

modulation

From "Hargrave's Communications Dictionary, Wiley"

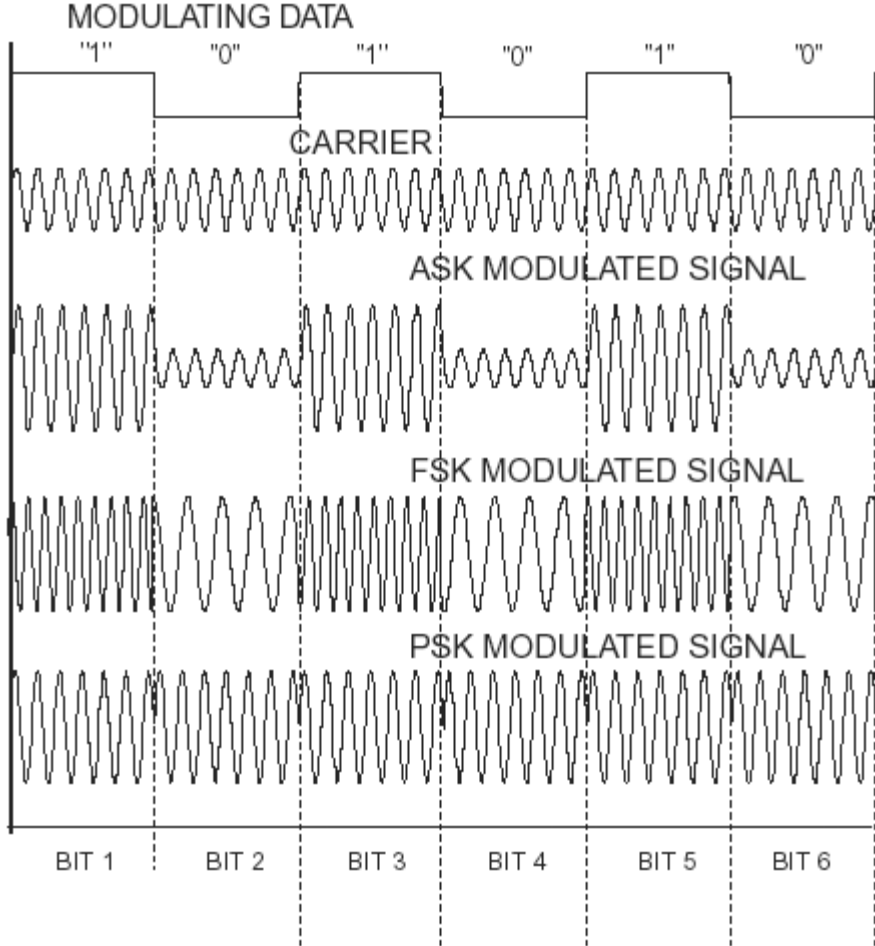


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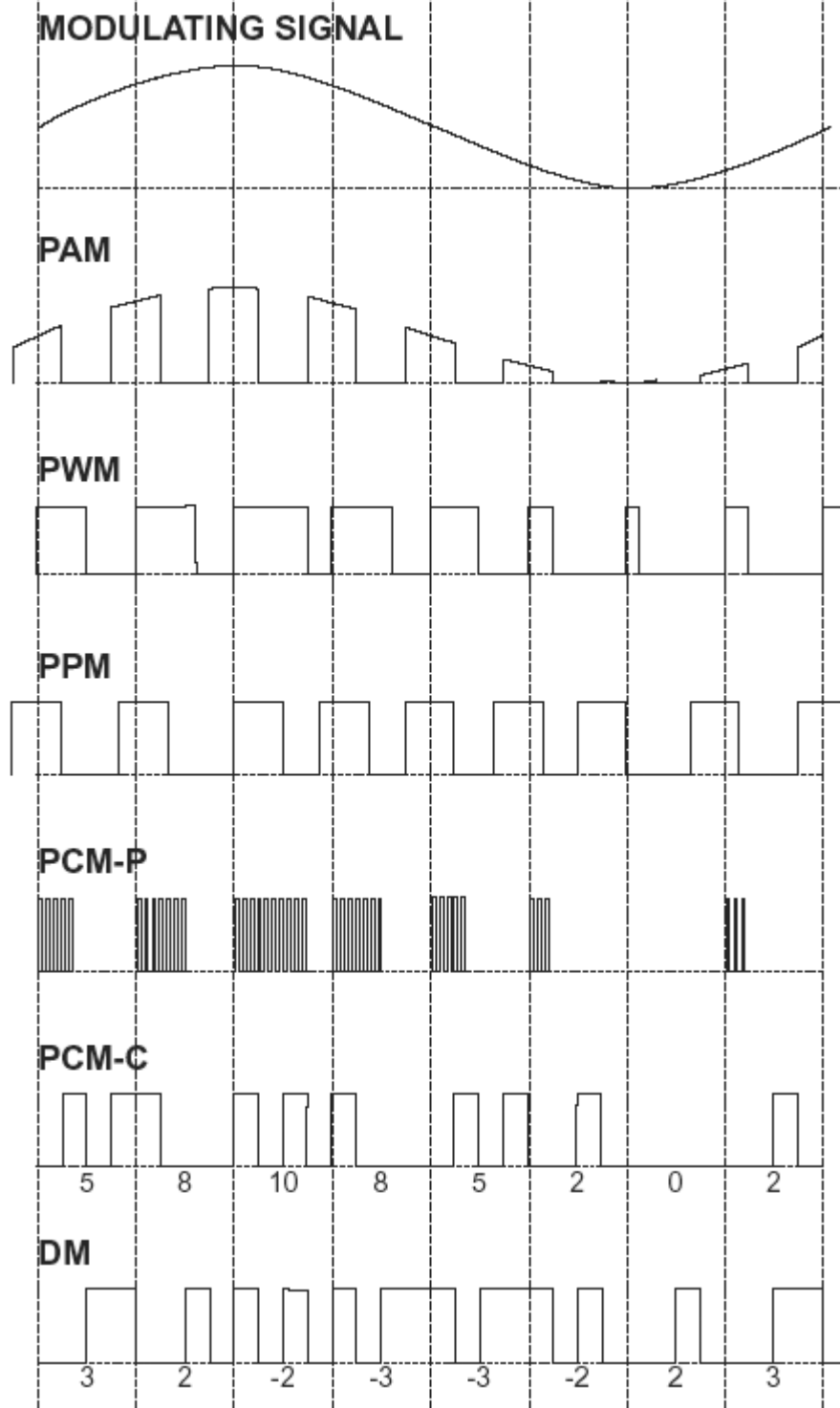
Modulation is the process of varying some characteristic of one signal (the carrier) in accordance with another signal (the message signal). Some of the parameters of a carrier that may be modulated are:

- Amplitude (yielding AM or ASK).
- Frequency (yielding FM, FSK, MFSK, MSK, etc.).
- Phase (giving rise to PM, PSK, DPSK, QPSK, 4PSK, 8PSK, etc.).
- Both amplitude and phase may be changed independently, giving rise to QAM (Quadrature Amplitude Modulation).

AM (amplitude modulation), FM (frequency modulation), and PM (phase modulation) are the generic terms for the modulation method; that is, the information signal may be analog or digital in form. ASK (amplitude shift keying), FSK (frequency shift keying), and PSK (phase shift keying) apply only when the information signal is a digital signal. DPSK (differential phase shift key), 4PSK and 8PSK describe the number of phases possible in a PSK modulator. Three basic digitally modulated carrier waveforms are displayed in the diagram.



The top trace is the information signal, and the second trace is the carrier. The three remaining traces show what happens to a carrier when it is modulated with a digital data stream using ASK, FSK, and PSK modulation techniques. Several forms of pulse modulation are illustrated in the following figure.



The top trace is the modulating wave having values of 5, 8, 10, 8, 5, 2, 0, 2, 5 at the nine indicated sampling times. The modulation methods shown are **pulse amplitude modulation (PAM)**, **pulse width modulation (PWM)** sometimes called **pulse density modulation (PDM)**, **pulse position modulation (PPM)**, and three forms of **pulse code modulation (PCM)**. The three PCM waveforms are pulse count, direct code word, and difference code word (called delta modulation—DM). See also **amplitude modulation (AM)**, **frequency modulation (FM)**, **gaussian minimum shift key (GMSK)**, **minimum shift key (MSK)**, **phase modulation (PM)**, **pulse amplitude modulation (PAM)**, **pulse code modulation (PCM)**, **pulse position modulation (PPM)**, and **pulse width modulation (PWM)**.



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APA

Modulation. (2001). In *Hargrave's communications dictionary*, Wiley. Retrieved from <http://search.credoreference.com/content/entry/hargravecomms/modulation/0>

MLA

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Chicago

"Modulation." In *Hargrave's Communications Dictionary*, Wiley. Hoboken: Wiley, 2001. <http://search.credoreference.com/content/entry/hargravecomms/modulation/0> (accessed June 19, 2014.)

Harvard

2001 'Modulation' in *Hargrave's communications dictionary*, Wiley, Wiley, Hoboken, USA. Accessed: 19 June 2014, from Credo Reference