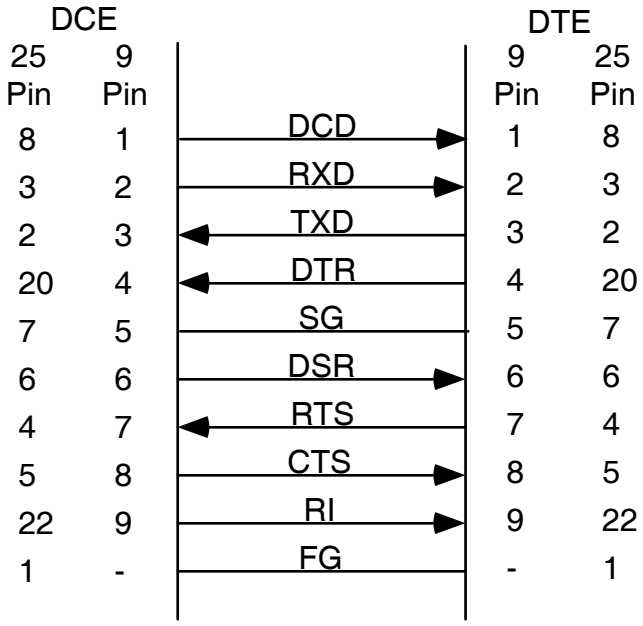
A Concise Guide to RS-232 (EIA-232)
Control Solutions, Inc.
www.csimn.com

The signal definitions and pin numbers on "D-sub" connectors are shown below.



DCE stands for Data Communications Equipment. DTE stands for Data Terminal Equipment. These definitions go back to the days when the teletype machine was DTE, and a modem was DCE.

The MALE connector is located on or associated with DTE.
The FEMALE connector is located on or associated with DCE.

IBM PC 9-pin COM1 or COM2 connectors follow the DTE pinout. Older IBM PC 25-pin COM1 or COM2 connectors follow the DCE pinout.

MARK = OFF = Binary 1 data = -12V
SPACE = ON = Binary 0 data = +12V

Interpretation of Signals:

RTS is turned on by DTE indicating that DTE wishes to transmit to DCE. DCE responds by turning on CTS at which time DTE may transmit data to DCE via TXD. When DTE turns off RTS off, DCE responds by turning CTS off.

DCE may also turn off CTS to cause DTE to suspend transmission via TXD while DCE processes data already received.

DSR is turned on by DCE to indicate that DCE is connected, and in the case of a modem that dialing has been completed and a connection made.

RI is the ring indicator that turns on when an incoming call is detected (applies to modems on phone lines).

DCD is the carrier detect which turns on when a good signal is being received from the modem at the other end of the line.

DTR is turned on by DTE indicating DTE is ready to transmit or receive data. DTR is turned off by DTE to indicate that DCE should stop sending data to DTE via RXD.

Summary:

CTS enables data on TXD from DTE to DCE.
DTR enables data on RXD from DCE to DTE.

When used between computers rather than with modems, DSR is usually just turned on to indicate that a cable is connected, and therefore the equipment generating DSR simply connects it to +12V.

RI and DCD are commonly not used between computers. Most often, only CTS and DTR are used for handshaking between computers if there is any handshaking at all.