Moxa TCC-120/120I

User's Guide

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MOXA®

Moxa TCC-120/120I
User's Guide

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Introduction

The TCC-120 and TCC-120I are RS-422/485 isolated repeaters, and the TCC-120I comes with 2 KV isolation protection.

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❑ **Product Features**
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Overview

Introduction

Many important devices used in today's industrial environment use the RS-422 or RS-485 interface for data transmission. In some cases however, it is necessary to extend the transmission distance between RS-422/485 devices. This is where the TCC-120/120I RS-422/485 Repeaters come in. Simply wire the power terminal block, wire the two signal terminal blocks, set the DIP switches, and you're ready to go.

The RS-422/485 standards use a differential signal for transmitting data signals. In addition to distance and multi-drop issues for industrial applications, housing, wiring, power supply, and over-surge protection are also serious concerns.

The TCC-120I provides isolation protection for users who need an industrial grade repeater to extend RS-422/485 transmission distance and increase networking capability. The superior industrial application design of this product, which includes DIN-Rail mounting, terminal block wiring, external terminal block power, and optical isolation for system protection, makes the TCC-120/120I suitable for use in critical industrial environments.

Built-in RS-485 ADDC™ Intelligence

ADDC™ (Automatic Data Direction Control), a Moxa leading technology, uses a clever hardware solution to take care of the RS-485 data flow control problem. ADDC™ is a hardware data flow solution that automatically senses and controls data direction, making the handshaking signal method unnecessary.

Isolation

Moxa's electrical isolation technology uses two photo couplers to create a gap in each electrical signal. One photo coupler transforms the electrical signal into a light signal, which is transmitted across a small gap, and then the other photo coupler transforms the light signal back into an electrical signal. In this way, the two electrical circuits are completely isolated from each other, limiting the damage that could otherwise be caused by power surges in the electrical signal.

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 automatically detect 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. The TCC-120/120I's terminator is set with a DIP Switch located on the outside of the converter's casing.

Auto Baudrate Detection

The TCC-120/120I incorporates a method for automatically detecting the serial signal's baudrate by hardware. This is an extremely convenient feature for the user. Even if a device's baudrate changes, the signal will still be transmitted through the RS-422/485 repeater without any problems.

Product Features

- Boost serial signal for extending transmission distance up to an additional 1.2 km
- Wall or DIN-Rail mountable
- Terminal block for easy wiring
- Power input from terminal block
- DIP switch setting for built-in terminator(120 ohms)
- PWR, Tx, Rx LEDs
- Operating temperature from -20 to 60°C
- 2 KV Isolation (for the TCC-120I)

Package Checklist

Before installing the TCC-120/120I, verify that the package contains the following items:

Standard Accessories:

- TCC-120 or TCC-120I
- User's Guide
- Warranty Card
- 5-contact terminal block connector x 2
- 3-contact terminal block connector x 1

Optional Accessory

• 2 DIN-Rail mounting brackets with 4 screws

Please notify your sales representative if any of the above items is missing or damaged.

Product Specifications

Model Names	TCC-120, TCC-120I
Communication	
Signals for 2-wire (RS-485 2-wire)	Data+, Data-, SGND
Signals for 4-wire (RS-422 or 4-wire RS-485)	Tx+, Tx-, Rx+, Rx-, SGND
RS-485 Data Direction Control	ADDC™
Baudrate	50 bps to 921.6 Kbps
Isolation	2 KV for both Power and Signal (TCC-120I)
Environmental	
Operating Temperature	-20 to 60°C
Storage Temperature	-20 to 85°C
Humidity	5 to 95 %RH
Power	
Input Power Voltage	External 12-48 VDC Power, Terminal Block
Reverse Power Protection	Protects against V+/V- reversal
Over Current Protection	Protects against 2 signals shorted together

Power Consumption	TCC-120:	TCC-120I:
	3.4 W	3.68 W
	= 12V x 286 mA	= 12V x 390 mA
	= 24V x 143 mA	= 24V x 195 mA
	= 30V x 113 mA	= 30V x 156 mA

Mechanical

|	
Dimensions (W × D × H)	67 × 100 × 22 mm (casing only)
	90 × 100 × 22 mm (including ears)
Casing material	Aluminum
Plug-In Screw Terminal Block	#22 – #16 AWG
Color	Black
Weight	148±5 g
Regulatory Approvals	CE, FCC (Class B)

Product Views

Top-End View

Top Panel View

Side View

Bottom-End View
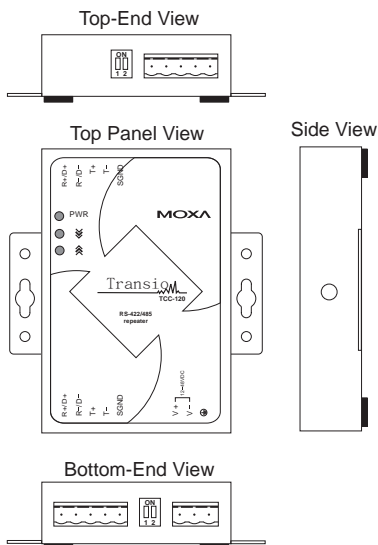
LED Indicators

The TCC-120/120I's top panel contains three LED indicators, as described in the table below:

RED ——— ○ PWR

Orange ——— ○ ≫

GREEN ——— ○ ≪
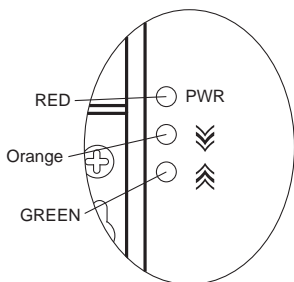
LED Name	LED Function	
PWR	Red indicates the power is on.	
⊻	Orange	Data is entering through the top-end port and exiting through the bottom-end port.
⋀	Green	Data is entering through the bottom-end port and exiting through the top-end port.

2
Installation

This chapter includes information about how to install the TCC-120/120I.

The following topics are covered in this chapter:

❑ **Hardware Installation**

Hardware Installation

Four steps are required to installing the TCC-120/120I:

- **STEP 1: Set the terminator DIP Switches**
- **STEP 2: Attach the Power Supply**
- **STEP 3: Wire the RS-422/485 Terminal Blocks**
- **STEP 4: Test the Connection**

The details of each of these four steps are described next.
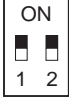
STEP 1: Set the DIP Switches

The DIP Switches on the TCC-120/120I are used to set the signal transmission mode and to enable or disable the termination resistor. You can configure for either 2-wire (RS-485) or 4-wire (RS-422/485) transmission mode. Also note that your program and serial port should be set to match the repeater's settings.

NOTE   **The TCC-120/120I has two sets of DIP Switches—one set on the top-end and the other set on the bottom-end. To ensure proper data transmission, make sure that the two sets of DIP switches are configured the same.**


SW1— Switch 1 selects 4-wire or 2-wire mode. Set Switch 1 to the ON position for 4-wire, and to the OFF position for 2-wire.

SW2— Switch 2 enables or disables termination. Set Switch 2 to the ON position to enable termination, and to the OFF position to disable termination.

→ For easy reference, the following figures show the four possible settings.

| Dip Switch Settings			
	SW1	SW2	ON ▉ ▉ 1 2 4-wire, termination enabled
RS-422/4-wire RS-485 with Terminator	ON	ON	
	SW1	SW2	ON ▉ ▉ 1 2 4-wire, termination disabled
RS-422/4-wire RS-485	ON	OFF	
	SW1	SW2	ON ▉ ▉ 1 2 2-wire, termination enabled
2-wire RS-485 with Terminator	OFF	ON	
	SW1	SW2	ON ▉ ▉ 1 2 2-wire, termination disabled
2-wire RS-485	OFF	OFF	

STEP 2: Attach the Power Supply
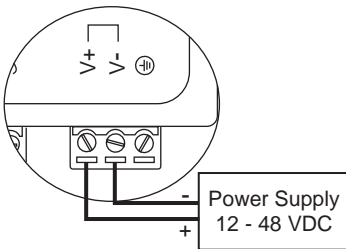
The TCC-120/120I is powered by an external 12-48 VDC power supply. To connect to the power supply, run two wires from the V+ and V- terminals, on the TCC-120's 3-connector terminal block, to the DC power supply, as shown in the figure on the left.

Once the power supply is connected to its power source, the PWR LED located on the TCC-120's top panel should be illuminated in red.
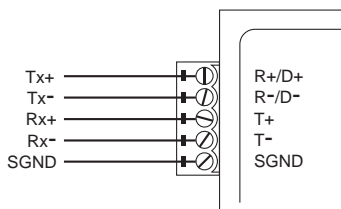
STEP 3: Wire the Terminal Block

There are two wiring options available for connecting to the TCC-120/120I's RS-422/485 terminal block.
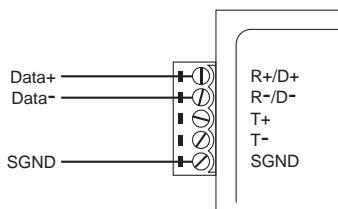
2-wire

When using the 2-wire (for RS-485) wiring option, you will need to connect three wires from each of the TCC-120/120I's RS-422/485 terminal blocks to the opposite connections. Connect from R+/D+ to Data+, from R-/D- to Data-, and from SGND to SGND.

4-wire

When using the 4-wire (for RS-422 or 4-wire RS-485) wiring option, you will need to connect five wires from each of the TCC-120/120I's RS-422/485 terminal blocks to the opposite connections. Connect from R+/D+ to Tx+, from R-/D- toTx-, from T+ to Rx+, from T- to Rx-, and from SGND to SGND.

STEP 4: Test the Connection

After setting the DIP Switches, connecting the power, and wiring the terminal block, we suggest using a Console Terminal program, such as HyperTerminal or Moxa Terminal Emulator, to test the connection. If you have an RS-422/485 serial board (such as Moxa Industio CP-132) installed on your PC, you can connect your PC's COM port to one of the TCC-120/120I's RS-422/485 terminal blocks, and connect the TCC-120/120I's other RS-422/485 terminal block to one of the RS-422/485 serial board's ports. Next, start HyperTerminal or Moxa Terminal Emulator, and then open a connection to the COM port, and to the port associated with the TCC-120/120I's RS-422/485 port. Simply type a few characters on your PC's keyboard. The characters you type should show up in the HyperTerminal window that is currently inactive, indicating that the typed characters were transmitted between the TCC-120/120I's two RS-422/485 ports.