

Let's communicate



RS-232/422 Converter with Galvanic Isolation of the Interface



ELO E0CC

Operation manual

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1.0 Introduction

RS-232 is the interface with asymmetric signals designed for two terminal equipments (DTE) connection. Maximum load capacity can be 2500 pF (about 50m twisted pair). The load impedance is to be 3-7 kilohm that allows disturbing pulses induction into the cable even from relatively soft supplies. The terminal equipments have to have the same signal ground potentials therefore RS-232 interface range is limited to 15m distance. Signals conversion to RS-422 allows transmitted range and interference immunity to be increased.

1.1 Use of the converter

The converter increases transmission immunity against electrical disturbance and isolates both interfaces RS-232/RS-422. ELO E0CC model insulation strength is 3 kV. As for permissible over-voltage, the converter can be used in the environments where lightning over-voltage is not necessary to be considered. To lead the cable outside buildings, it is necessary to provide additional over-voltage protection on the input points.

The converter allows transmission rate up to 115200 bps. This maximum attainable rate decreases due to the line length or its impedance growth. Recommended maximum line length is 1200 m at rate of 9600 bps.

2.0 Operation principles

RS-422 interface is mainly contented for two devices communication in duplex mode. As transmission media there are two twisted pairs, each for one transmission direction.

RS-422 signal is symmetric and its parameters are consistent with the signal standard RS-485. The signal under standard RS-422 does not recognize high impedance mode (third state) which allows the bus construction in standard RS-485. There are also RS-422 modifications so-called MULTIDROP systems they are duplex and transmitters are set off into the third state but ELO E0CC converter does not allow this option.

3.0 Installation

The converter has to be installed with the respect for specifications of both interfaces.

3.1 Converter connection to RS-232 Interface

Signals assignment to the contacts and DTE interconnection is in the following table:

Signal name	abbrev	DTE connector (DB25M)	E0CC connector (DB25F)	trans.direction	
				DTE	E0CC
Signal Ground	SG	7	7	--	--
Transmitted Data	TxD	2	2	output	input
Received Data	RxD	3	3	input	output
Request To Send	RTS	4	4	output	input
Clear To Send	CTS	5	5	input	output
Data Set Ready	DSR	6	6	input	output
Data Terminal Ready	DTR	20	20	output	input
Data Carrier Detect	DCD	8	8	input	output



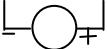
Important cautions:

DTE and converter interconnection has to transmit at least TxD, RxD and GND signals, with TxD active so supply voltage of at least -5 V in the idle mode. The converter will not work if the terminal equipment is designed similarly it means that its transmitter is turned off to save and turns it on when it finds out the voltage on the RxD contact.

The converters transmit only RxD and TxD signals. Control signals are not transmitted. RTS-CTS and DTR-DSR-DCD are locally interconnected inside the converter. Maximum rate is 115200bps.

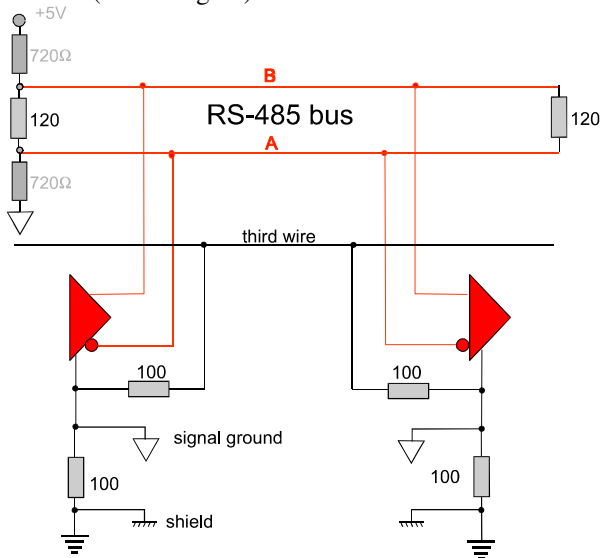
3.2 RS-422 link connection

RS-422 connector is of DB25 male type. Besides link connection, power supply and terminators can be connected, too. RS-422 converter input and output circuits are protected against interference pulses of width 1ms and output 400 VA with induced into the line. Connector description for RS-422 is in the following table:

Contact	1	2	3	4	6, 7, 8	24	25	13
Signál	B	A	B	A	SG	SP	0	+ 6V
Meaning	transmitter		receiver		signál ground	for-pull-up resistor (active terminator)	external supply	
								

Two converters connection is as follows: transmitter A (B) signal is connected to the receiver A (B) contact of the opposite converter and the receiver A (B) signal is connected to the transmitter A (B) contact of the opposite converter.

To eliminate influence of the ground potentials differences of both devices, the third conductor is added and connected via resistors on the signal ground of both devices (see the figure).



3.3 Converter setting

The converter does not need any setting for its operation.

3.4 Power Supply Connection

The converter needs external power supply 6V/200 mA that is connected to the connector on the side of the converter. The power supply can also be connected via contacts 13 (positive terminal) and 25 (negative terminal) of RS-422 connector. The converter can be ordered with the supply connector SCJ 2.5mm /Jack mono) or DC connector EIAJ 2.35mm.

!!!Caution!!!

RS-232 interface isolated circuits have to be supplied from the terminal equipment signals (TxD or DTR, RTS). ELO E0CC will not work without this energy!

4.0 Specifications

4.1 Electrical parameters

Interface	RS-232 / RS-422
Power supply	External DC supply 6V/200mA
Supply connector	SCJ 2.5 mm or EIAJ 2.35mm
Signals TxD, (DTR, RTS) take off:	
	summarily max. 10 mA
	typically 5 mA
Isolation voltage between interfaces	max. 3 kV permanently
Required link impedance	100 Ω
Matching to the line	external terminators 100 – 200 Ω
Permissible over-voltage on the line	the line must not be exposed to the atmospheric discharge influences

4.2 Other

Transmitted signals	TxD, RxD
Control signals	local interconnectors RTS-CTS DTR-DSR-DCD
RS-232 connector	DB25F, DCE
Trasmission mode	duplex on 4-wire link simplex on 2-wire link
Maximum RS-232 signals configuration of DTE for duplex operation:	TxD; RxD; GND
Minimum RS-232 signals configuration of DTE for simplex operation:	TxD; GND, when transmitting, RxD, GND+ at least one from TxD, RTS, DTR signals
Range without repeaters	1200 m
Data rate	50 – 115 200 bit/s
Dimension width× length× height	57 × 83 × 24 mm
Weight	80 g
Stocking temperature	-10° to +55°C
Working temperature	+ 0° to +50°C
Humidity	0 – 85% (non-condensing)

5.0 Testing

To provide a benchmark test of the transmitter and receiver, just connect power supply to the converter. Interconnect 1-3 and 2-4 contacts on the RS-422 connector. Connect positive terminal to the 2 contact and negative terminal to the 7 contact of DC power supply 5 to 9 V to the RS-232 connector. LED diodes „OUT“ and „IN“ have to switch on. After reversing polarity 2-7 indicators have to switch off.

5.1 Auto-test

Connect converter via RS-232 connector to the terminal equipment. Interconnect 1-3 and 2-4 contacts on the RS-422 connector. Received data must be equal to the transmitted data. Use any terminal emulator for transmitting.

6.0 Troubleshooting

Symptom	Action
Converter does not work after installation	<p>Check if the link is connected properly if 1-2, 3-4 contacts are not changed</p> <p>Check if the mode selection is right.</p> <p>Check the power supply.</p> <p>Check RS-232 connection</p>
Connection in normal operation quit working	<p>Check the power supply.</p> <p>Check the cable connection.</p> <p>Use the test as with 5.0 or 5.1</p>

7.0 Ordering information

Supply code is ELO E0CC. It is provided in two versions according to the supply connector:

E0CC – converter with the supply connector **SCJ 2.5mm** (Jack mono)

E0CC – converter with the supply connector **EIAJ 2.35mm**.

If not specified the a converter is delivered

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