

## QAM

Definition:

→ QAM is a combination of amplitude and phase modulation scheme.

⇒ If the amplitude and phase of carrier is varied noise immunity is increased such a system called, QAM

⇒ " In QAM both amplitude and phase of the carrier signal are varied in accordance with digital input signal

Representation:

$$s_i(t) = \sqrt{\frac{2E_s}{T_s}} k_p \cos \omega_c t - \sqrt{\frac{2E_s}{T_s}} l_i \sin \omega_c t$$

$E_s$  = symbol Energy

$T_s$  = symbol duration

$k_p$  &  $l_i$  → A pair of constant

types of QAM:

⇒ 4 QAM - 4 symbols and 2 bits

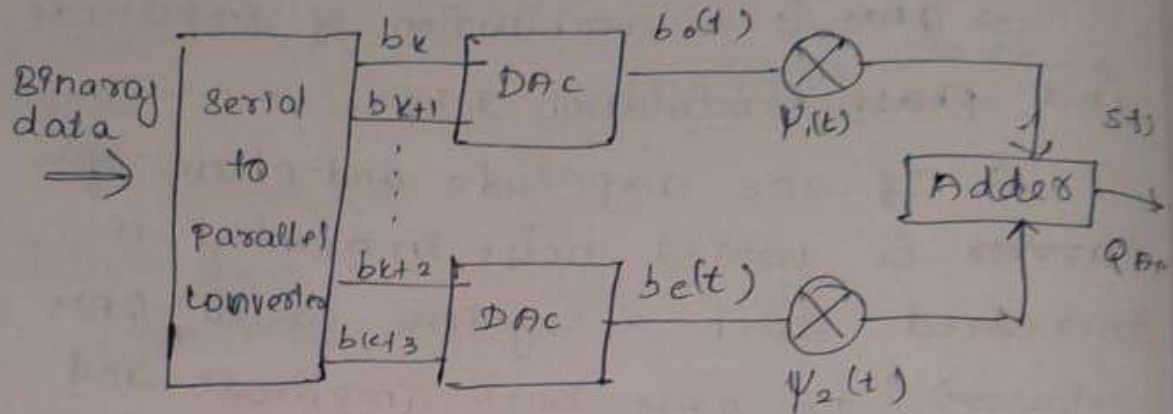
⇒ 8 QAM - 8 symbols and 3 bits

⇒ 16 QAM - 16 symbols and 4 bits

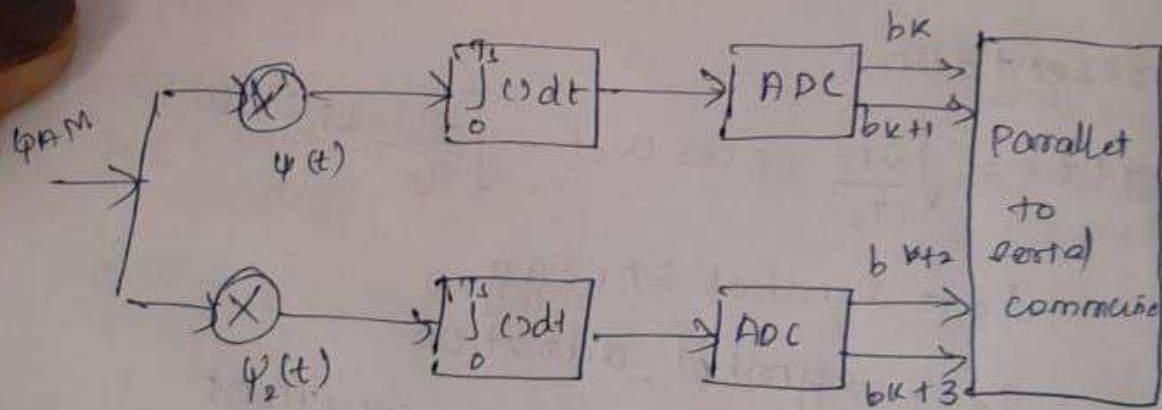
⇒ 32 QAM - 32 symbols and 5 bits

⇒ 64 QAM - 64 symbols and 6 bits

## QAM Transmitter



## QAM Receiver



### Advantage:

- ⇒ supports high data rate
- ⇒ Low probability of error's value

### Disadvantage

- ⇒ The receiver is more complex compared to receiver of other modulation types.