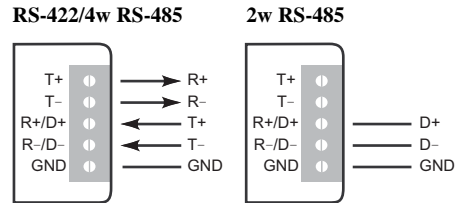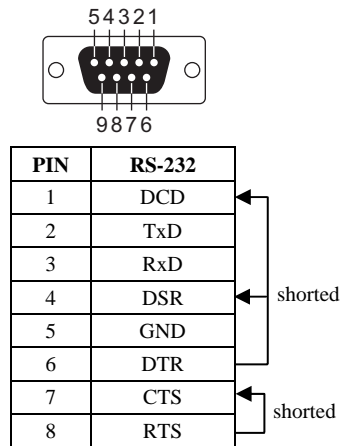## RS-422/485 Connection

The RS-422/485 port to terminal block connector is shown below. Note that some RS-422/485 devices are labeled "+" and "-" and some are labeled "B" and "A". In other words, Data (B) is equivalent to Data (+) and Data (A) is equivalent to Data(-).
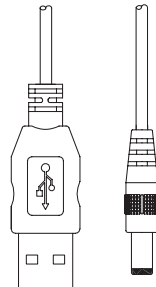
RS-422/4w RS-485　　　**2w RS-485**

RS-232 Pinouts

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

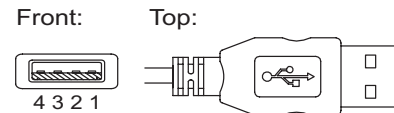| PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

shorted (DSR/DCD)
shorted (CTS/RTS)

Note: As shown above, RTS and CTS are shorted, and DTR, DSR, DCD are shorted. This frees users from the hardware flow control cable wiring problem.

USB Power Cord
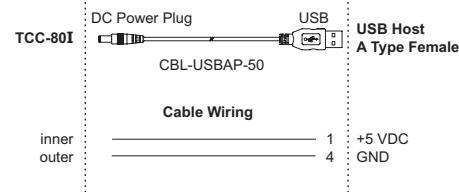
If additional external power is required, TCC-80I can be connected to a standard 5 to 12 VDC power supply or the USB power cord **CBL-USBAP-50**.

USB "A" Male Connector

Front:　　　Top:

4 3 2 1

TCC-80I
USB Connector

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

TCC-80I　DC Power Plug　　USB　**USB Host A Type Female**

CBL-USBAP-50

Cable Wiring

inner ——————————— 1 +5 VDC
outer ——————————— 4 GND

Ø5.1±0.1
Ø2.1±0.1



5-12 VDC
20 mA (max.)

Transio TCC-80I

First High-speed, Isolated, Self-powered RS-232 to RS-422, 2-wire/4-wire, RS-485 Bi-directional Converter with 2.5 KV Isolation and 15 KV ESD Surge Protection.

Overview

The TCC-80I is the world's first high-speed, isolated, self-powered converter. It is powered via the host's RS-232 port and provides complete signal conversion between RS-232 and RS-422/485 devices. The TCC-80I coverts back and forth between RS-232's TxD and RxD lines to either half duplex 2-wire RS-485 or the balanced signal of full duplex 4-wire RS-422/485. In addition, the TCC-80I's built-in 15 KV ESD surge protector provides the output ports with comprehensive protection against surges and spikes. Perhaps the most important feature is the 2.5 KV isolation designed to prevent ground loop currents, reduce damage caused by data loss, and prevent damage to the communication interfaces. The TCC-80I is also designed to provide RS-485 auto data direction control, in which the RS-485 driver is enabled automatically when the circuitry senses the TxD output from the RS-232 signal. Programming effort is not required to control the transmission direction of the half duplex RS-485 signal.
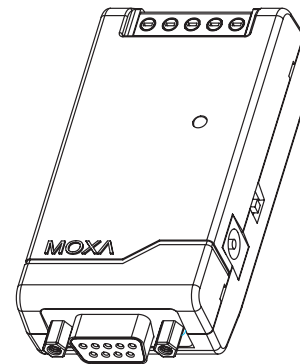
Package Checklist

- TCC-80I
- USB Power Cord
- User's Manual

Applications

- Multipoint data acquisition
- Factory automation
- Remote serial device control
- Building security automation
- Critical industrial control

Features and Specifications

- Signals:
  RS-232:　TxD, RxD and GND
  RS-422:　TxD+(B) / -(A),
  　　　　　RxD+(B) / -(A), GND
  RS-485:　Data+(B) / -(A), GND
- Port types: RS-232: Female DB9
  　　　　　　RS-422/485: Terminal Block
- Supports baudrate up to 115.2 Kbps
- RS-232 loopback: RTS to CTS; DTR to DSR and also DCD
- Supports automatic RS-485 data direction control with no baudrate switch settings
- 15 KV ESD for all RS-232/422/485 signals
- 2.5KV Optical Isolation
- Built-in 120 ohm termination resistors for RS-422/RS-485 (DIP switch selectable)
- Supports up to 32 units connected in an RS-485 multi-drop network
- Serial Power Source: TxD, RTS and DTR (RTS/DTR ON are recommended)
- LED Port Power Indicator (switch settings)
- Ext. Power (jack): DC +5V to +12V adapters or a USB power cord (DC +5V)
- Operating temperature: 0 to 60°C (32 to 140°F)
- Dimensions: 42 × 80 × 22 mm
- Case: ABS + PC
- Weight: 50 ± 5 g
- CE, FCC Class B approval
- Power Consumption: 20 mA at +5 VDC (termination disabled)
- Warranty: 2 years

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Transio TCC-80I User's Manual　　　　P/N: 1802000801000

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Installation

Serial (RS-232) Port Power

The RS-232 port of the TCC-80I 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 activate the "ON" signal for either the RTS or DTR lines. 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.

Serial Power Source/Data
±5 to ±12 VDC Signal
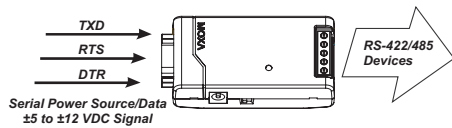
Port Power Dissipation

When installing an RS-232 port-powered TCC-80I converter, pay attention to the power consumption, RS-232 cable length, power provided by the serial port, and the RS-422 /485 transmission distance. In general, the TCC-80I itself gets 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 TCC-80I. The rest of the supplied power is used for transmitting the RS-422/485 signal.

.Serial Port Power Compatibility

Serial ports use a diversity of interface chips, but the power provided by the different ports is not always the same. In fact, some of the ports do not provide enough power to activate the TCC-80I. 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 tested as a good power source to drive the TCC-80I when their RTS/DTR is connected and in the "ON" state.

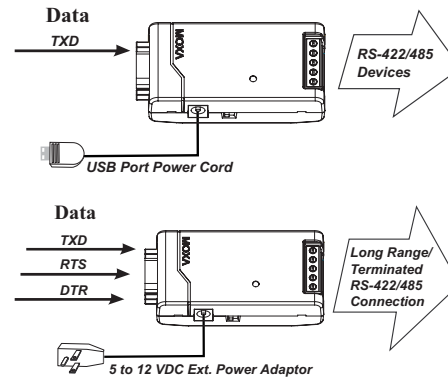| Multiport Serial Boards	Serial Device Servers
MOXA Smartio CP-118U CP-168U V2 CP-104U V2 CP-102U	MOXA NPort 5110/5210 V2.1 5410 V2.2 5610 V3.0 (or later)
MOXA Smartio CP-118EL Series CP-168EL Series CP-104EL Series	MOXA USB NPort U1110
	MOXA USB to Serial UPort 1410/1610

LED Port Power Indicator

The best way to ensure that the attached serial port provides enough electricity to the TCC-80I is to check the power indicator LED on the front panel. To do this, connect the TCC-80I to the target RS-232 port, and then turn the SW4 switch to the right to **Test** mode. If the LED lights up, the TCC-80I is receiving enough power. If the LED does NOT light up, you will need to attach the external power cord to the TCC-80I.

Note: Be sure to turn the SW4 switch back to **Std.** mode (the default) when you finish testing. When in **Test** mode, the TCC-80I **WILL NOT** transmit data.

Std. Mode   **Test Mode**

SW4
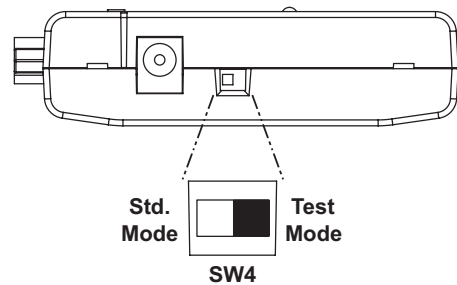
Optional External Power

Termination is a critical requirement for port-power devices such as the TCC-80I. In most circumstances, termination resistors are used when the RS-422/485 cable length is longer than 100 m. Regardless of how much the data signal dissipates, the termination resistors absorb more than 75 mW of power from the power source when the TCC-80I is unable to use the limited serial 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.

Data
TXD
RS-422/485 Devices
USB Port Power Cord

Data
TXD
RTS
DTR
Long Range/ Terminated RS-422/485 Connection
*5 to 12 VDC Ext. Power Adaptor*

By testing the TCC-80I at different baudrates and transmission distances, we have determined the maximum transmission distances that can be achieved when using serial port power. The test results are shown in the following table.

Port Powered Transmission Distance

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

Switch and Jumper Settings

To change the operation mode, check the DIP Switch settings on the back panel.

ON
1 2 3
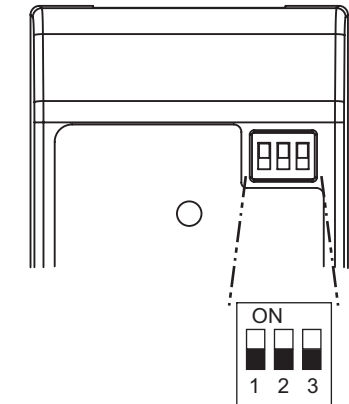
DIP Switch Settings			
RS-422	SW1	SW2	SW3
	OFF	OFF	OFF
RS-422 with Terminator	SW1	SW2	SW3
	OFF	OFF	ON
4-wire RS-485	SW1	SW2	SW3
	ON	OFF	OFF
4-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	OFF	ON
2-wire RS-485	SW1	SW2	SW3
	ON	ON	OFF
2-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	ON	ON

DIP Switches SW1 and SW2 are used to select the operation modes (RS-422, 4W RS-485, or 2W RS-485). Termination is controlled by DIP Switch SW3.

Ext. Power Supply

The TCC-80I is designed to be connected to a standard 5 to 12 VDC power adapter if additional external power is required.

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