if the RS-232 device is a low power device. For external power, a 5 to 12 VDC power supply can be connected using an adaptor or a USB power cord.

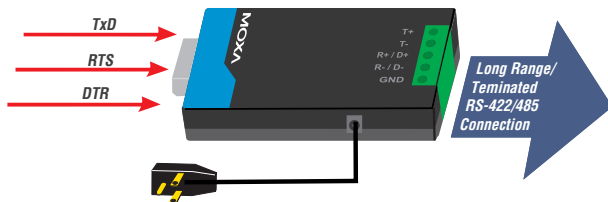


Optional External Power

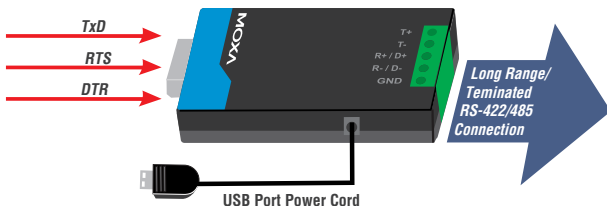
Termination is a critical requirement for port-powered devices such as the TCC-80. In most circumstances, termination resistors are used if the RS-422/485 cable is longer than 100 m. Regardless of how much the data signal is dissipated, the termination resistors absorb more

than 75 mW of power. In other words, if long distance RS-422/485 transmission or termination is required, then an external USB power cord or DC power supply should be used.

External Power Adaptor



USB Power



Port Power Dissipation

When installing a TCC-80 converter, it is important to pay attention to power consumption, RS-232 cable length, and RS-422/485 transmission distance. In general, the TCC-80 obtains 50 mW from the power source. Standard PC COM ports can provide 70 to 90 mW of power if the TxD, RTS, and DTR lines are connected. Moreover,

the RS-232 cable should be shorter than 15 m (@ 9600 bps) to ensure that less power is lost from the host/device to the TCC-80. The remainder of the supplied power is used for transmitting the RS-422/485 signal.

Specifications

RS-232 Side

Connector: DB9 female

Signals:

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

RS-422/485 Side

Connector: Terminal Block or DB9 male

Signals (interface selected by DIP switch):

RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND

RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Transmission

Baudrate: 300 bps to 115.2 Kbps

ESD Protection: 15 KV

Pull High Resistance: 1k ohm

Pull Low Resistance: 150k ohm

Physical Characteristics

Case: ABS + PC

Weight: 50 ± 5 g

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

Environmental Limits

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

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements

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

Input Voltage: 5 to 12 VDC

Power Consumption: 10 mA @ 5 V (with termination disabled)

Surge Protection: Embedded 15 KV ESD Surge Protection

Regulatory Approvals

CE: Class B

FCC: Class B

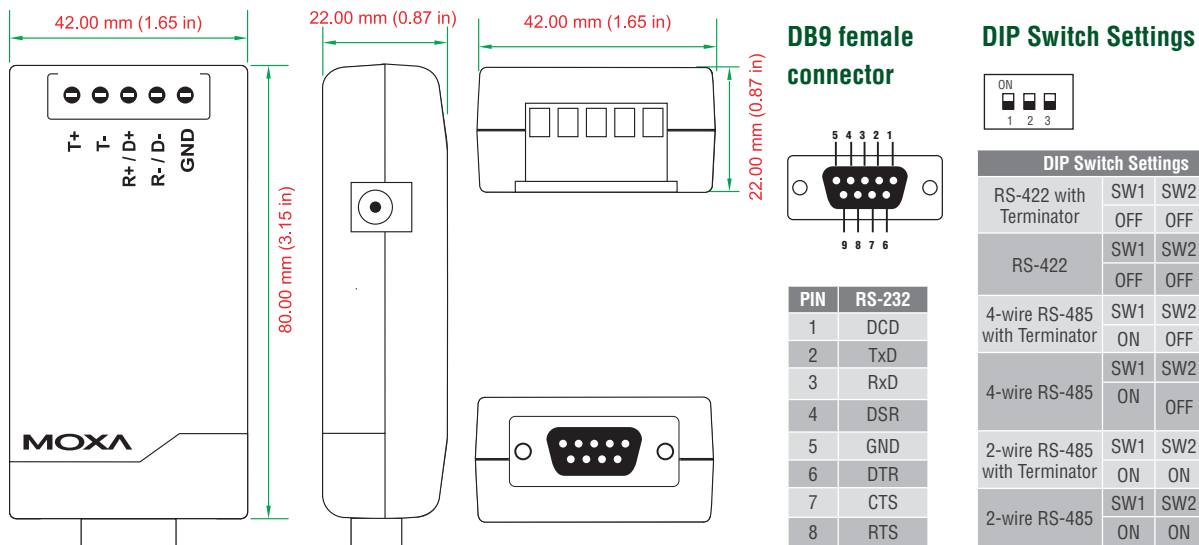
Warranty

Warranty Period: 5 years

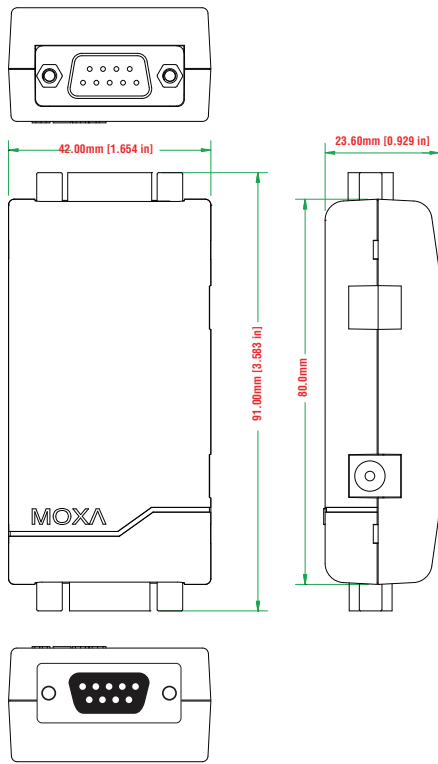
Details: See www.moxa.com/warranty

Dimensions

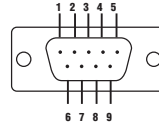
TCC-80



TCC-80-DB9



DB9 male RS-422/485 port



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

Ordering Information

Available Models

TCC-80: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and terminal block on the RS-422/485 side

TCC-80-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and DB9 male connector on the RS-422/485 side

Optional Accessories (can be purchased separately)

Power Adaptor

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

Package Checklist

- TCC-80 media converter
- USB power cord (50 cm)
- Quick Installation Guide (printed)
- Warranty Card



TCC-80I

Port-powered RS-232 to RS-422/485 converter with isolation protection



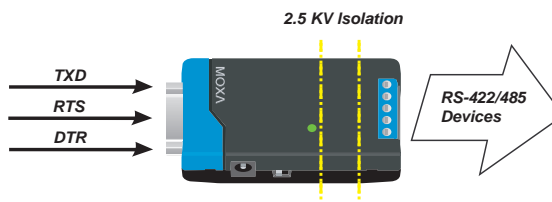
- > External power source supported but not required
- > High-speed transmission up to 115.2 Kbps
- > 2.5 KV isolation
- > Compact size
- > Converts RS-422, and both 2-wire and 4-wire RS-485
- > RS-485 automatic data direction control
- > 15 KV serial ESD protection
- > Built-in 120-ohm termination resistors
- > Patented LED port power indicator

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



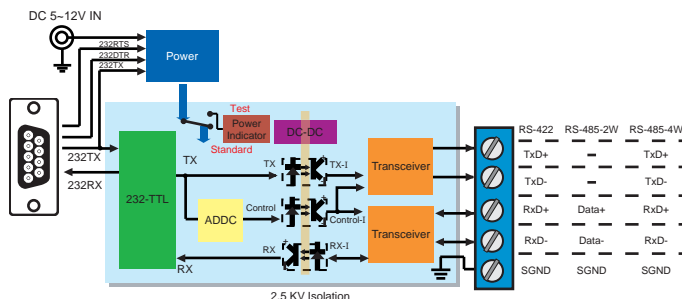
Introduction

The TCC-80I is the world's first high-speed, port-powered converter with 2.5 KV isolation. It draws power from the attached RS-232 device, and provides complete RS-232 to RS-422/485 interface conversion and electrical isolation protection. The TCC-80I converts between the RS-232 TxD and RxD lines and half duplex 2-wire RS-485, or full duplex 4-wire RS-422/485. In addition, the TCC-80's 15 KV ESD protection guards against damage from electrostatic discharge. The TCC-80I also supports RS-485 automatic data direction control, in which the RS-485 driver is enabled by circuitry when the RS-232 TxD output is sensed. This means that no programming effort is required to control the direction of the RS-485 signal.



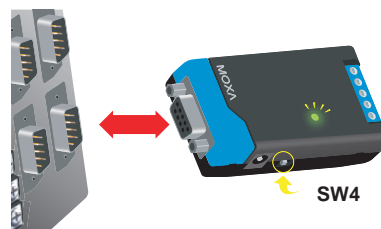
Port Power and Optical Isolation

The RS-232 port of the TCC-80 is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD line. Electrical 2.5 KV isolation is achieved with a photo coupler that transforms the electrical signal into light, and then re-transforms the light back into an electrical signal on the other side. In this way, the two electrical circuits are completely isolated from each other. This also protects the devices from ground loop currents, reduces damage caused by data loss, and prevents damage to the communication interfaces.



Patented LED Port Power Indicator

It's easy enough to test the serial device with a multimeter to determine that the serial device will provide enough power to the media converter. However, it's even easier to let the TCC-80I test the device for you. Simply connect the TCC-80I to the device's RS-232 port and set the SW4 switch to Test mode. If the patented port power LED indicator lights up, the TCC-80I is receiving enough power. If the LED does not light up, you will need to attach an external power source to the TCC-80I.



Port Power Dissipation

Termination is considered a critical factor for port-powered devices such as the TCC-80I. In most circumstances, terminal resistors are used when the RS-422/485 cable is longer than 100 m. Refer to the table at the right to see the transmission distance of the TCC-80I as a function of baudrate.

Port-Powered Transmission Distance

Baudrate (bps)	RS-422/485 Transmit Distance (m)	Embedded Terminator	External Power Required
9600	1200	(ON) 120 W	NO
19200	1200	(ON) 120 W	NO
38400	600	(ON) 120 W	NO
57600	300	(ON) 120 W	NO
115200	150	(ON) 120 W	NO

Specifications

RS-232 Side

Connector: DB9 female

Signals:

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

RS-422/485 Side

Connector: Terminal Block or DB9 male

Signals (interface selected by DIP switch):

RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND

RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Transmission

Baudrate: 300 bps to 115.2 Kbps

ESD Protection: 15 KV

Optical Isolation: 2.5 KV rms for 1 minute

Pull High Resistance: 1k ohm

Pull Low Resistance: 150k ohm

Physical Characteristics

Case: ABS + PC

Weight: 50 ± 5 g

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

Environmental Limits

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

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements

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

Input Voltage: 5 to 12 VDC

Power Consumption: 20 mA @ 5 V (with termination disabled)

Surge Protection: Embedded 15 KV ESD Surge Protection

Regulatory Approvals

CE: Class B

FCC: Class B

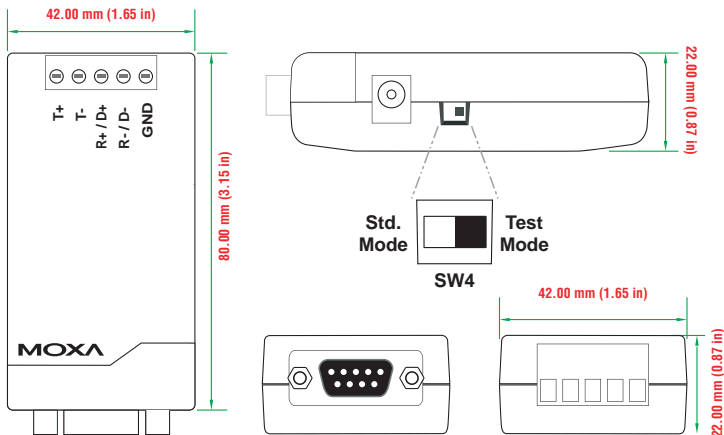
Warranty

Warranty Period: 5 years

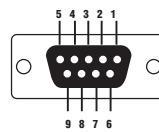
Details: See www.moxa.com/warranty

Dimensions

TCC80I



DB9 female connector



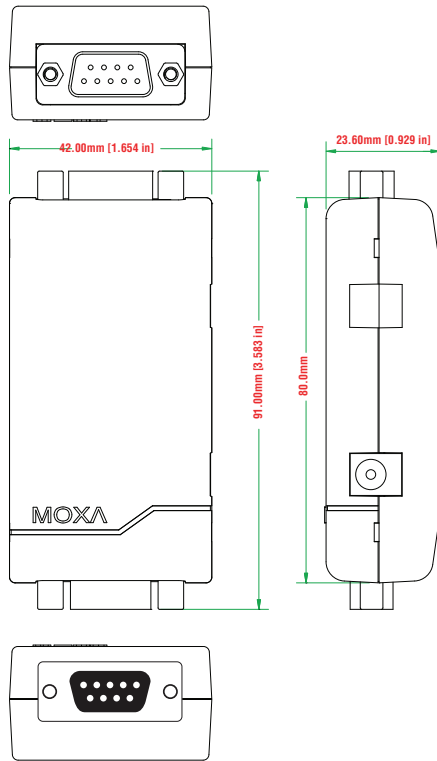
PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

DIP Switch Settings

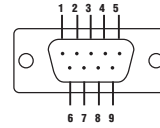


	DIP Switch Settings		
RS-422 with Terminator	SW1	SW2	SW3
	OFF	OFF	ON
RS-422	SW1	SW2	SW3
	OFF	OFF	OFF
4-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	OFF	ON
4-wire RS-485	SW1	SW2	SW3
	ON	OFF	OFF
2-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	ON	ON
2-wire RS-485	SW1	SW2	SW3
	ON	ON	OFF

TCC-80I-DB9



DB9 male RS-422/485 port



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

Ordering Information

Available Models

TCC-80I: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, terminal block on the RS-422/485 side, and 2.5 KV optical isolation

TCC-80I-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, DB9 male connector on the RS-422/485 side, and 2.5 KV optical isolation

Package Checklist

- TCC-80I media converter
- USB power cord (50 cm)
- Quick Installation Guide (printed)
- Warranty Card

Optional Accessories (can be purchased separately)

Power Adaptor

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



TCC-120/120I

Industrial RS-422/485 converter/repeater with 2 KV isolation protection



- > Boost serial signal to extend transmission distance
- > Wall or DIN-rail mounting
- > Terminal block for easy wiring
- > Power input from terminal block
- > DIP switch setting for built-in terminator (120 ohms)
- > Boost RS-422 or RS-485 signal, or convert RS-422 to RS-485
- > 2 KV isolation protection (TCC-120I)

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



12

Media Converters > TCC-120/120I

Introduction

The TCC-120 and TCC-120I are RS-422/485 converters/repeaters designed to extend RS-422/485 transmission distance. Both products have a superior industrial-grade design that includes

DIN-rail mounting, terminal block wiring, and external terminal block for power. In addition, the TCC-120I supports optical isolation for system protection. The TCC-120 and TCC-120I are ideal RS-422/485 converters/repeaters for critical industrial environments.

Specifications

Serial Communication

Connectors: Terminal Block on both ends

Baudrate: 300 bps to 230.4 Kbps

Signals:

RS-422/485-4w: TxD+, TxD-, RxD+, RxD-

RS-485-2w: Data+, Data-

RS-485 Data Direction Control: ADDC® (automatic data direction control)

ESD Protection: 15 KV for all signals

Optical Isolation: 2 KV for power and signal (TCC-120I only)

Physical Characteristics

Case: Aluminum

Weight: 148 ± 5 g

Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)

Environmental Limits

Operating Temperature: -20 to 60°C (-4 to 140°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 85°C (-14 to 176°F)

Power Requirements

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

Input Voltage: 12 to 48 VDC

Power Consumption:

TCC-120: 98 mA @ 12 V, 1.18 W

TCC-120I: 234 mA @ 12 V, 2.81 W

Voltage Reversal Protection: Protects against V+/V- reversal

Over Current Protection: Protects against two signals shorted together

Regulatory Approvals

CE: Class B

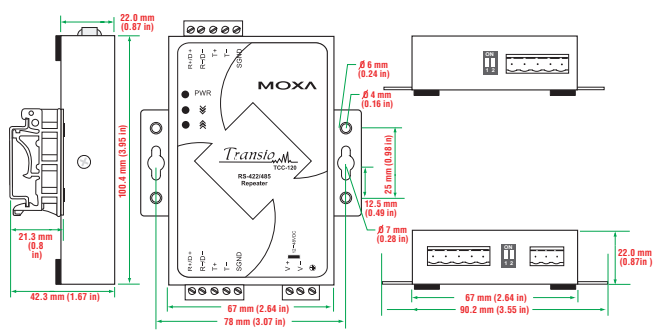
FCC: Class B

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions



Ordering Information

Available Models

TCC-120: RS-422/485 converter/repeater

TCC-120I: RS-422/485 converter/repeater with 2 KV optical isolation

Package Checklist

- TCC-120 or TCC-120I media converter
- DK-35A: DIN-rail mounting kit
- Quick Installation Guide (printed)
- Warranty Card



TCC-82

Port-powered RS-232 4-channel isolator



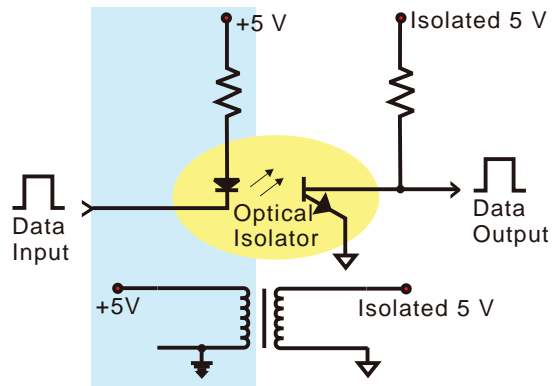
- > 4 channels of 4 KV RMS isolation for 1 minute
- > External power source supported but not required
- > 15 KV serial ESD protection
- > Automatic baudrate detection
- > Compact size

The certification logos shown here apply to some or all of the products in this section. Please see the **Specifications** section or Moxa's website for details.



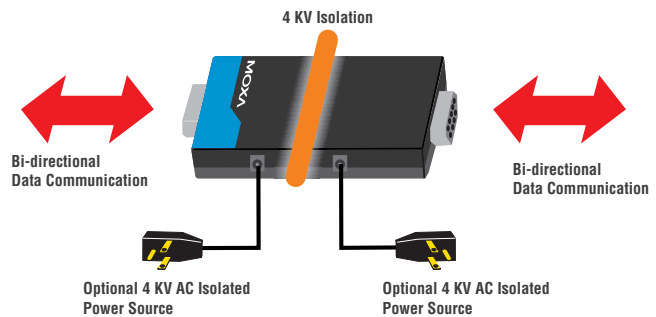
Introduction

The TCC-82 provides full electrical isolation for bi-directional serial communication between two RS-232 devices in a compact, industrial-grade package. Both sides of an RS-232 connection are isolated optically to provide perfect protection against lightning surges, accidental high voltage shorts, and ground loops. The built-in, wide range isolators are tested to ensure that they can withstand more than 4 KV rms input to output for 1 minute. This means that the TCC-82 not only meets the requirements of general serial data communications, but also the high standards required by industrial automation and medical applications. The TCC-82 protects the Tx and Rx data lines, and also protects the RTS and CTS handshake lines for a total of 4 isolated channels to provide complete protection of your RS-232 applications.



External Power Source Not Required

The TCC-82 supports port-powered operation, which means that it can obtain power directly from the attached serial devices. Power is obtained from the RS-232 Tx, RTS, or DTR lines, regardless of whether the signal is high or low, eliminating the need for an external power supply. However, external power can be used if handshake lines are not available, if the serial cable is too long, or if the serial device is a low powered device. For external power, the TCC-82 can use a 5 to 12 VDC adaptor or a USB power cord. Note that both sides of the connection are powered independently, so if necessary, one side can rely on port power and the other on an external power source.



When installing the TCC-82, we recommend that you connect all output signals. The TCC-82 obtains power from these signals even if they are not used by your system. Care should be taken when choosing the external power supply if your application requires the full 4 KV of isolation. Most commercial power supplies provide only 1500 VAC isolation between the primary and secondary windings. If you are using external power for both sides of the TCC-82, make sure that separate power sources are used, each with sufficient isolation protection.

Specifications

Serial Communication

Connectors: DB9 male and DB9 female

Baudrate: 300 bps to 115.2 Kbps

Signals:

RS-232: TxD, RxD, RTS, CTS

(Loop-back wiring: DTR to DSR and DCD)

ESD Protection: 15 KV for all signals

Optical Isolation: 4 KV for 1 minute

Physical Characteristics

Case: ABS

Weight: 60 ± 5 g

Dimensions: 42 x 80 x 23.6 mm (1.65 x 3.15 x 0.93 in)

Environmental Limits

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

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements

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

Input Voltage: 5 to 12 VDC

Power Consumption: 20 mA @ 5 V

Regulatory Approvals

CE: Class B

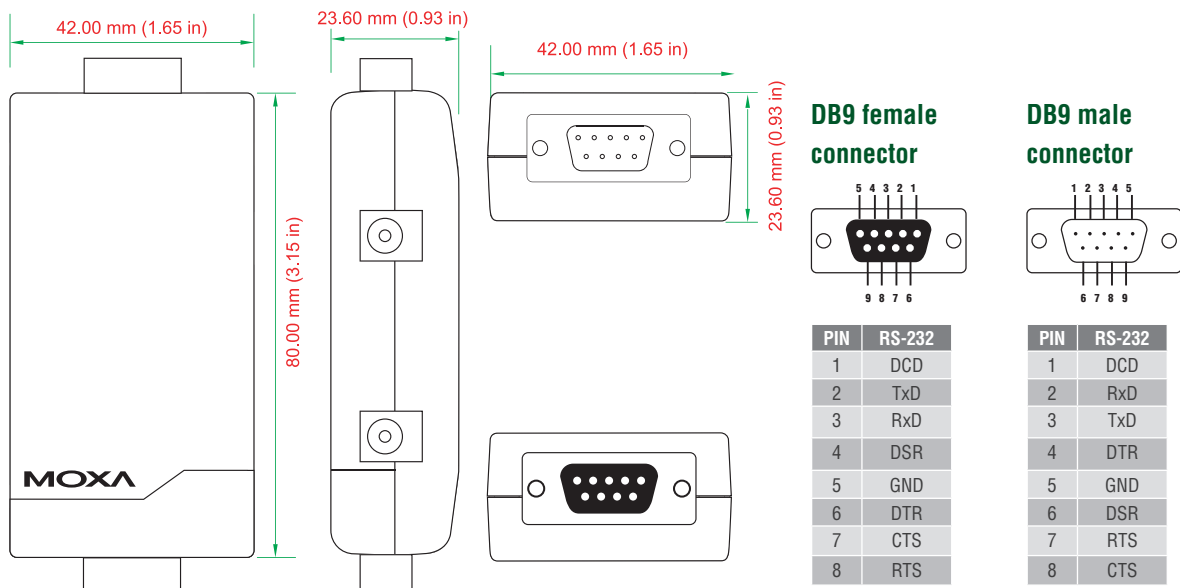
FCC: Class B

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions



Ordering Information

Available Models

TCC-82: Port-powered RS-232 isolator with 4 KV isolation and 15 KV serial ESD protection

Optional Accessories (can be purchased separately)

Power Adaptor

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

Package Checklist

- TCC-82 media converter
- USB power cord (50 cm) x 2
- Quick Installation Guide (printed)
- Warranty Card