Figure 7.2 *Classes of transmission media*

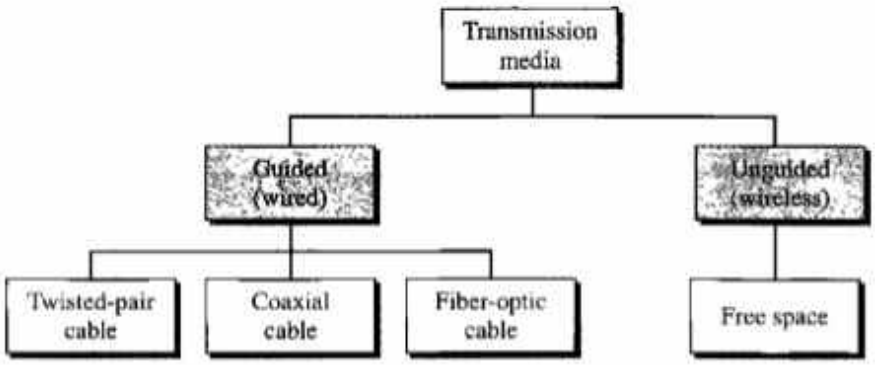
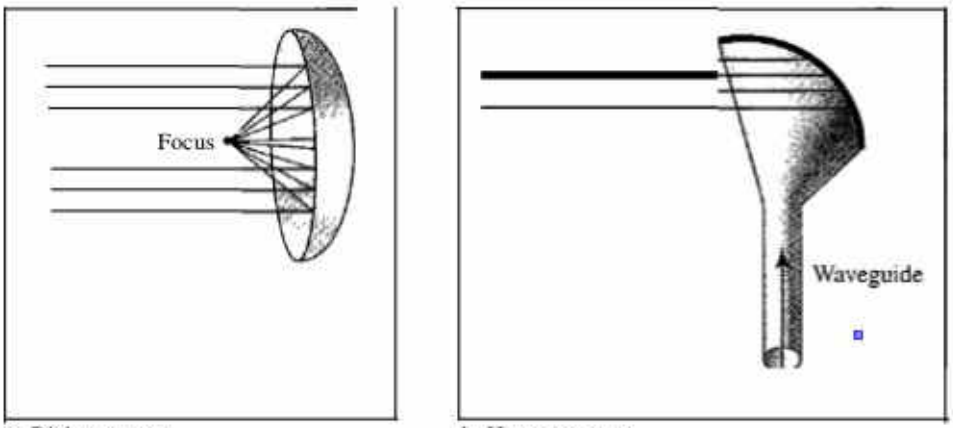


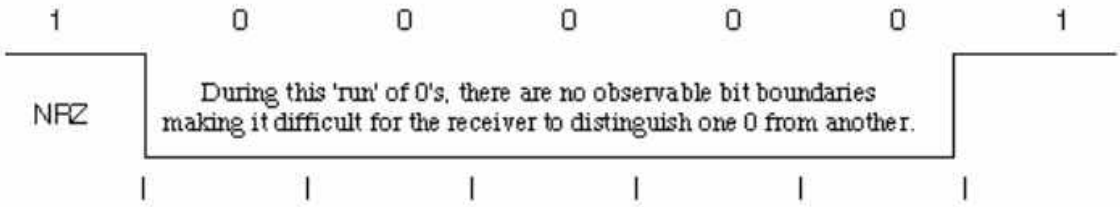
Table 7.4 *Bands*

Band	*Range*	*Propagation*	*Application*
VLF (very low frequency)	3-30 kHz	Ground	Long-range radio navigation
LF (low frequency)	30-300 kHz	Ground	Radio beacons and navigational locators
MF (middle frequency)	300 kHz-3 MHz	Sky	AM radio
HF (high frequency)	3-30 MHz	Sky	Citizens band (CB), ship/aircraft communication
VHF (very high frequency)	30-300 MHz	Sky and line-of-sight	VHF TV, FM radio
UHF (ultrahigh frequency)	300 MHz-3 GHz	Line-of-sight	UHF TV, cellular phones, paging, satellite
SHF (superhigh frequency)	3-30 GHz	Line-of-sight	Satellite communication
EHF (extremely high frequency)	30-300 GHz	Line-of-sight	Radar, satellite

Figure 7.21 *Unidirectional antennas*



NRZ Figure



A long run of bits with the same value results in no transitions on the cable when NRZ encoding is used

Figure 4.8 *Polar biphase: Manchester and differential Manchester schemes*

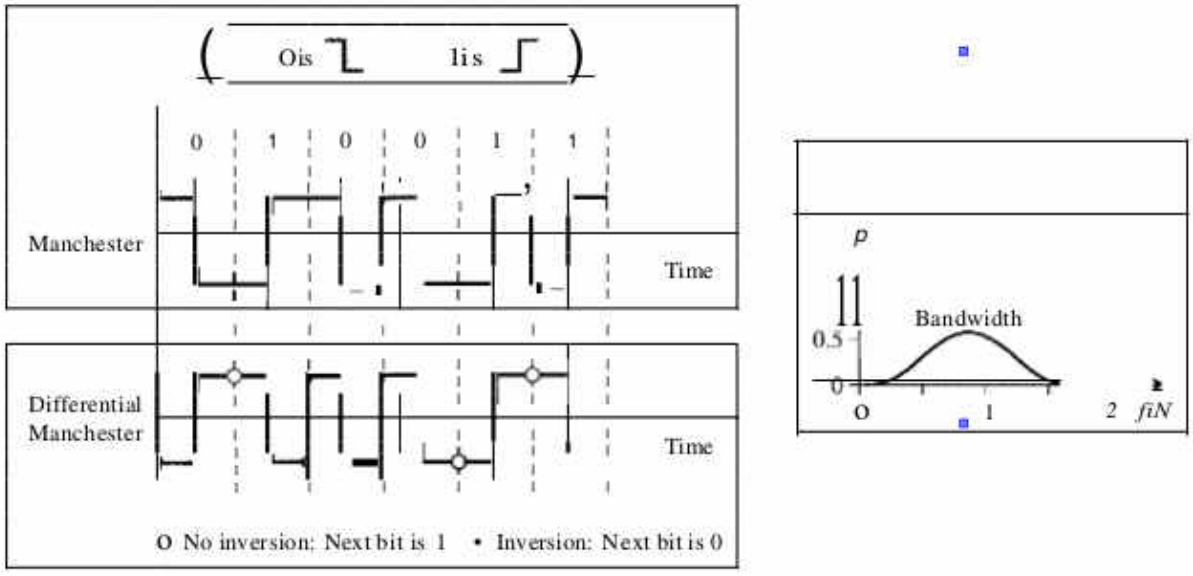


Figure 4.9 *Bipolar schemes: AMI and pseudoternary*

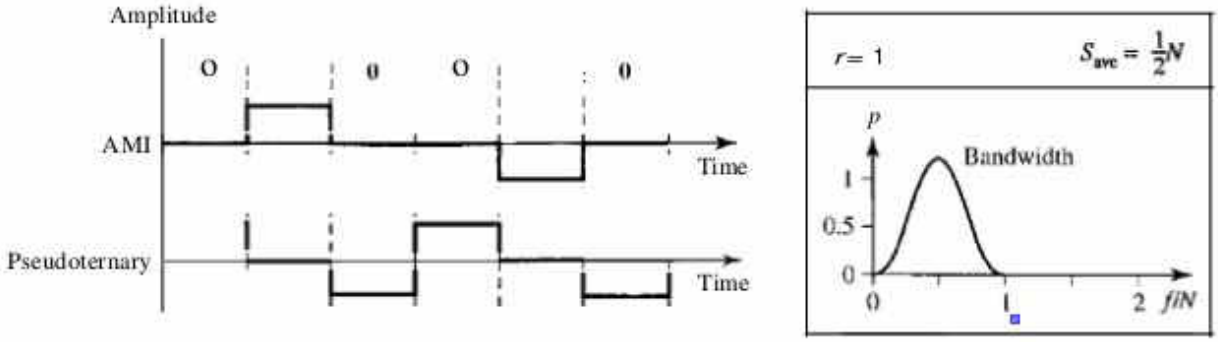
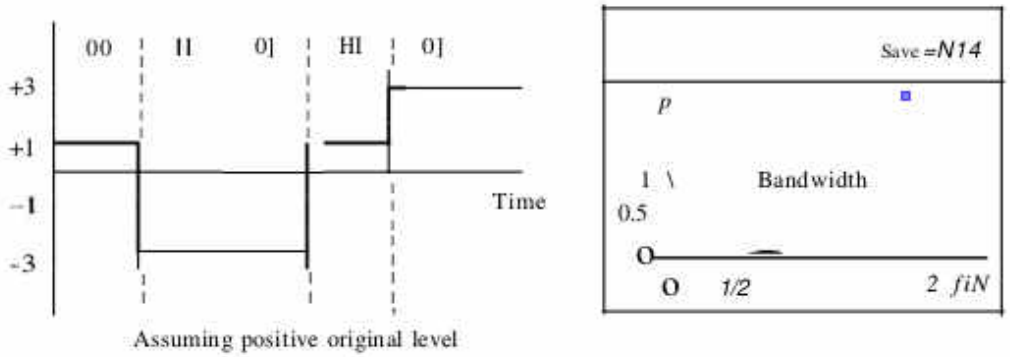


Figure 4.10 *Multilevel: 2B1Q scheme*

Next bits	Previous level: positive — Next level	Previous level: negative — Next level
00	+1	-1
01	+3	-3
10	-1	+1
11	-3	+3

Transition table



Assuming positive original level

Figure 4.11 *Multilevel: 8B6T scheme*

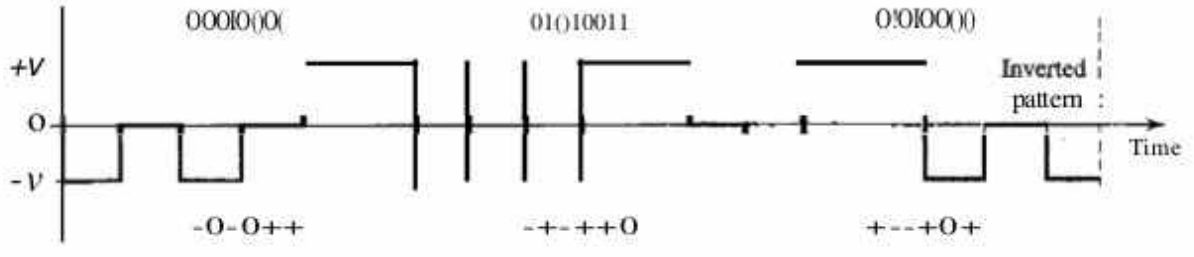


Figure 4.12 *Multilevel: 4D-PAM5 scheme*

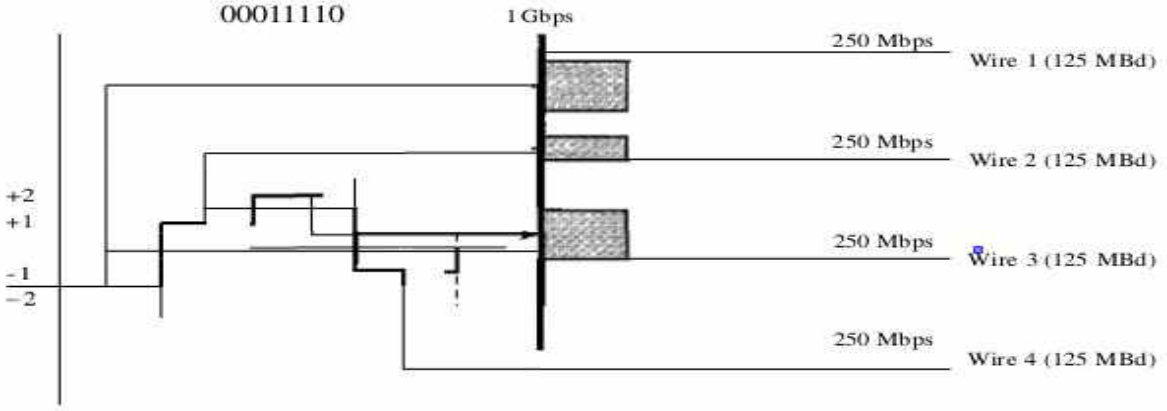
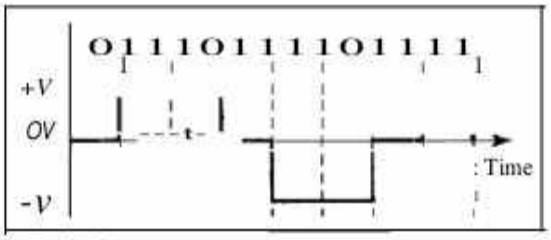
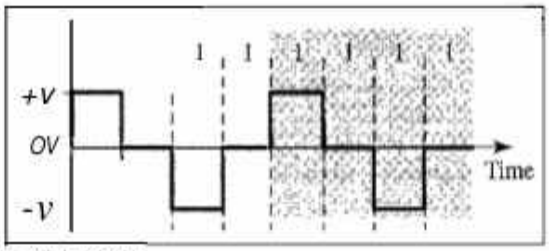


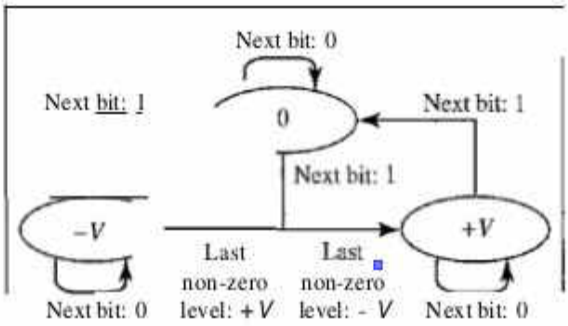
Figure 4.13 *Multitransition: MLT-3 scheme*



a. Typical case



b. Worse case



c. Transition states

Figure 4.21 *Components of PCM encoder*

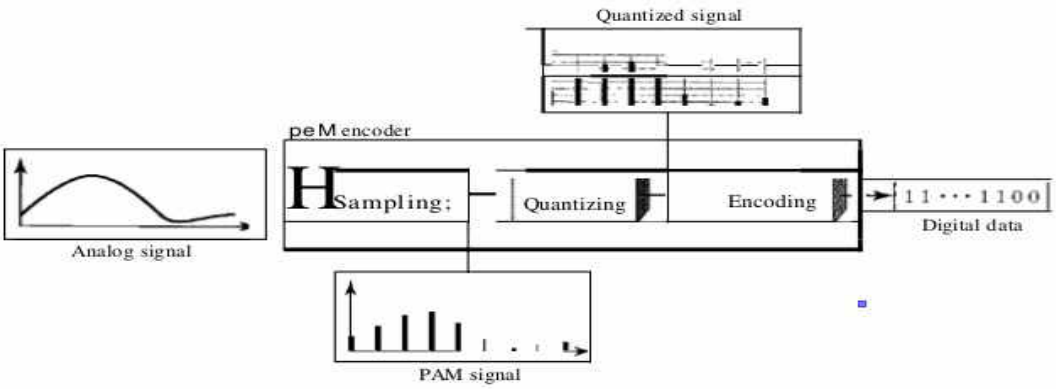


Figure 4.22 *Three different sampling methods for PCM*

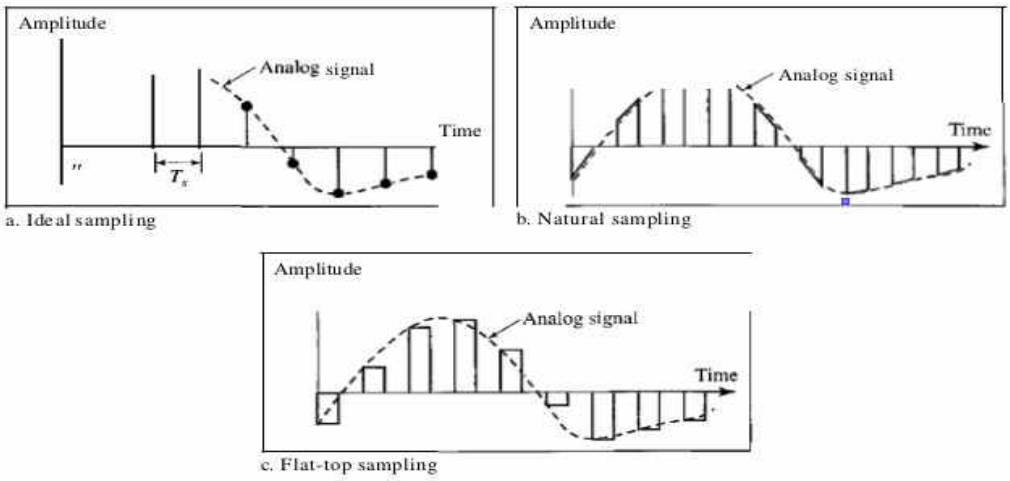


Figure 4.23 *Nyquist sampling rate for low-pass and bandpass signals*

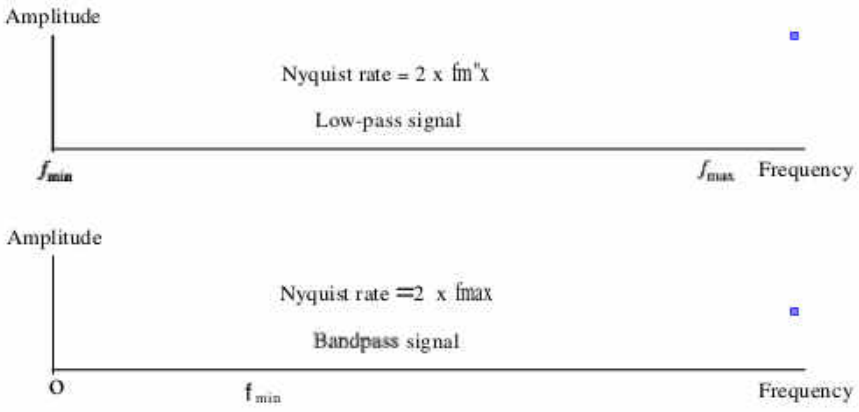
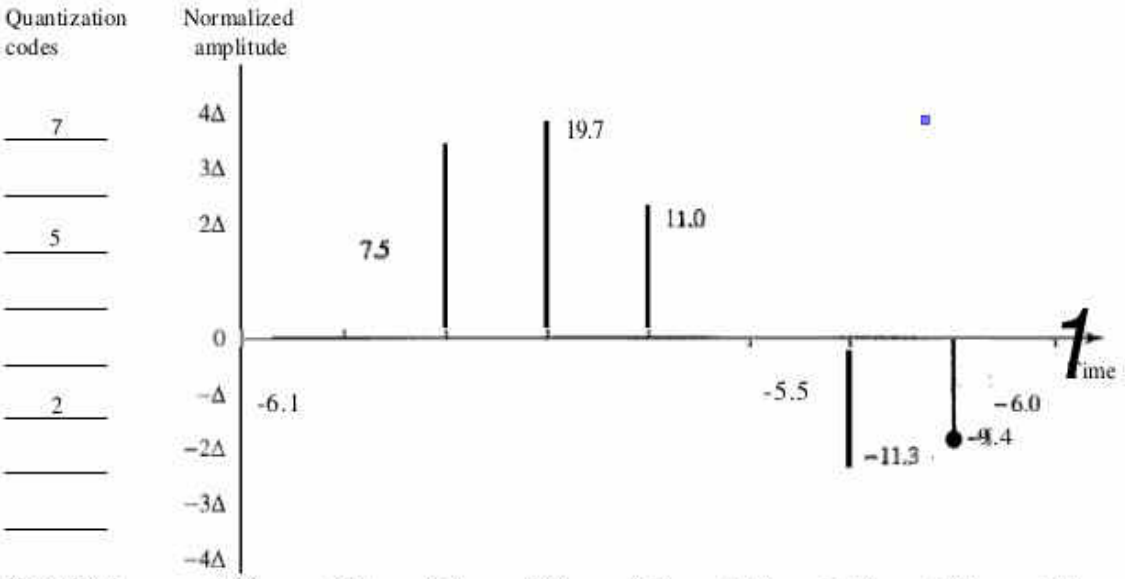


Figure 4.26 *Quantization and encoding of a sampled signal*



Normalized PAM values	-1.22	1.50	3.24	3.94	2.20	-1.10	-2.26	-1.88	−1.20
Normalized quantized values	-1.50	1.50	3.50	3.50	2.50	-1.50	-2.50	-1.50	-1.50
Normalized error	-0.38	O	+0.26	-0.44	+0.30	-0.40	-0.24	+0.38	-0.30
Quantization code	2	5	7	7	6	2		2	2
Encoded words	010	101	111	111	110	010	001	010	OW

Figure 5.2 *Types of digital-to-analog conversion*

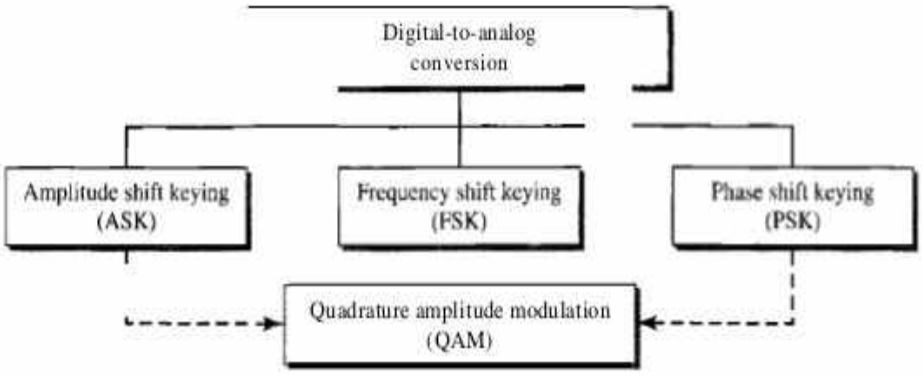


Figure 5.3 *Binary amplitude shift keying*

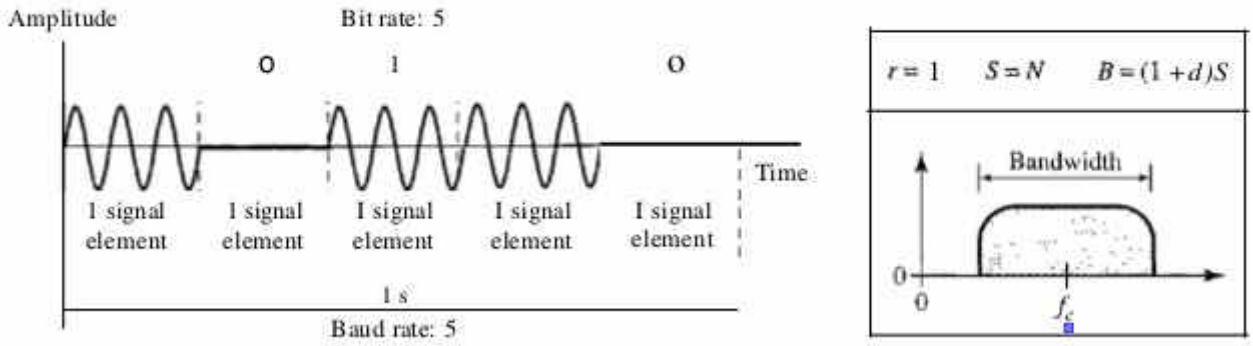


Figure 5.4 *Implementation of binary ASK*

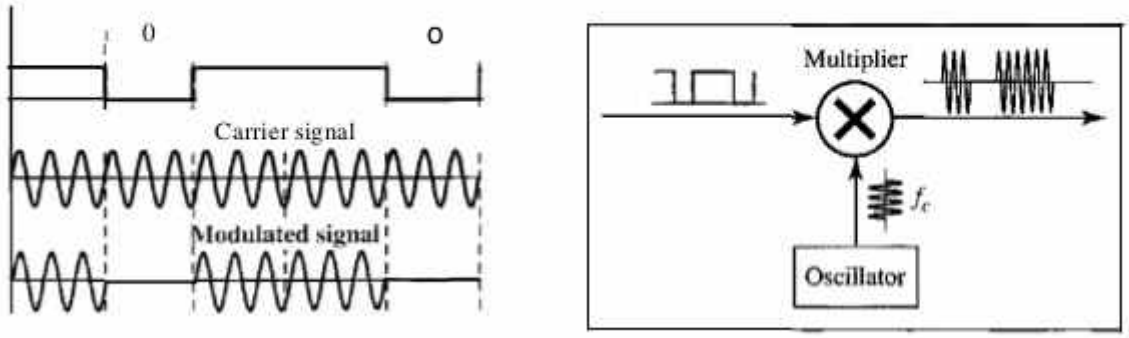


Figure 5.6 *Binary frequency shift keying*

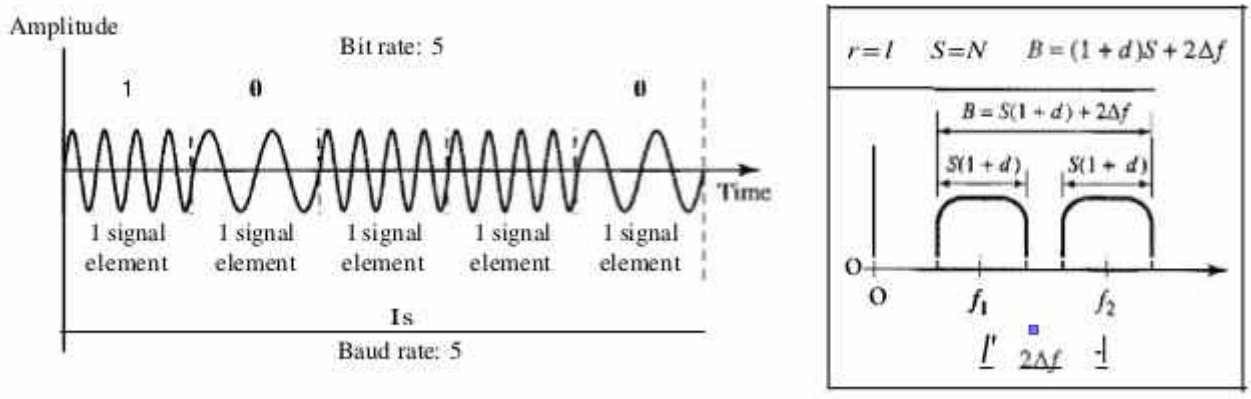


Figure 5.9 *Binary phase shift keying*

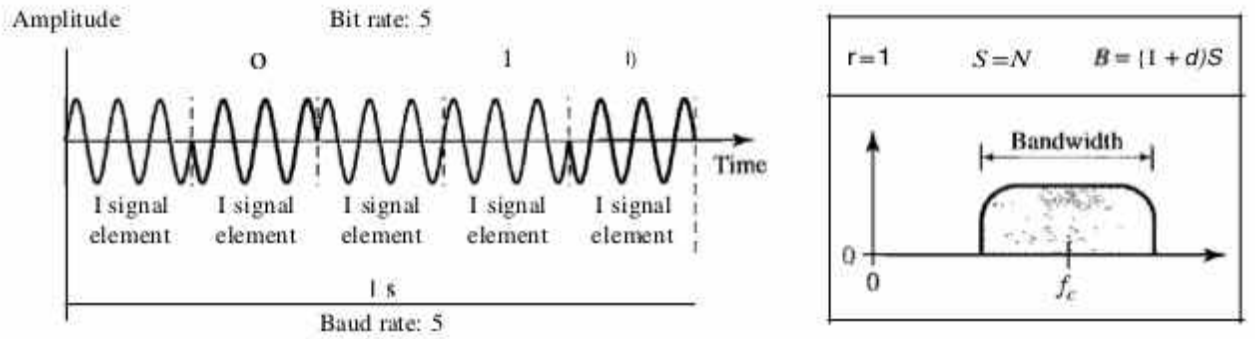


Figure 5.11 *QPSK and its implementation*

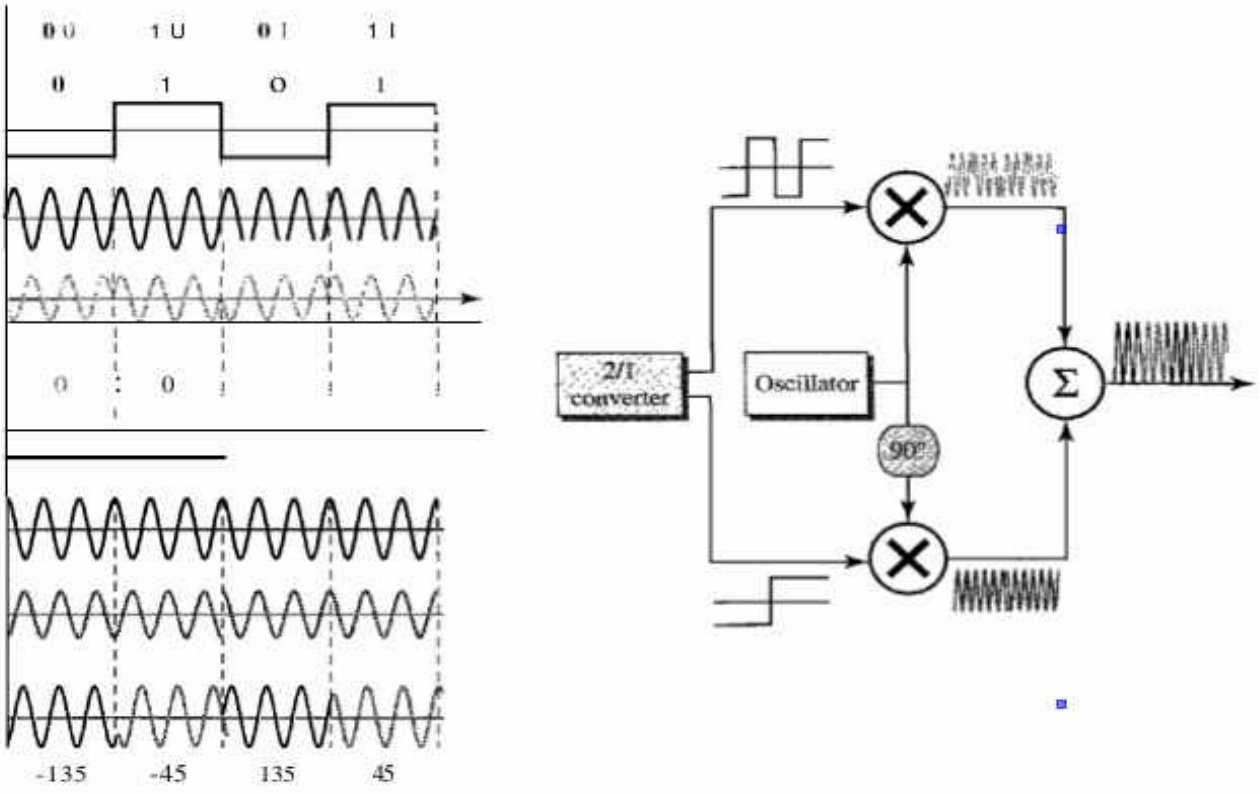


Figure 5.16 *Amplitude modulation*