What is Modulation?

In modulation, a message signal, which contains the information is used to control the parameters of a carrier signal, so as to impress the information onto the carrier.

The Messages

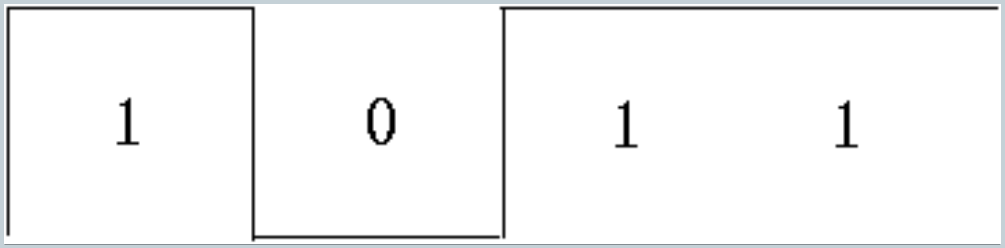
The message or modulating signal may be either:
analogue – denoted by $m(t)$
digital – denoted by $d(t)$ – *i.e.* sequences of 1's and 0's
The message signal could also be a multilevel signal, rather than binary; this is not considered further at this stage.

The Carrier

The carrier could be a 'sine wave' or a 'pulse train'.
Consider a 'sine wave' carrier:

- If the message signal $m(t)$ controls amplitude – gives AMPLITUDE MODULATION AM
- If the message signal $m(t)$ controls frequency – gives FREQUENCY MODULATION FM
- If the message signal $m(t)$ controls phase- gives PHASE MODULATION PM or ϕM

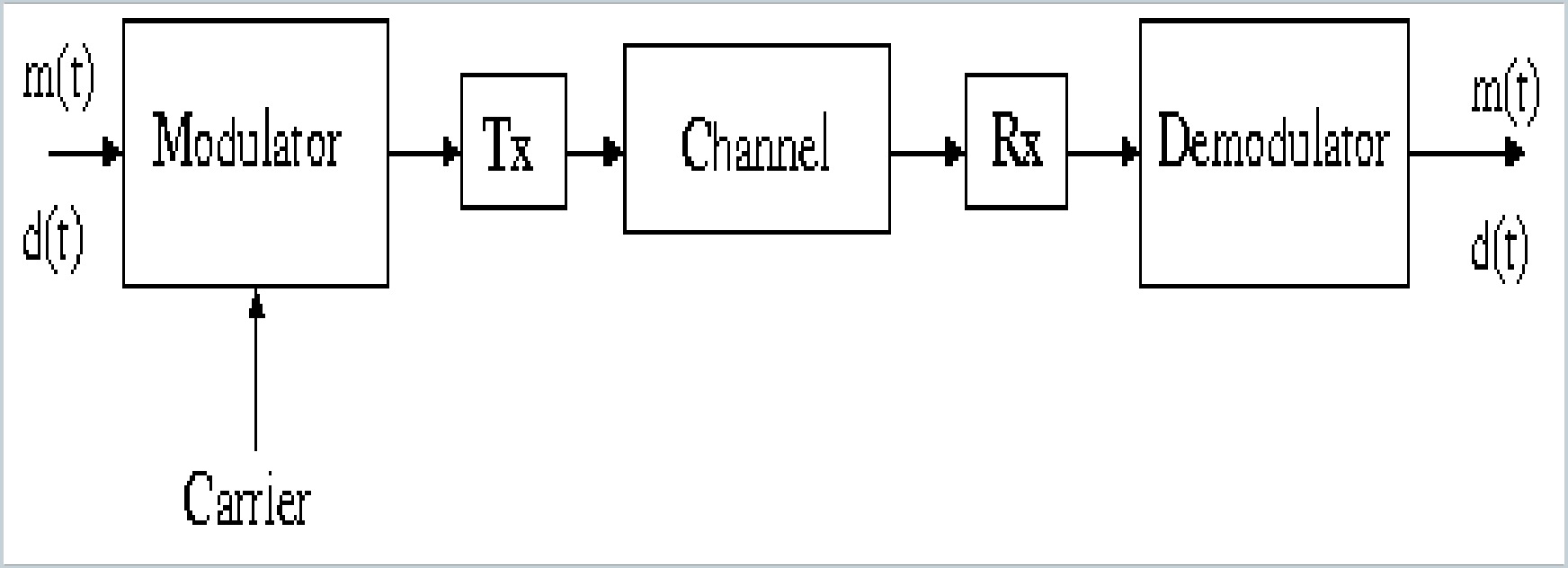
- Considering now a digital message $d(t)$:
  If the message $d(t)$ controls amplitude – gives **AMPLITUDE SHIFT KEYING ASK**.
  As a special case it also gives a form of Phase Shift Keying (PSK) called **PHASE REVERSAL KEYING PRK**.
- If the message $d(t)$ controls frequency – gives **FREQUENCY SHIFT KEYING FSK.**
- If the message $d(t)$ controls phase – gives **PHASE SHIFT KEYING PSK**.
- In this discussion, $d(t)$ is a binary or 2 level signal representing 1's and 0's



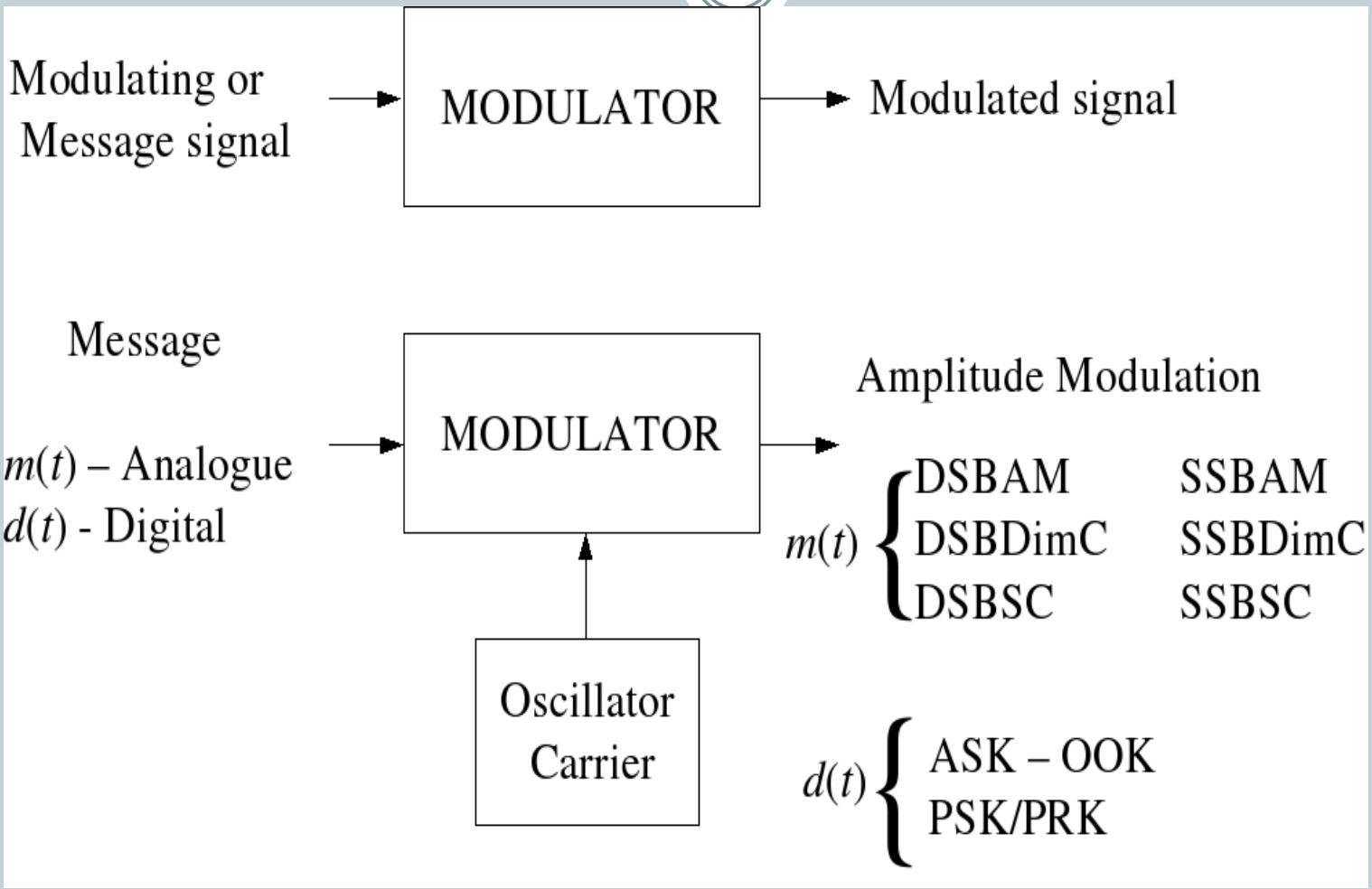
- The types of modulation produced, *i.e.* ASK, FSK and PSK are sometimes described as binary or 2 level, *e.g.* Binary FSK, BFSK, BPSK, *etc.* or 2 level FSK, 2FSK, 2PSK *etc.*
- Thus there are 3 main types of Digital Modulation:
  ASK, FSK, PSK.

What is Demodulation?

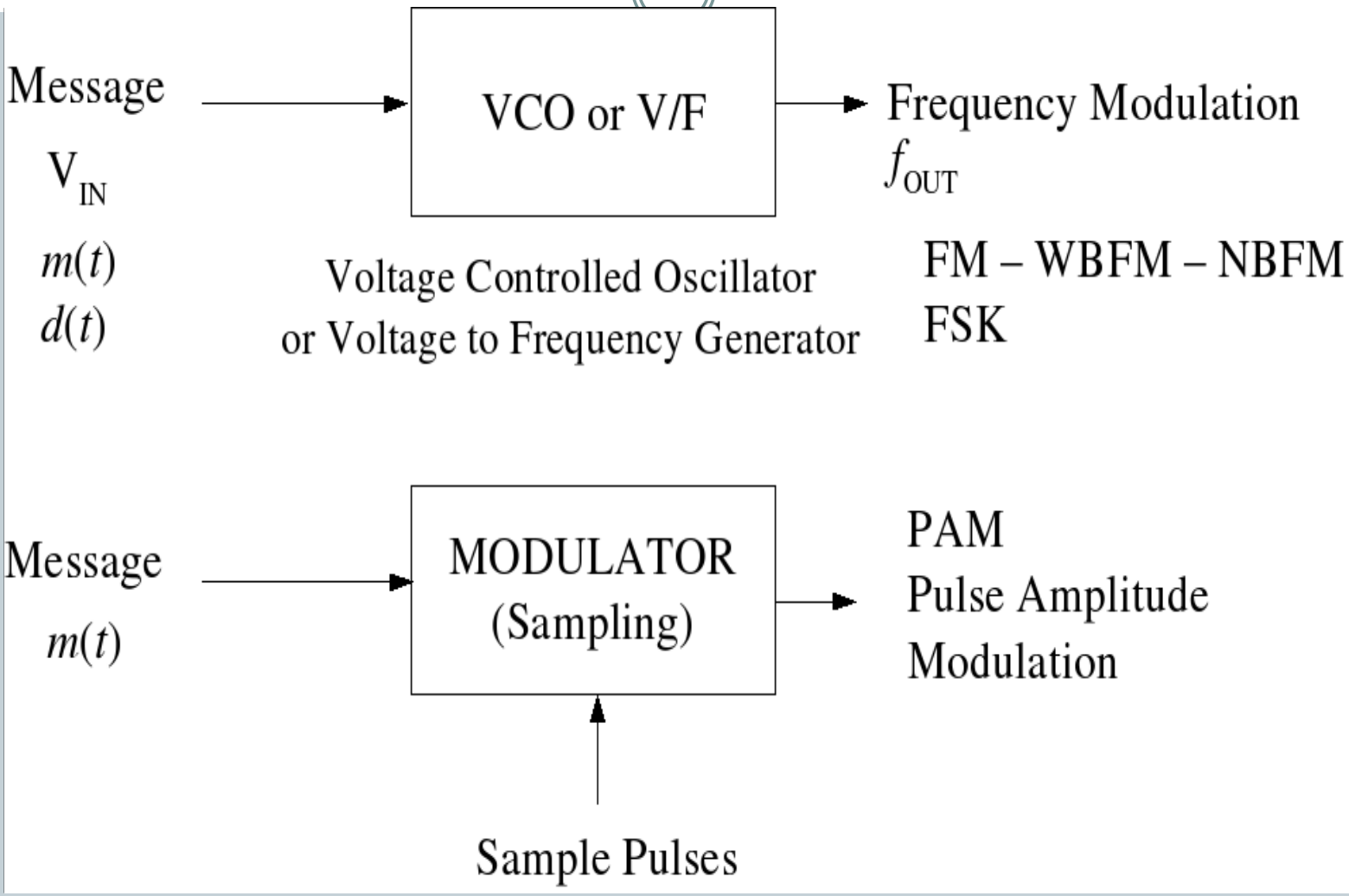
Demodulation is the reverse process (to modulation) to recover the message signal $m(t)$ or $d(t)$ at the receiver.



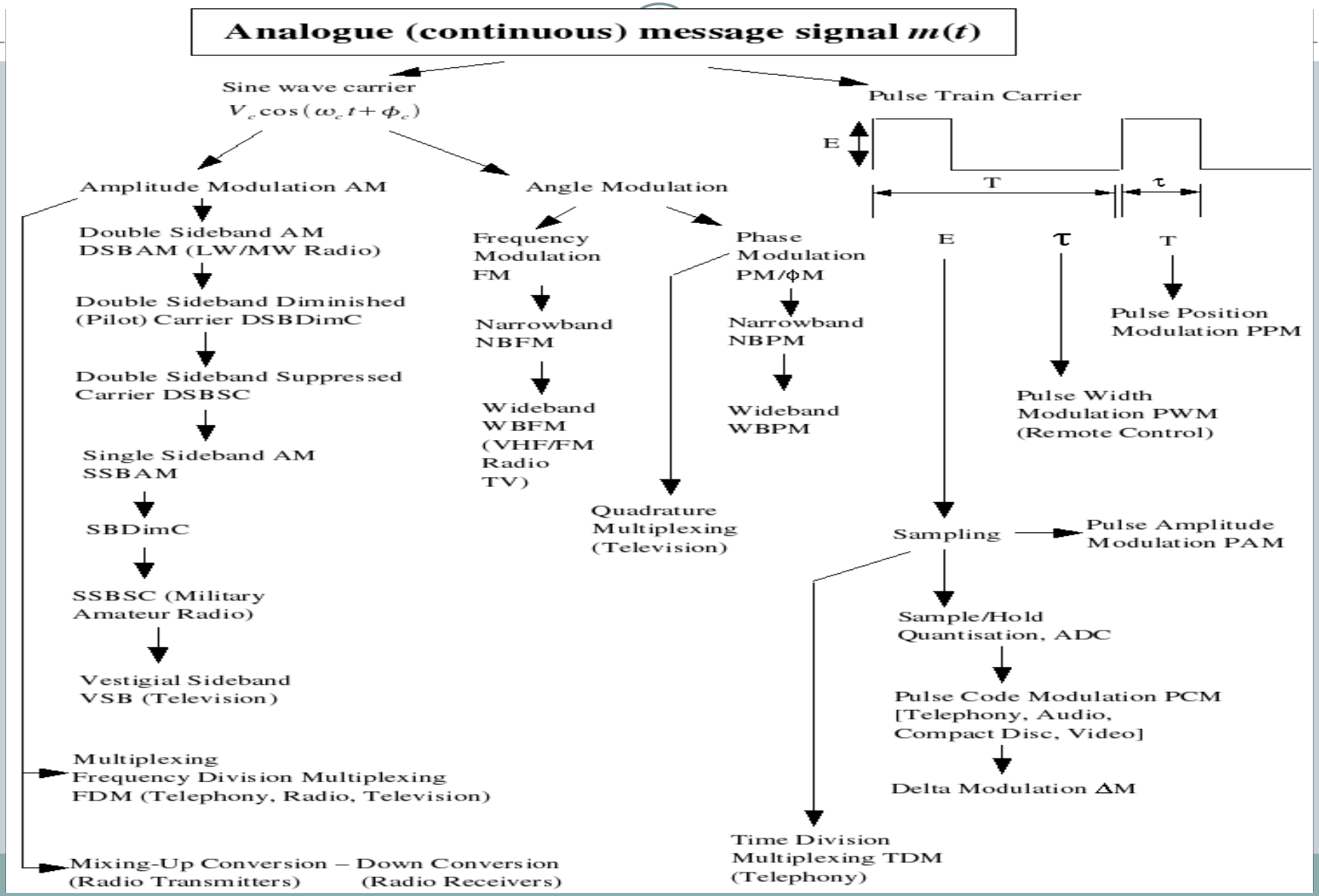
Summary of Modulation Techniques 1



Summary of Modulation Techniques 2



Summary of Modulation Techniques with some Derivatives and Familiar Applications



Summary of Modulation Techniques with some Derivatives and Familiar Applications