Week 2: System basics

Week 2: Serial and parallel communication

Serial communication

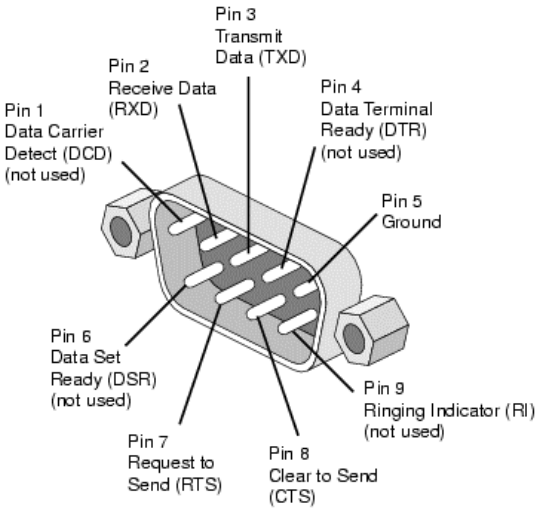
The legacy *serial port* protocol (known as **RS-232 (http://en.wikipedia.org/wiki/RS-232)**) has been around since the 1960s. Originally, it was used to connect display terminals to mainframe computers. In the context of desktop computing, it is most commonly used to connect a modem to a computer.

The standard calls for a 25-pin connector similar to that of a parallel port; however many computer systems (and virtually all modern systems) use a more compact 9-pin port.

The standard as used on IBM PCs is rated for speeds of up to 115 kilobits per second. Older Apple Macintosh machines had an enhanced serial port which allowed for faster data transfer (230kbit/sec). This interface was fast enough for a basic networking scheme known as **LocalTalk (http://en.wikipedia.org/wiki/Localtalk)** .

– e.g. legacy AT keyboard connector & PS/2 mouse connector verses more modern USB connector

– e.g. ye olde RS-232 serial port (since the 1960s!)



Above is a diagram of 9-pin serial port. The only three lines that are actually necessary for data transmission are Transmit, Receive, and Ground. The other pins are for flow control, which may or may not be used, depending on the *protocol* of the communication scheme being used.

Like parallel ports, serial ports and cables with proper grounding can be hot-swapped in relative safety. The same caveats apply with regard to standardisation and software compliance.

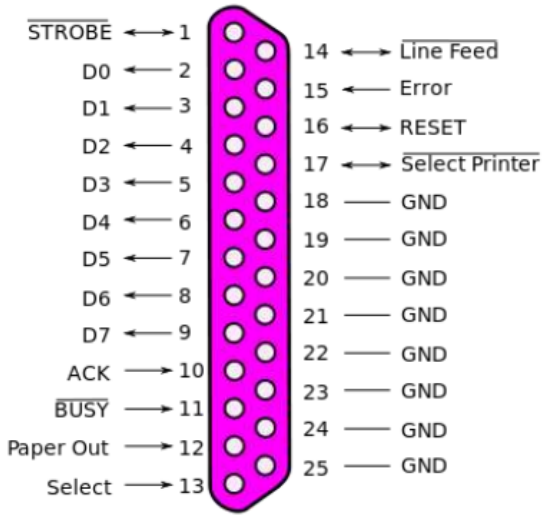
Parallel communication

The legacy ***parallel p or t*** **(http://en.wikipedia.org/wiki/IEEE_1284)** was most often used to connect computers to a printer. Parallel ports could also be used to transfer data between computers relatively quickly for the time. At its development peak, parallel ports could deliver data at speeds of up to 4 megabits (million bits) per second.

Being a parallel interface, many (25) wires were needed, resulting in chunky connectors and thick cables that could not span more than a couple of metres.

– e.g. a parallel printer cable

One big advantage of the parallel port was that it is very easy to build electronics for; many enthusiasts were attracted to this ease of development, and created many home-built computer peripherals.



The diagram above is that of a DB25 parallel port, commonly seen on most older PCs (and some modern business and specialty PCs). *D0* to *D7* are the eight data lines, each with a corresponding ground pin. The *strobe* signal defines the timing of the parallel signal, and other pins such as *ACK* (acknowledge) and *BUSY* (device is busy) are for flow control - making sure data is properly understood, and sent at the right time.

Parallel ports and cables with proper grounding can be hot-swapped relatively safely; however there is no guarantee in the standard that this is so, or that the software running on the computer system will tolerate it gracefully.