

Re: Speed

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"w2aew" <w2aew@xxxxxxxxxxx> wrote in message
news:1142176878.952755.73370@xx

Jon,

Encoding schemes are used to overcome certain problems (long run length, transmission spectra, clock recovery, etc.). While many encoding schemes increase the BW, there are many that also decrease the BW required. A good example is your old 56K modem. This uses an encoding scheme that squeezes 56kilobits/sec through about 3KHz of bandwidth on the phone line.

I would say that in most cases, when someone quotes a datarate, then they are referring to the actual information rate, or resulting bits/sec of real information, rather than the encoded or transmitted baudrate.

In basic, digital baseband serial transmission, without encoding, the basic frequency is equal to $1/2 * 1/\text{bitrate}$, as explained above.

In the 10Gb/s optical transmission I mentioned – this is basically the transmission rate. There's a standard for 9.953Gb/s transmission, which includes the header, framing info, etc., so the actual "data information rate", or "payload" rate is slightly lower. Many transmission systems include forward error correction, which adds bits and thus increases the signally rate for the same payload rate. Common FEC rates are in the range of 11.5Gb/s to 12.5Gb/s for the same payload rate as the unencoded 9.953Gb/s basic rate. The optical transmission is most commonly done with simple two-level transmission (i.e. light=on for a 1, light=off for a 0). Thus, for 10Gb/s, the maximum optical square wave frequency is 5GHz.

Mainstream silicon bipolar and silicon CMOS process can produce devices that support serial bitrates in excess of 10Gb/s. There are exceptions of course. In many cases, more high-performance processes such as silicon-gemanium, gallium-arsenide, or other heterojunction semiconductors are used for >10Gb/s. There are processes that produce devices capable of operating at speeds in excess of 100Ghz.

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There are ways of directly handling ultra high speeds like 1THz, but generally these speeds are achieved in a parallel fashion – lots of high speed signals processed simultaneously.

Ok, Thanks for the indepth explanations.

Jon