Bangladesh Army University of Engineering & Technology

CSE-3215
Data Communication

Lecture-26

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Phase Shift Keying

In phase shift keying, the phase of the carrier signal is varied to represent data. Both peak amplitude and frequency remain constant as the phase changes.

Binary Phase Shift Keying (BPSK)

The simplest PSK is binary PSK, in which we have only two signal elements, one with a phase of 0°, and the other with a phase of 180°. Figure 1 gives a conceptual view of BPSK. It is to be noted that, PSK is less susceptible to noise than ASK and it is also superior to FSK.

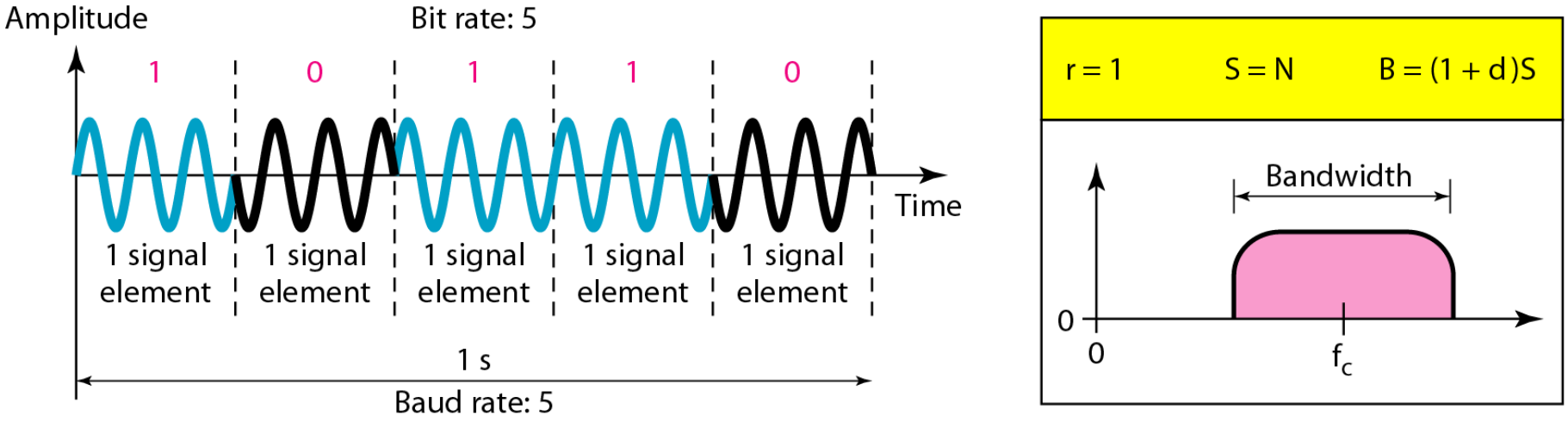
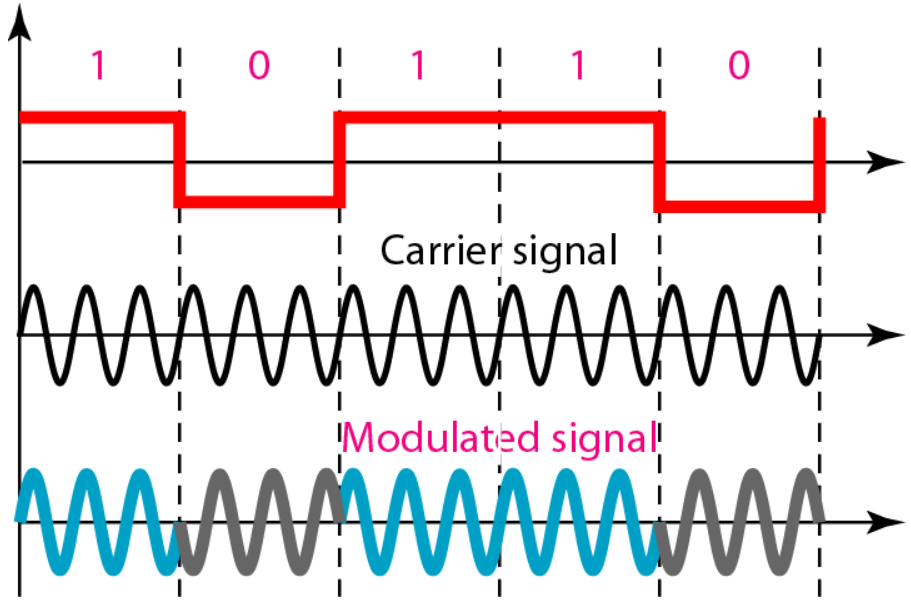


Figure 1 *Binary phase shift keying*



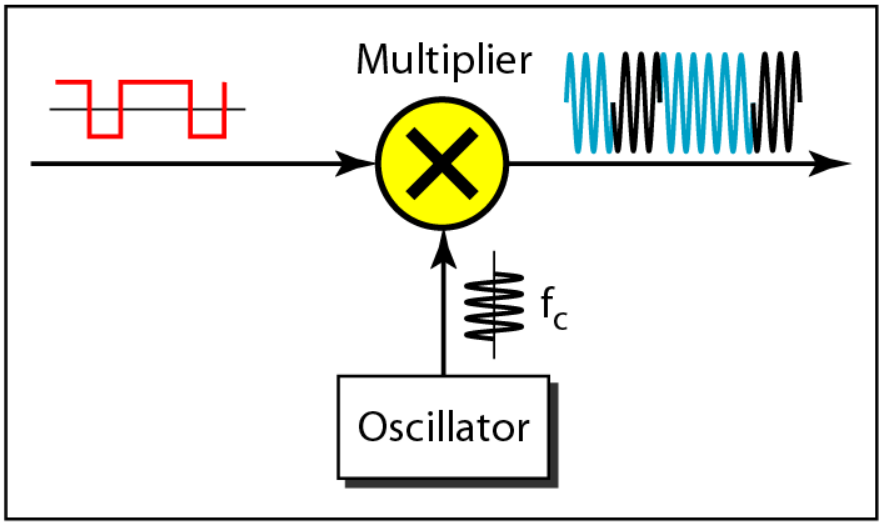


Figure 2 *Implementation of BPSK*

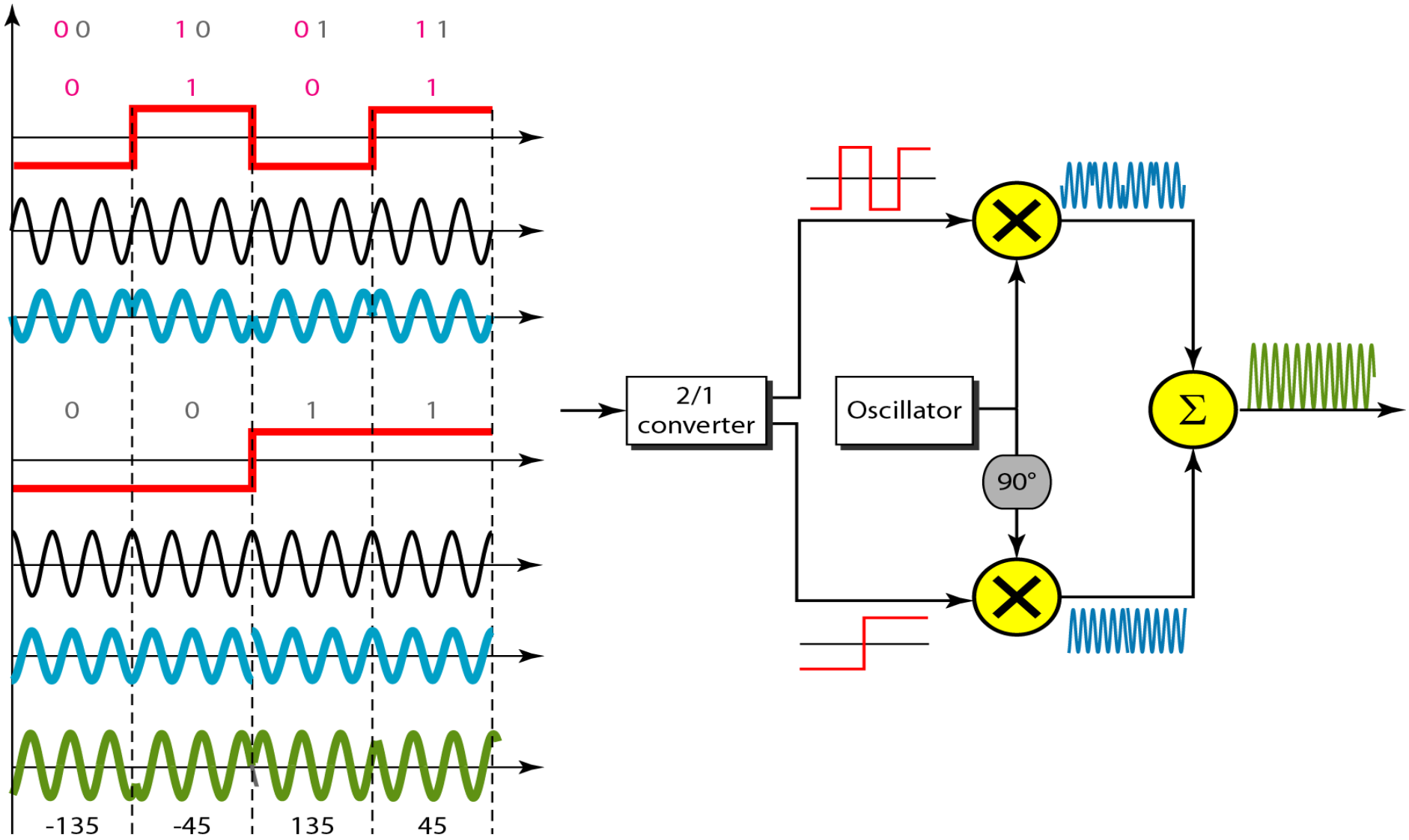


Figure 3 *QPSK (Quadrature PSK) and its implementation*

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Find the bandwidth for a signal transmitting at 12 Mbps for QPSK. The value of d = 0.

Solution

For QPSK, 2 bits is carried by one signal element. This means that r = 2. So the signal rate (baud rate) is S = N × (1/r) = 6 Mbaud. With a value of d = 0, we have B = S = 6 MHz.

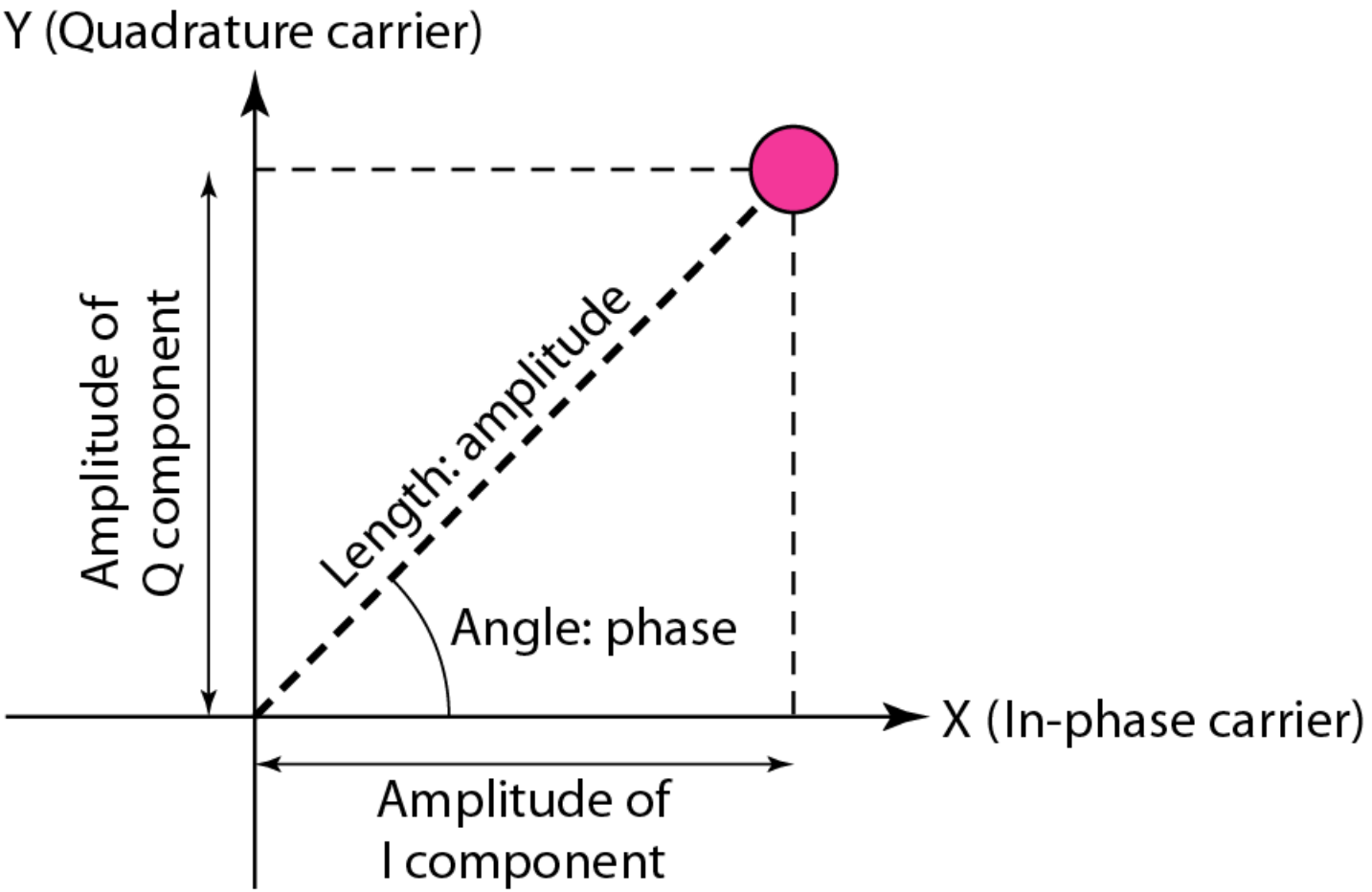

Figure 4 *Concept of a constellation diagram*

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Show the constellation diagrams for an ASK (OOK), BPSK, and QPSK signals.

Solution

Figure 5 shows the three constellation diagrams.

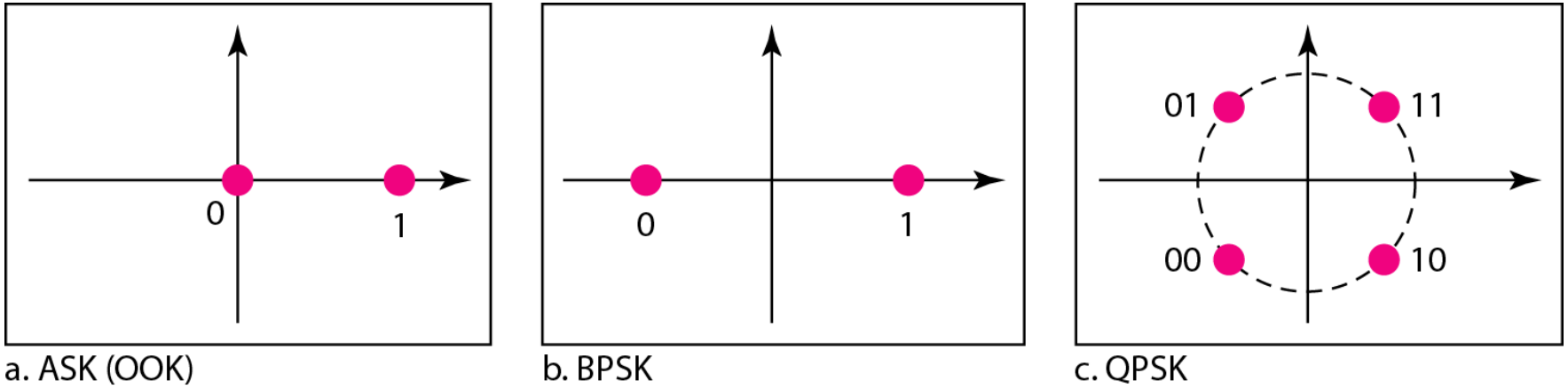

Figure 5 *Three constellation diagrams*

Note

Quadrature amplitude modulation is a combination of ASK and PSK.

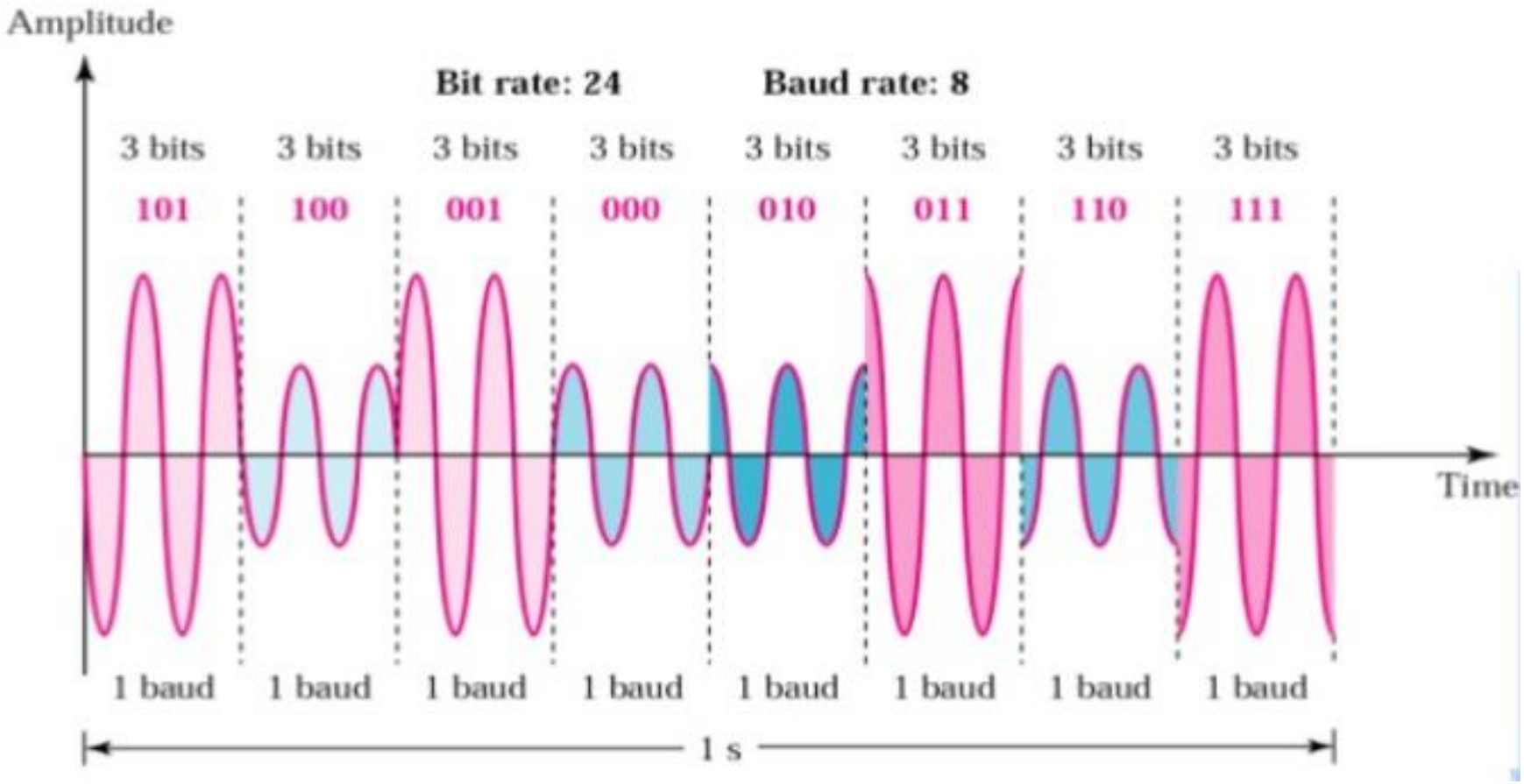

Figure 6 *Quadrature Amplitude Modulation (QAM)*

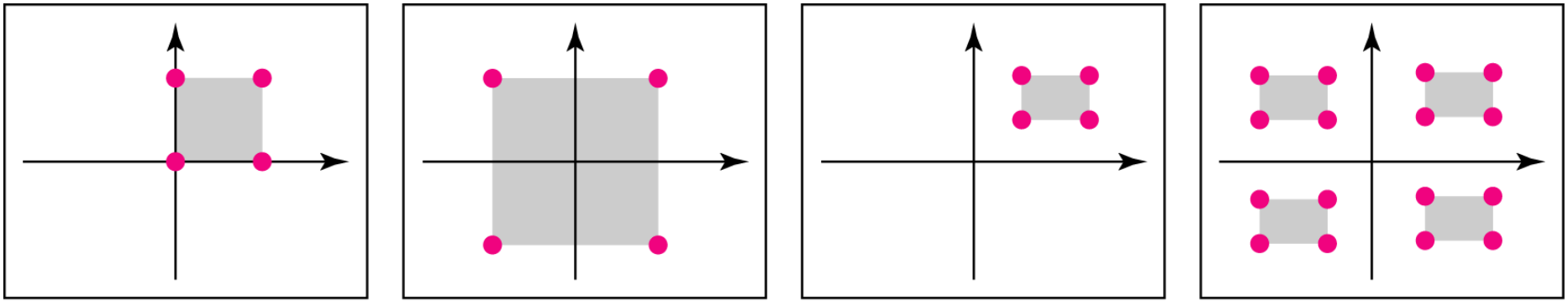

Figure 7 *Constellation diagrams for some QAMs*

That's all for today

Thank You