**To be DTE or not to be DCE – That is the question**

(Some attempts to define whether a device is DTE or DCE because the same device can be either depending on it position and function in the network).

The terms DTE and DCE are very common in the datacommunications market. DTE is short for Data Terminal Equipment and DCE stands for Data Communications Equipment. But what do they really mean? As the full DTE name indicates this is a piece of device that ends a communication line, whereas the DCE provides a path for communication.  
  
Let's say we have a computer on which wants to communicate with the Internet through a modem and a dial-up connection. To get to the Internet you tell your modem to dial the number of your provider. After your modems has dialed the number, the modem of the provider will answer your call and your will hear a lot of noise. Then it becomes quiet and you see your login prompt or your dialing program tells you the connection is established.  
Now you have a connection with the server from your provider and you can wander the Internet.  
  
In this example you PC is a Data Terminal (DTE). The two modems (yours and that one of your provider) are DCEs, they make the communication between you and your provider possible. But now we have to look at the server of your provider. Is that a DTE or DCE?  
The answer is a DTE. It ends the communication line between you and the server although it gives you the possibility to surf around the globe. The reason why it is a DTE is that when you want to go from your provider’s server to another place it uses another interface. So DTE and DCE are interface dependent. It is e.g. possible that for your connection to the server, the server is a DTE, but that that same server is a DCE for the equipment that it is attached to on the rest of the Net.

**DTE vs. DCE**

This is one of the most misunderstood areas of RS-232. DTE stands for Data Terminal Equipment, and DCE stands for Data Communications Equipment. DTE is typically either a dumb terminal or the serial port on a computer/workstation.

DCE is typically a modem, DSU/CSU, or other piece of data communications equipment, hence the names. This is all most people really need to know about these terms.Where it gets confusing is when you start to talk about signal definitions and direction. For example, it's easy for someone to understand that when you transmit data, you send it out. However, when you talk in terms of DCE, it becomes an input signal. This is because the specification was written from the perspective of the DTE end of the link. Another example is the Receive Data signal is an input to DTE, but an output from DCE.

Therefore, a straight through "one to one" cable is all that is necessary between a modem and a standard DTE serial port. However, if you want to connect two DTE ports together, you have to simulate the existence of the pair of DCE devices, typically modems that would normally be between the two DTE devices. This is where the null-modem device or cable comes in.

Below is a post from a CISCO discussion forum regarding DTE/DCE

* From Federal Standard 1037C -- Glossary of Telecommunication Terms

DCE = Data Circuit-terminating Equipment.

1. In a data station, the equipment that performs functions, such as signal conversion and coding, at the network end of the line between the data terminal equipment (DTE) and the line, and that may be a separate or an integral part of the DTE or of intermediate equipment.

2. The interfacing equipment that may be required to couple the data terminal equipment (DTE) into a trasnmission circuit or channel and from a transmission circuit or channel into the DTE.

synonyms Data Communications Equipment (deprecated) and data set (deprecated).

DTE = Data Terminal Equipment

1. An end instrument that converts user information into signals for transmission or reconverts the received signals into user information.

2. The functional unit of a data station that serves as a data source or a data sink and provides for the data communication control function to be performed in accordance with link protocol.

Given that the above sounds like gobbledegook, a brief history lesson:

Back in the dark ages of networking (before the Codaphone decision opened  up the telephone network in the US, and the case for decades afterward in many other countries), to get from point A to point B, you had to go to the phone company to get a data line. To "protect" their cable plant, the phone company provided the DCE (aka modem or CSU/DSU) to take your data and make it palatable for their infrastructure.

Networking standards were defined in terms of the DTE/DCE interface, the definition of how your equipment talked to the equipment provided by the phone company (a government agency in most countries outside the US). Example DTE/DCE interface definitions include RS232, X.21, X.25, RS530, etc. Note that some of these interface protocols are for higher levels of the OSI model, such as X.25 and LAPB. At the physical layer, they define the physical interface (the connecter to use), the electrical interface (what value is a 0 and what is a 1), the functional interface (which pin is receive and which is send), and the procedural interface (hardware handshakes, who provides clock, and the like).

Be very careful of what you read, because many authors and manual writers never take the time to keep the details straight (be particularly wary of marketing literature, whose authors prefer to define old terms in new ways to make their product sexier). The classic examples are redefinition of the term "baud" to mean "bits/second" and "internal clocking" to mean coming from the device  (rather than from the DCE, internal / external refering to the network infrastructure).

Bottom line: Use extreme care when reading, because many networking terms have been corrupted over the years, and their meaning in context may or may not relate to the formal definition. My favorite example was the marketing campaign about 10 years ago for "revolutionary new protocol independent routers" which, if you read between the line, were nothing more than multiport bridges! If in doubt, use the duck test: If it waddles like a duck, swims like a duck, flies like a duck and quacks like a duck, don't worry what the brochure calls it, it's a duck.