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Flow Control Protocols (XOn/XOff or DTR)

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Data is usually transmitted much more rapidly than it can be processed. This is why devices allocate memory to buffer space. Buffers are used to collect the received data as it comes in. However, many transmissions are quite a bit larger than the buffer space allocated. What is needed is a way for the receiving station to tell the transmitting station to stop and start transmitting as its buffer fills and is emptied. This is the purpose of flow control protocols.

We'll discuss the two most popular methods of flow control used in personal computer systems.

1. XON/XOFF - is a very popular method of flow control between asynchronous full duplex devices (for more info on asynchronous data transfers search on HTS and Asynchronous; for more info on full duplex search on HTS and Duplex). In full duplex, both communicating devices can send each other data at the same time. When the receiver's buffer starts getting too full, it sends an XOFF (which is most often an ASCII DC3 character; for more information on ASCII control characters search on HTS and ASCII Control Characters). The Transmitter sees the XOFF and stops its transmission. When the receiver is ready for more data it sends the transmitter an XON (most often an ASCII DC1 character). The transmitter sees the XON and resumes transmission. This process goes on until the transmission is complete.

2. DTR (also called hardware handshaking) - can be used in full or half duplex RS232 communications. DTR is an RS232 control signal which normally indicates that a DTE device is online (for more info on DTEs and DCEs, search on HTS and RS232). However, many manufacturers use it for flow control. When the receiver's buffer starts getting too full, it turns off its DTR signal. The transmitter stops sending data. When the receiver is ready for more data it turns its DTR back on. The transmitter resumes transmission. This process goes on until the transmission is complete.

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