

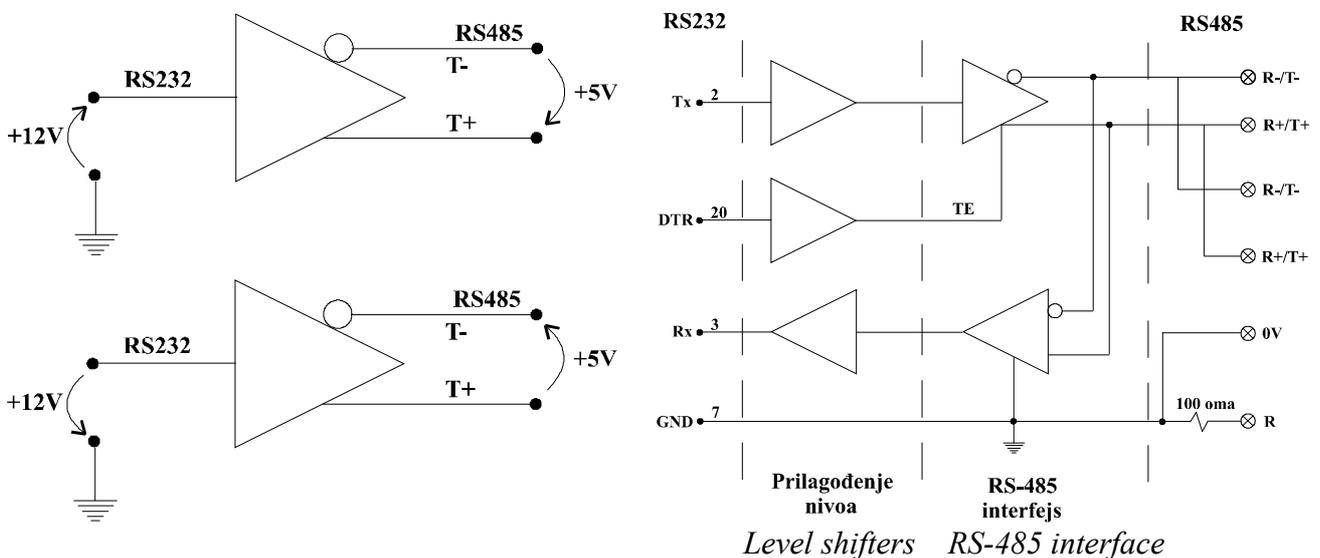
SL-254 RS232<->RS485 converter Technical description

The SL-254 is a compact dongle that converts asymmetric, RS-232 signals into symmetric (differential) RS-485 signals.

1. What is RS-485 ?

RS-485 is a standard that defines voltage levels and interface chips without going into the protocol.

The RS-485 standard supports connection of up to 32 devices onto a twisted pair daisy-chain by using a "multidrop" protocol. As opposed to the RS-232 interface, which uses asymmetric signals (i.e. signals that change polarity only in relation to a fixed point: signal-GND), RS-485 uses symmetrical signals. This means that the voltage polarity between two wires is relevant and there is no need for a common reference.



2. SL – 254 block diagram

For further explanation, please look at the converter's block diagram.

In the default state, when there's no active signal, the Tx pin of the RS-232 interface is low. The T+/R+ pin is also low (0V), while the T-/R- pin is at 5V. All this is dependent on the DTR pin (Transmit Enable) being high i.e. active.

The output drivers of the RS-485 interface are active only when this signal is active (High). When the output buffer on the RS-485 chip isn't active, the interface behaves as a receiver. Logically, only one RS-485 transceiver connected in a daisy-chain may be active at any given moment. In other words, only one can talk, many can listen.

3. Potential equalising

We said that a reference point (voltage) wasn't necessary. In some situations, however, we need to link the ground potentials of the RS-485 nodes that comprise a network.

The receiver part of the RS-485 transceiver chip (which is actually a fast comparator) has a sensitivity of a few hundred mV at CMV (Common Mode Voltage) of $\pm 15V$. That means that the network will function while the difference between the ground potentials of any two nodes is less than 15V.

Connecting the ground points of each node via a resistor ($R=100\Omega$) can equalise the potentials in the network in most cases. This resistor is present in the converter and the other pin is present on the screw terminal (marked with R).

Notes:

- the pin numbers of the RS-232 side are for the D25 connector (the D9 connector has different numbers!)
- make sure your PC software uses the DTR pin as Transmit Enable (if this isn't the case and it can't be changed in the setup, you must make an adapter cable in which all the pins are connected one-to-one except that RTS is connected to the DTR pin (pin 20).