

RS232-C Signals

The RS-232-C interface was initially used on modems. It has been adapted for use in serial communication between PCs and CNC machines. Most of the signals used on modems are not used in PC-CNC communication, and are irrelevant. The following explanation only includes signals that are used.

25 Pin connector

Pin No		Signal	
2	██████████	RD	Receive Data
3	██████████	TX	Transmit Data
4	██████████	RTS	Request To Send
5	██████████	CTS	Clear To Send
6	██████████	DSR	Data Set Ready
7	██████████	GND	Signal Ground
8	██████████	DCD	Data Carrier Detect
20	██████████	DTR	Data Terminal Ready

9 Pin connector

Pin No		Signal	
1	██████████	DCD	Data Carrier Detect
2	██████████	TD	Transmit Data
3	██████████	RD	Receive Data
4	██████████	DTR	Data Set Ready
5	██████████	GND	Signal Ground
6	██████████	DSR	Data Set Ready
7	██████████	RTS	Ready To Send
8	██████████	CTS	Clear To Send

Pin functions on PC

Transmit data (TD)

Carries serial data from the PC to the machine. This is an output from the PC.

Receive data (RD)

Carries input data from the machine to the PC. This is an input to the PC.

Request to send (RTS)

The PC informs the machine that the machine can send data. This is an output from the PC.

Clear to send (CTS)

The machine informs the PC that the PC can send data. This is an input to the PC.

Data set ready (DSR)

Machine informs the PC that it is on and ready to communicate.

Data terminal ready (DTR)

PC informs the machine that it is on and ready to communicate.

Data carrier detect (DCD)

This is always shorted with the DTR.

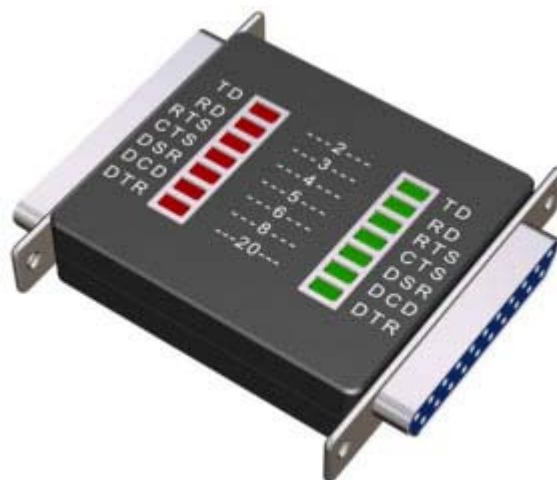
Signal ground

This is the reference point for all interface voltages. It is mandatory.

Communication

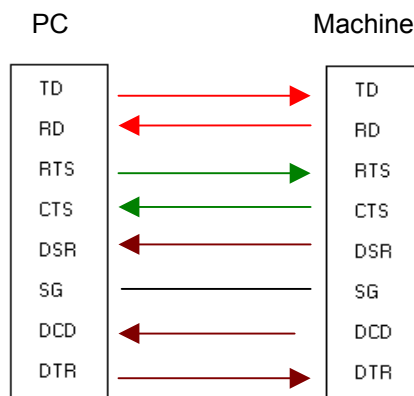
9 control lines are used in the connection between PC and machine. Each of the control lines has two states. They can be either high or low.

The signal status (high or low) can be detected using the Tester shown below. This device is very useful even when diagnosing serial communication problems. Testers are available in the market in different forms and designs. Typically, a green LED indicates a low state and a red LED indicates a high state



RS 232-C Tester

A typical sequence of control information in an RS232 transmission might go like this:



When the PC and machine are off

If you put the tester in either the PC or the machine's port, all LEDs on the tester are off – neither the green nor the red LEDs will glow.

When you switch on the PC and machine

1. When you start NCnet, the PC puts its DTR high to indicate that it is active and ready for communication. The machine receives this signal in its DSR and thereby knows that the

PC is ready for communication. If you put the tester at the PC, the DTR line glows red to show The tester shows

2. When the machine is switched on, it puts its DTR high to indicate that it is ready for communication. The PC receives this signal in its DSR.

When you transmit a program from the PC to the machine

The PC puts its RTS high to tell the machine that it wants to now send some data. The machine receives this signal in its CTS input. The PC now transmits data to the machine on its TD line and the machine receives it on its RD line. If the machine receives data too fast for it to handle, it temporarily stops the PC by using RTS output from machine. The machine drops DTR low to disconnect the communication after data transmission is over.

What happens when you transmit a program from the machine to the PC

The machine puts its RTS high to tell the PC that it wants to now send some data. The PC receives this signal in its CTS input. The machine now transmits data to the machine on its TD line and the PC receives it on its RD line. If the PC receives data too fast for it to handle, it temporarily stops the machine by using RTS output from PC. The PC drops DTR low to disconnect the communication after data transmission is over.