RS-232 / 485 Converter with Automatic Transmission Control and Galvanic Isolation of the Interface
ELO E06C

Characteristics

- Isolated interfaces
- Automatic control
- RxD, TxD transfer
- Maximum data rate 115.2 kbps
- 12V DC supply necessary

Introduction

RS-232 is the interface with asymmetric signals designed for two terminal equipments connection (DTE). The load impedance is to be 3-7 kilo-ohm that enables to induce disturbing pulses into the cable even from relatively soft supplies. Since the signals have to be symmetric, the terminal equipments have to have the same neutral potentials. For this reason, RS-232 interface range is limited to 15 m distance. Signals conversion to RS-485 enables to increase communication range, transmission interference immunity and communication partners´ number.

Use of the converter

The converter increases transmission immunity against electrical disturbance and isolates both interfaces RS-232 /RS-485. Insulation strength is 3 kV. As for permissible over-voltage, the converter is designed to 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 and/or its impedance growth. Recommended maximum line length is 1200 m at the rate of 9600 bps.

Operation principles

RS-485 interface is used to two-way simultaneous communication in one pair of conductors. For this reason, the transmission has to be half-duplex that means switching off RS-485 transmitter when receiving to allow transmitting to other communication partners and switching on during its own transmitting only. The converter implies DTE does not use RTS signal to control the transmitter. For this reason, the converter has to interpret its signal TxD **automatically**. At the TxD changing moment from the idle state (from the negative to positive polarity), the converter activates the link transmitter automatically.

The transmitter is switched off after the certain time τ of TxD return to the neutral polarity. Time interval length τ has to be matched to applied transmission rate because in the automatic mode there it is necessary to keep the transmitter active for the period equal to one byte transmission time. One important communication protocol request is necessary to observe: a device that is to transmit has to wait at least for the time τ from the last byte recorded on RS-485 clamps. If it is to the contrary the first transmitted byte would be damaged.

Block diagram
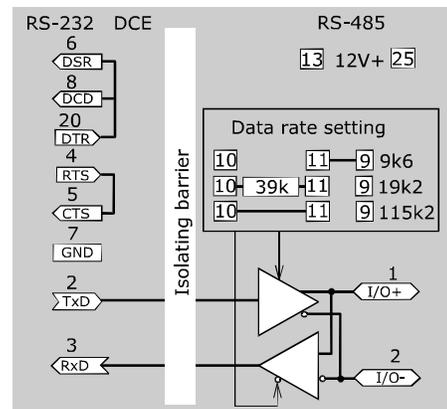
Specifications
Electrical parameters

Interface	RS-232/RS-422
Transmitted signals	TxD and RxD
Control signals	local interconnectors RTS-CTS DTR-DSR DCD
RS-232 connector	DB25F, DCE
Trasmission mode	half-duplex
Power supply	external DC supply 12V/80mA
Isolation voltage between interfaces	3 kV
Permissible over-voltage on the line-the line must not be exposed to the atmospheric discharge influences	

Required link impedance	100Ω
Signals take off:	
TxD, (DTR, RTS) summarily	max. 6mA
	typically 3mA

Other

Range without repeaters	1200m, double-wire link
Maximum data rate	115 200 bps
Minimum data rate	9 600 bps
Dimension: width x length x height	57 x 83 x 24 mm
Weight	80 g
Stocking temperature	- 10° to +55° C
Working temperature	+ 0° to +50° C
Humidity	0 – 85% (non-condensing)