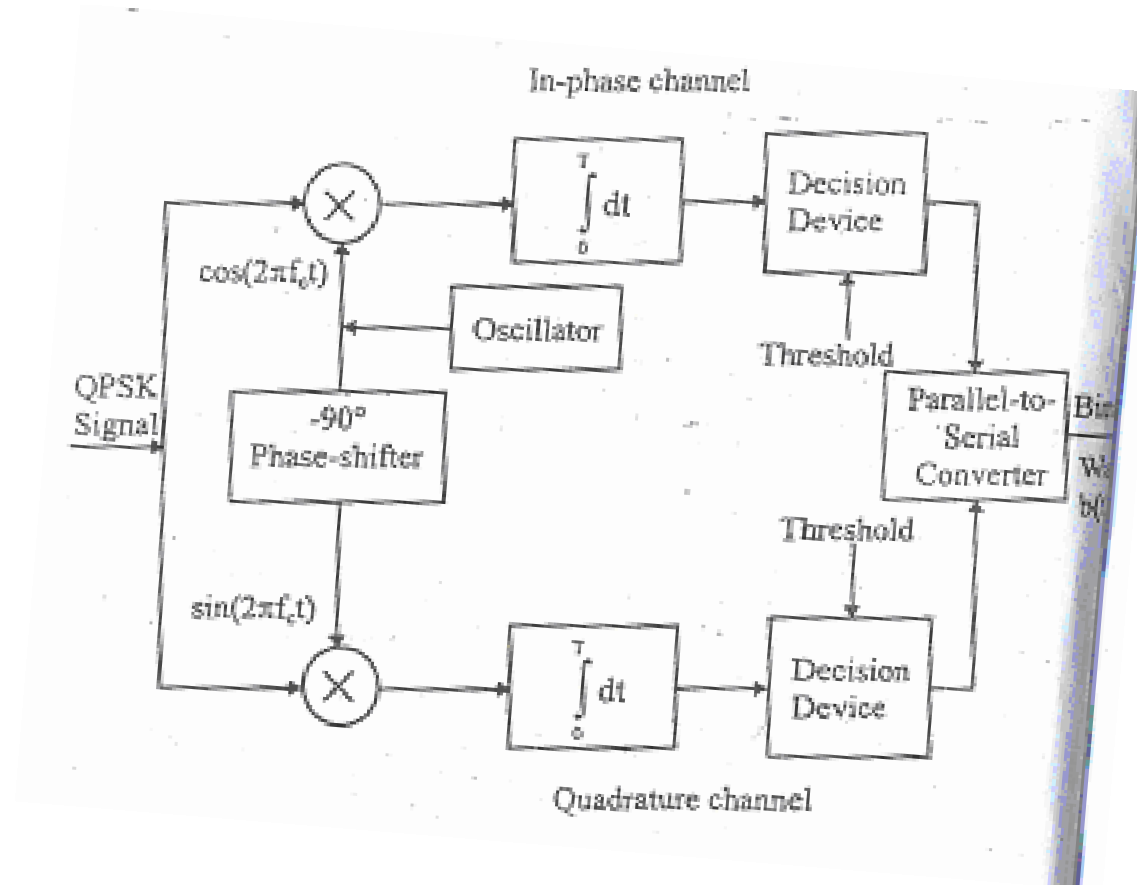
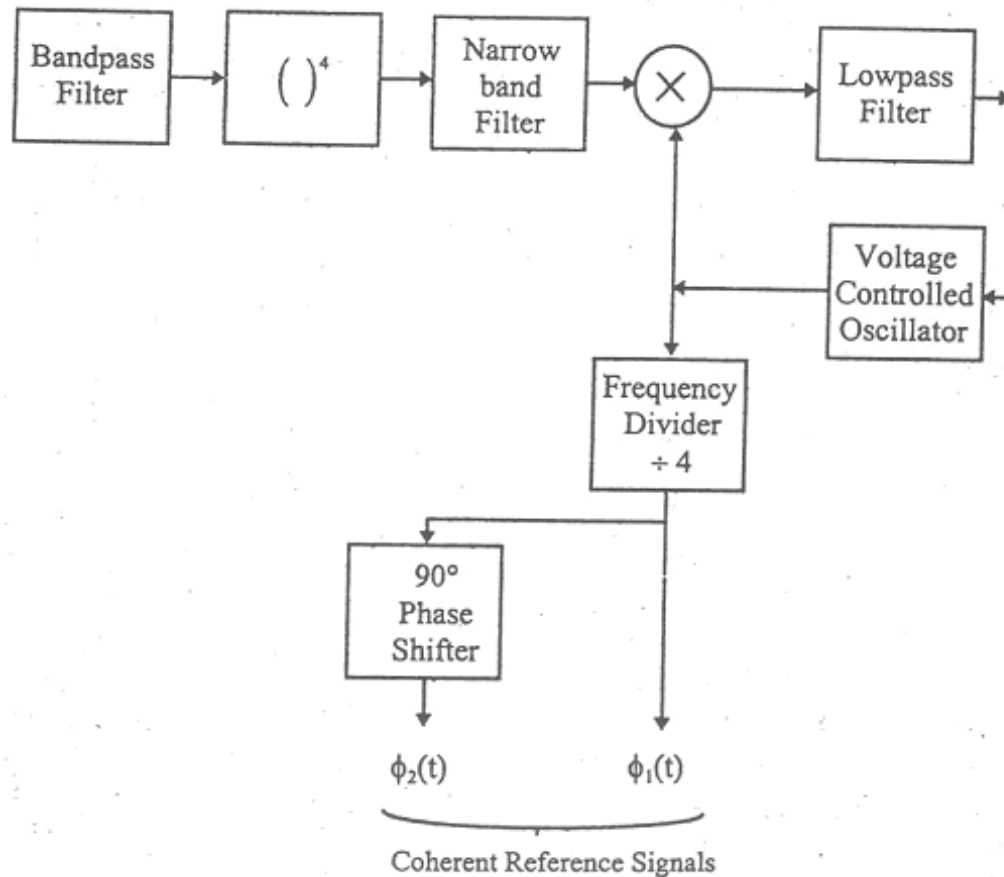


QPSK Receiver



Synchronization Circuit



Goal of Today's Lecture

- Differential Phase Shift keying
- Quadrature Phase Shift Keying
- ➔ ■ **Minimum Phase Shift Keying**
- Introduction To Information Theory
- Information Measure

Minimum Shift Keying (MSK)

- In Binary FSK the Phase Continuity is maintained at the transition Point. This type of Modulated wave is referred as Continuous Phase Frequency Shift Keying (CPFSK)
- In MSK there is phase change equals to one half Bit Rate when the bit Changes 0 to 1 and 1 to 0.

$$\delta f = \frac{1}{2T_b}$$

Minimum Shift Keying (MSK)

Let's take f_{c1} and f_{c2} represents binary 1 and 0 Respectively

$$f_{c1} = \frac{f_{c1} + f_{c2}}{2} + \frac{f_{c1} - f_{c2}}{2}$$

$$= f_c + \frac{\delta f}{2}$$

Where

$$f_c = \frac{f_{c1} + f_{c2}}{2}$$

$$\delta f = f_{c1} - f_{c2}$$

Similarly

$$f_{c2} = \frac{f_{c1} + f_{c2}}{2} - \frac{f_{c1} - f_{c2}}{2}$$

$$= f_c - \frac{\delta f}{2}$$

Minimum Shift Keying (MSK)

- The MSK Equation

$$s(t) = Ac \cos(2\pi fct + \phi(t))$$

where

$$\phi(t) = \pm\pi\delta ft$$

For Symbol 1

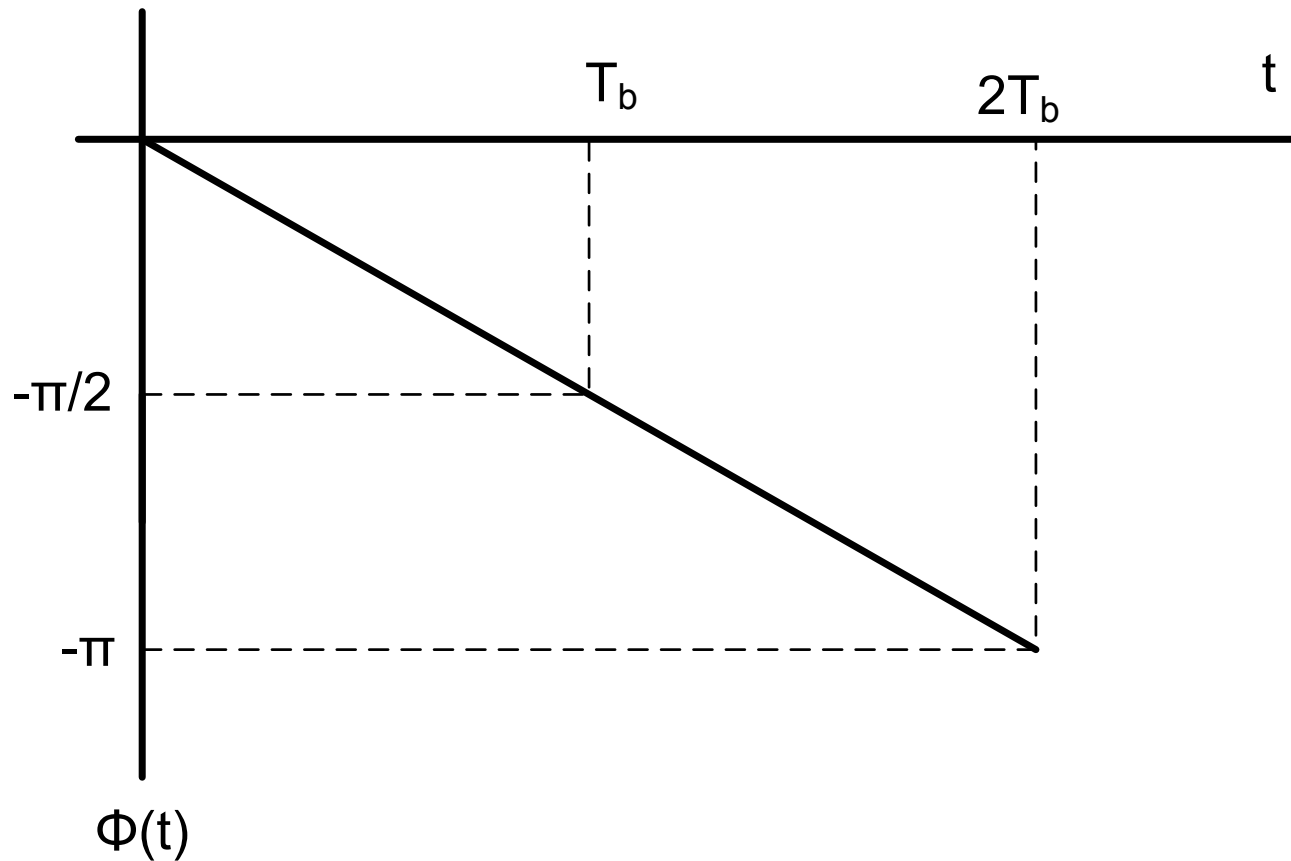
$$\begin{aligned}\phi(t) &= \pi\delta ft \\ &= \frac{\pi t}{2T_b}\end{aligned}$$

For Symbol 0

$$\begin{aligned}\phi(t) &= -\pi\delta ft \\ &= -\frac{\pi t}{2T_b}\end{aligned}$$

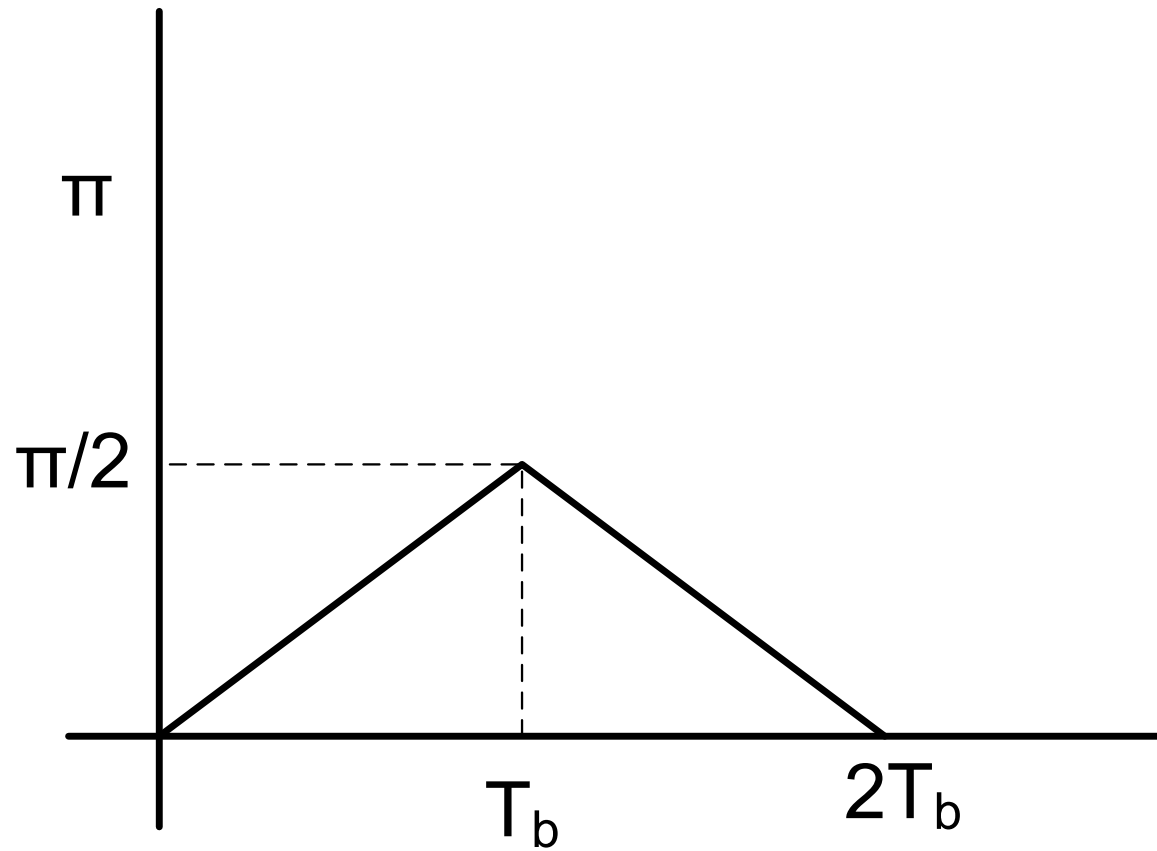
Carrier Phase Coding

For dibit 00



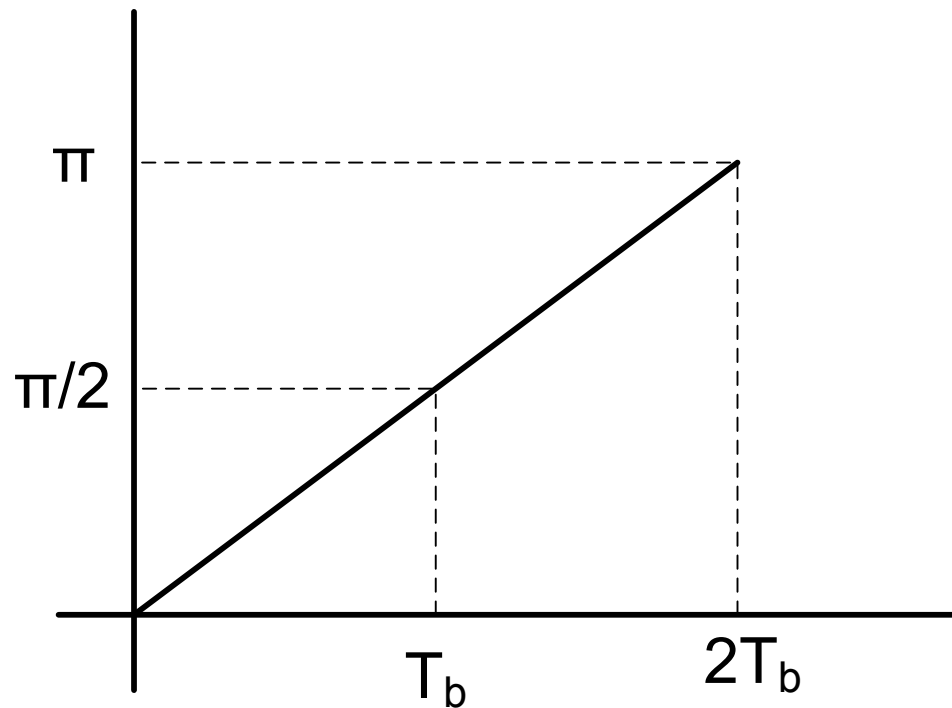
Carrier Phase Coding

For dibit 10



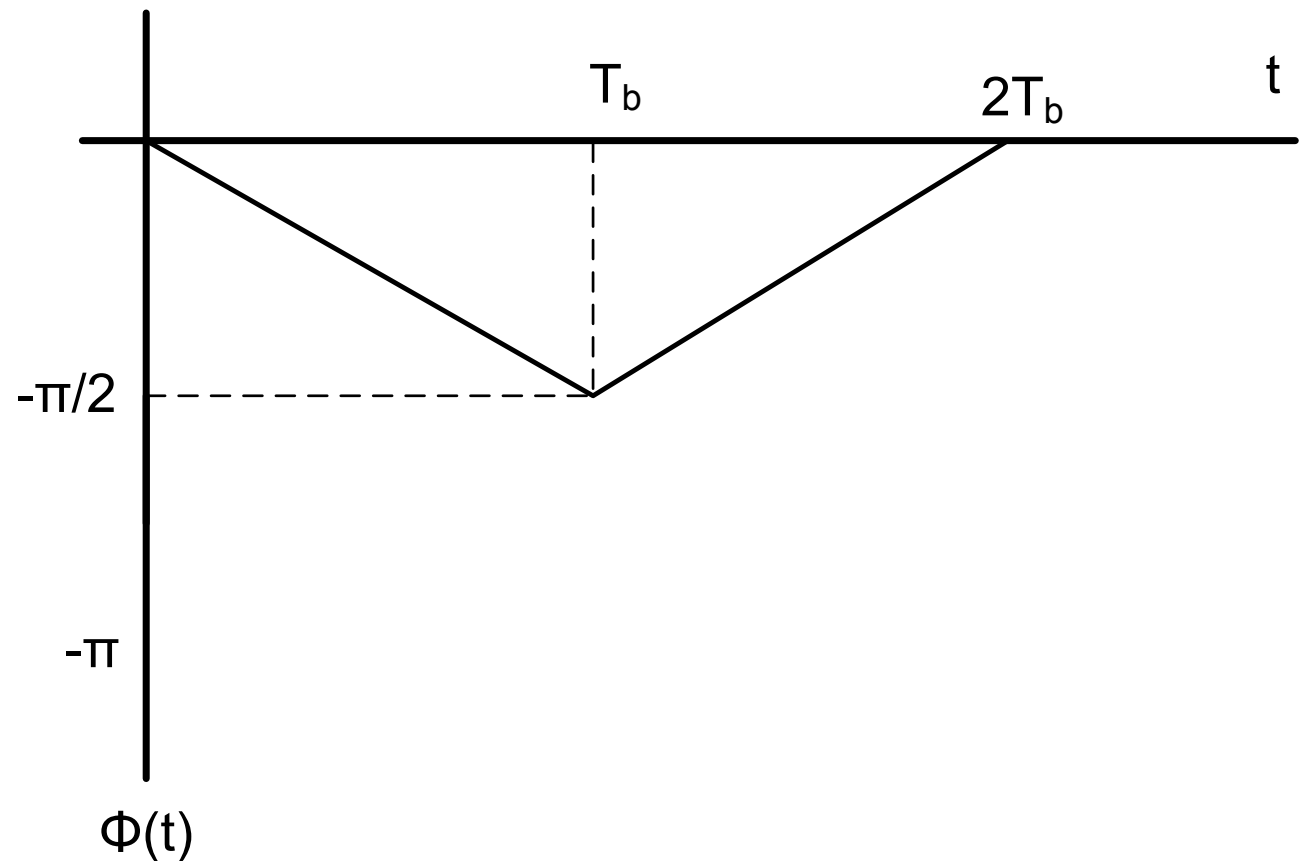
Carrier Phase Coding

For dibit 11



Carrier Phase Coding

For dibit 01



Goal of Today's Lecture

- Differential Phase Shift keying
- Quadrature Phase Shift Keying
- Minimum Phase Shift Keying
- ➔ ■ Introduction To Information Theory
- Information Measure

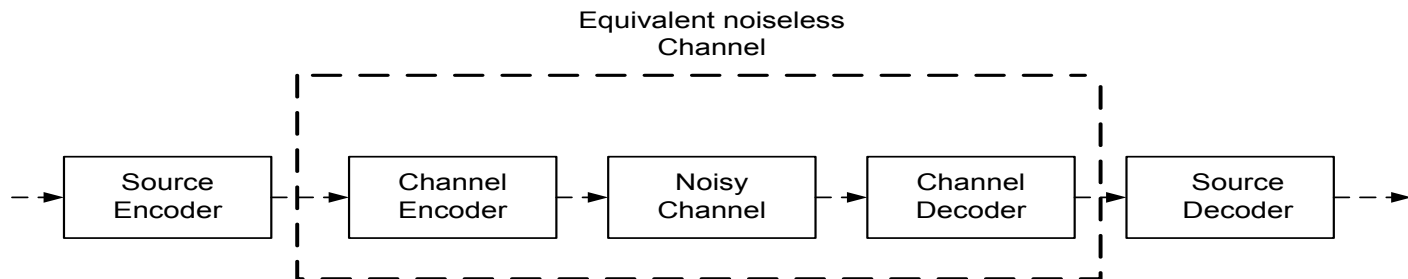
Information Theory

- It is a study of **Communication Engineering** plus **Maths**
- A Communication Engineer has to Fight with
 - Limited Power
 - Inevitable Background Noise
 - Limited Bandwidth

Information Theory deals with

- The Measure of Source Information
- The Information Capacity of the channel
- Coding

If The rate of Information from a source does not exceed the capacity of the Channel, then there exist a Coding Scheme such that Information can be transmitted over the Communication Channel with arbitrary small amount of errors **despite the presence of Noise**



Goal of Today's Lecture

- Differential Phase Shift keying
- Quadrature Phase Shift Keying
- Minimum Phase Shift Keying
- Introduction To Information Theory
- ➔ ■ Information Measure

Thank You