EIPC
NEE-403
Unit-3
Telemetry

R.F. TELEMETRY SYSTEM

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- No physical link between telemeter transmitter and receiver.
- Link is established through radio links.
- Examples : in spacecrafts, rockets and missiles corrective actions can be taken from stations with help of R.F. Links
- In instrumentation the o/p of transducer is considered as modulating signal.

R.F. TELEMETRY SYSTEM

Modulation schemes:

When signal is in continuous form:

- Amplitude Modulation
- Angle Modulation

When signal is in form of pulses:

- Pulse modulation

R.F. TELEMETRY SYSTEM

AM : amp. of high-carrier signal is varied according to instantaneous value of modulating message signal m(t)

Carrier Signal: $\cos(2\pi f_c t)$ or $\cos(\omega_c t)$

Modulating Message Signal: $m(t)$ $\cos(2\pi f_m t)$ or $\cos(\omega_m t)$

The AM Signa A_c $s_{AM}(t) = [A_c + m(t)]\cos(2\pi f_c t)$

ANGLE MODULATION

$$v_c(t) = V \cdot \sin(2 \cdot \pi \cdot f_c \cdot t + phase)$$

Calculating FM Bandwidth

$$Phase = \Phi$$

$$Frequency = \frac{\Delta\Phi}{\Delta t}$$

For PM $$\Phi(t) = \beta \cdot \sin(\omega_m \cdot t)$$

For FM $$\Phi(t) = \int \beta \cdot \sin(\omega_m \cdot t)\, dt$$

ANGLE MODULATION

$$\beta = \frac{f_d \cdot V}{f_m}$$

$$k_p = \frac{\Phi}{e_m}$$

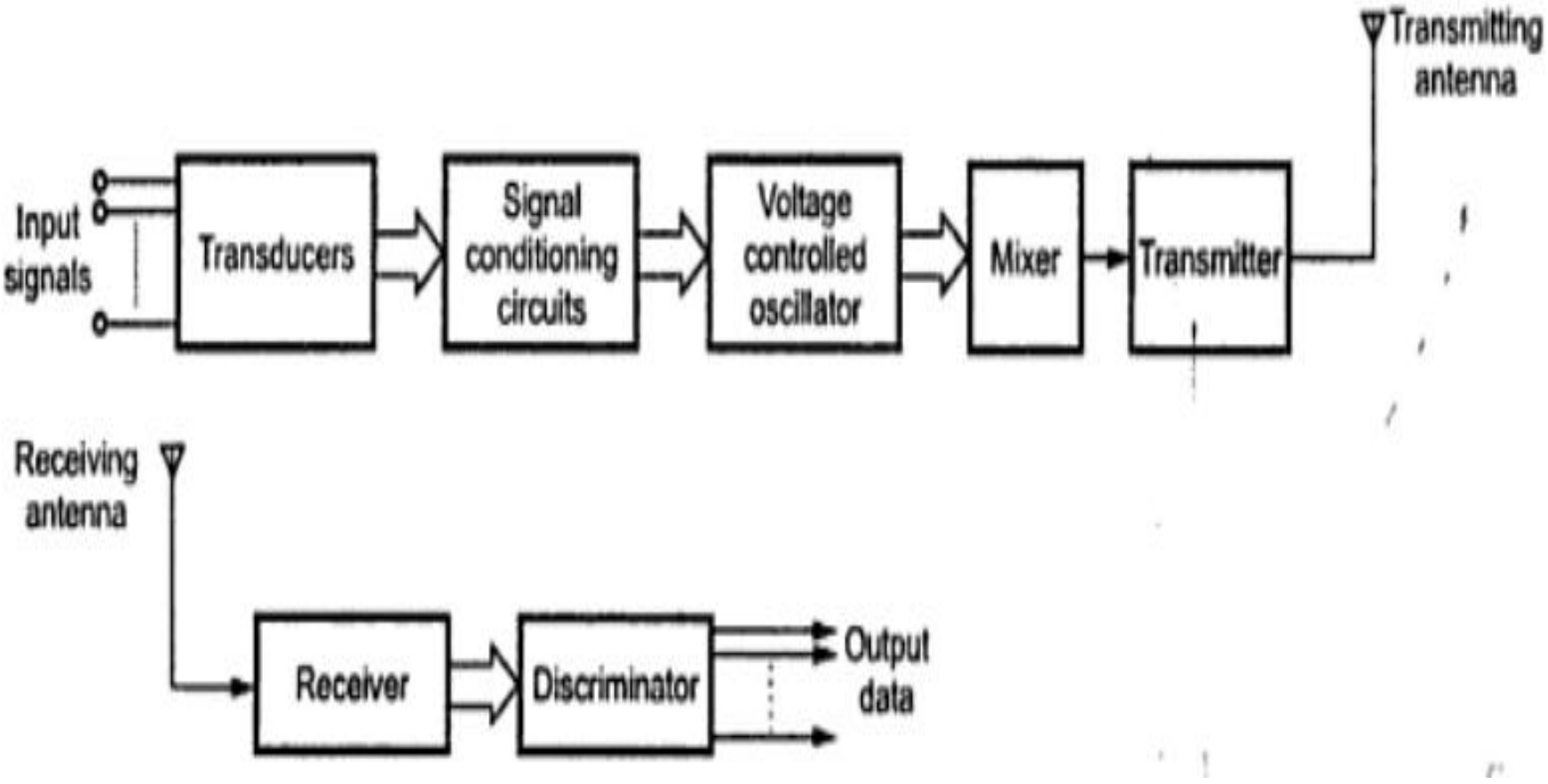
$$BW = 2 \cdot f_{max} \cdot (\beta + 1)$$
$$= 2 \cdot (f_{max} + f_{dev})$$

ANGLE MODULATION

FM: modulation index, is ratio of deviation, f_d multiplied by amplitude of modulating signal divided by modulating frequency, $f_{m.}$

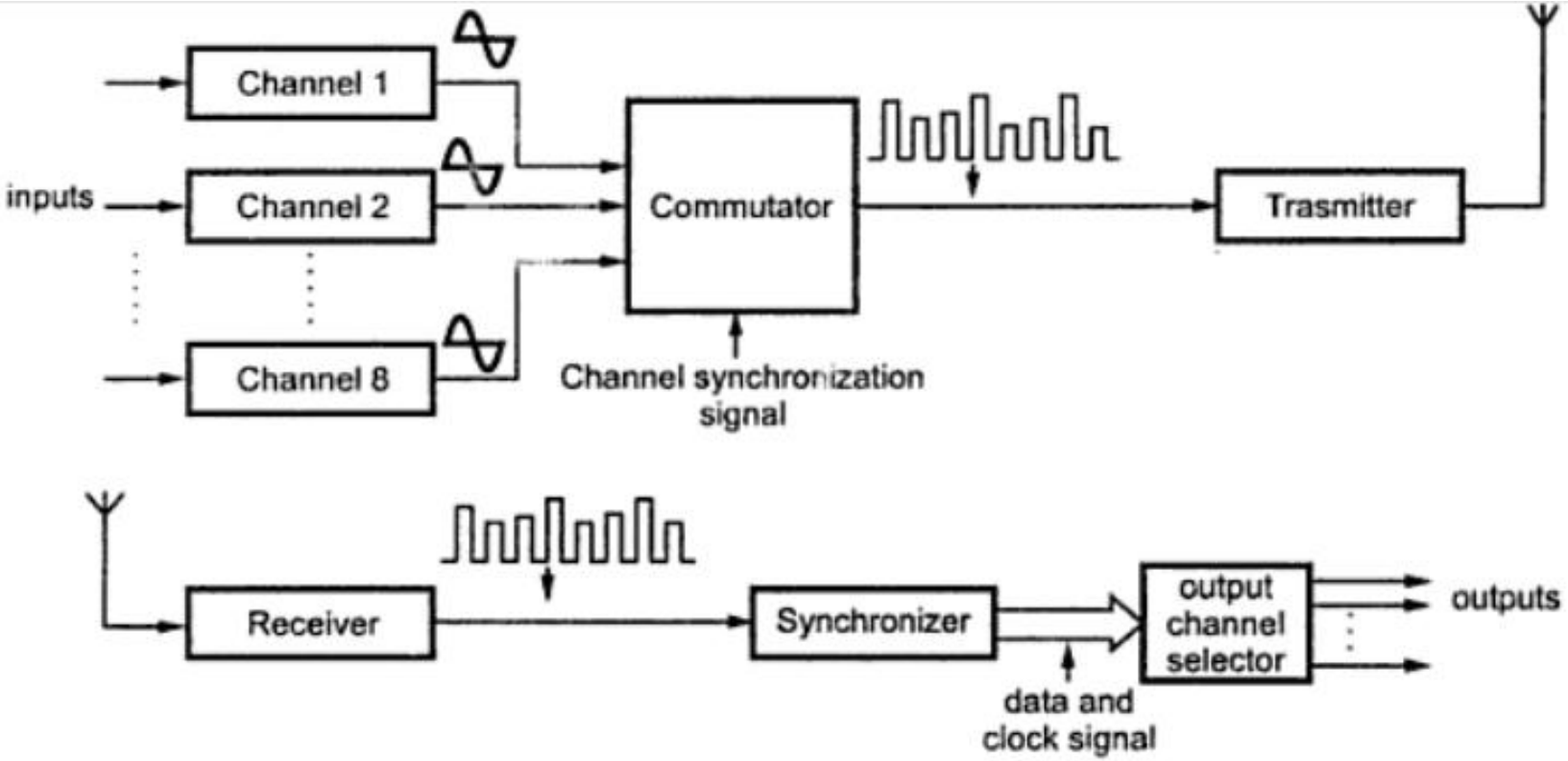
PM : the phase shift is proportional to instantaneous amplitude of the modulating signal.

Frequency telemetry system block diagram:



THE DISADVANTAGE OF FM TELEMETRY SYSTEM IS CAPACITY OF CHANNELS OFFERED IS LESS

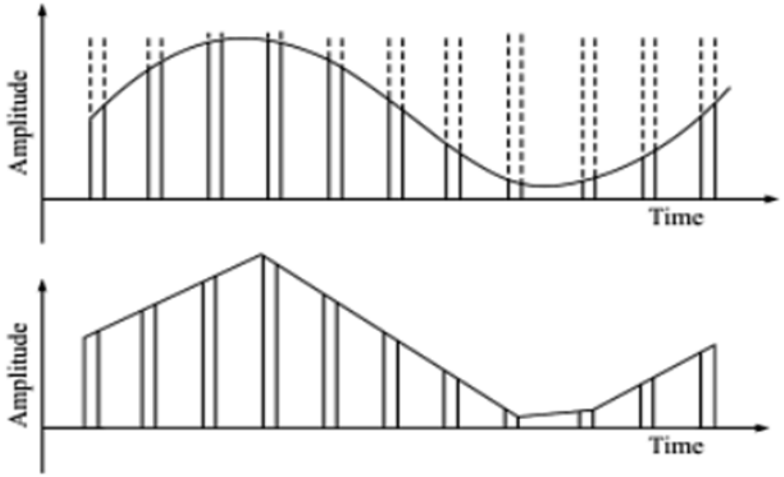
Pulse telemetry system



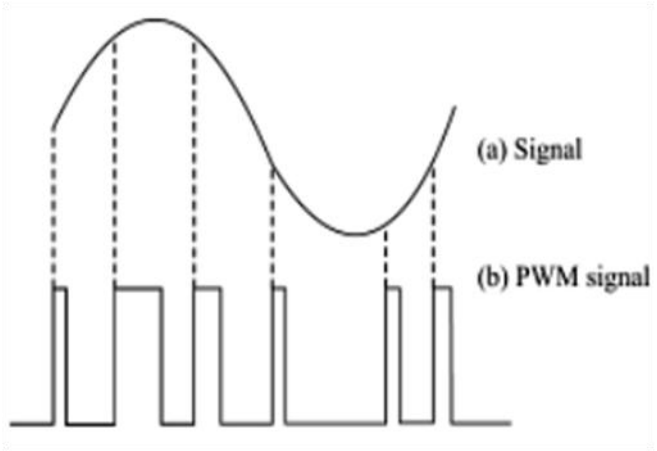
Pam telemetry system: Employs TDM technique

TYPES OF PULSE MODULATION

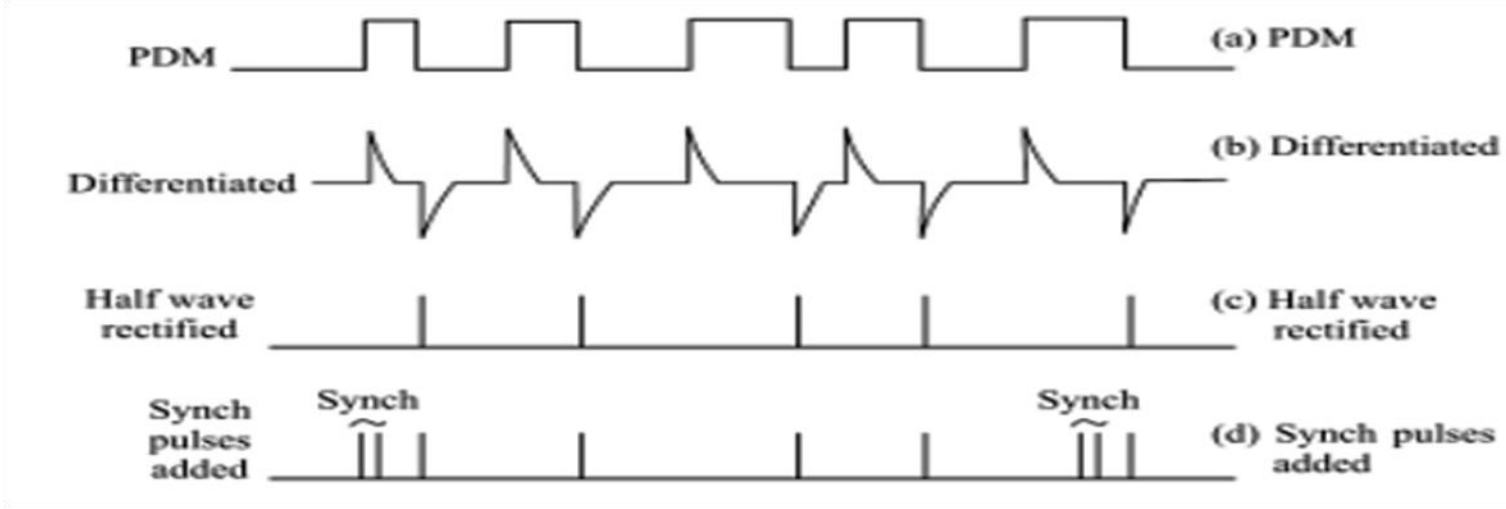
PAM



PWM: Monostable multivibrator



PPM



ANY QUESTIONS ???

Thank You