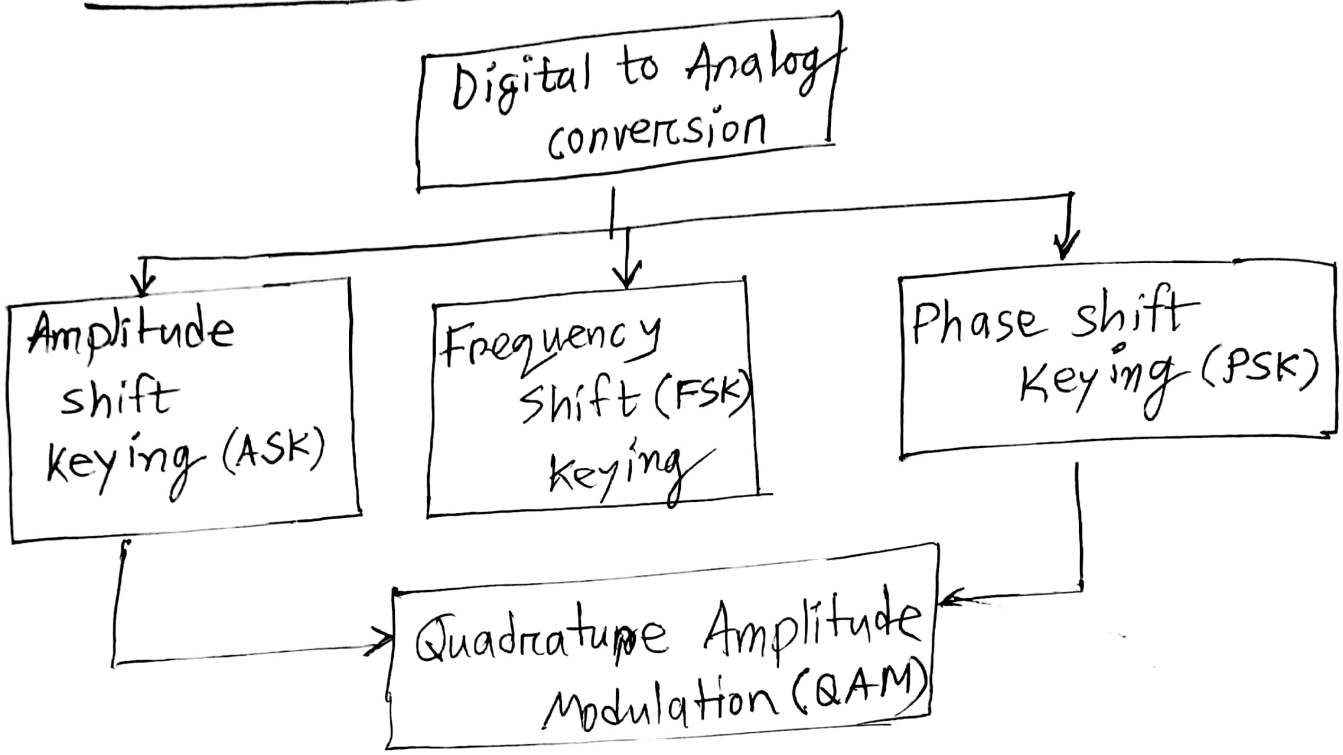
SA madam CSE 3103 6/D 15.7.19

ANALOG TRANSMISSION



$\left(S = N \times \frac{1}{r}\right)$ baud

4 bit per signal element, $r = 4$

$S = 1000$ bauds/s

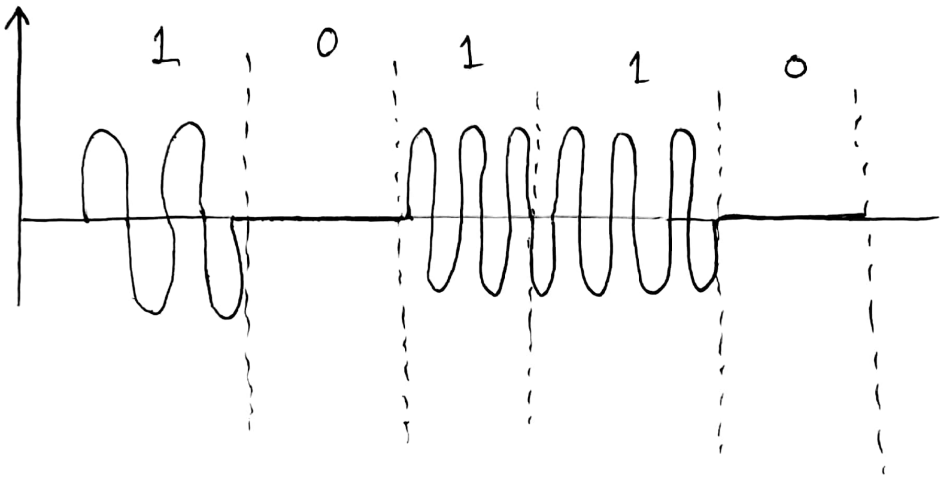
$N = ?$

↳ Bitrate

Carrier Signal

In ~~si~~ analog ~~signal~~ transmission the sending device produces a high frequency signal that acts as a base for the information signal. This base signal is called Carrier signal or carrier frequency.

Amplitude bit rate 5



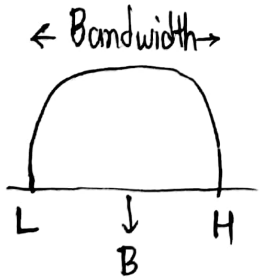
baud rate 5

Worst case — Best case

$S = N \quad B = (1+d)S$; d is factor whose value ranges [0, 1]

0.5

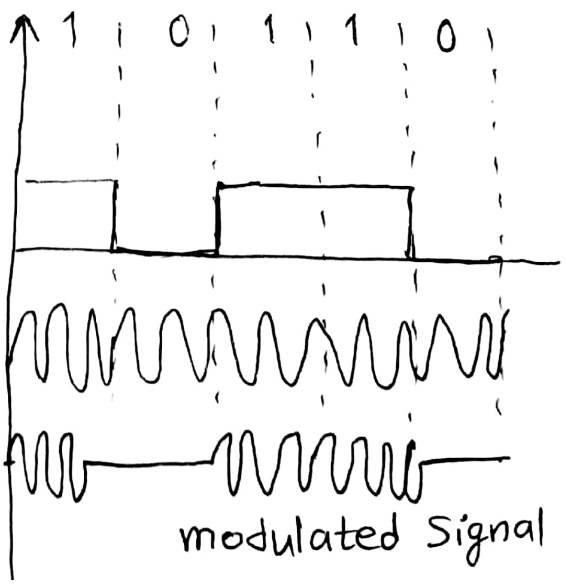
Average Case

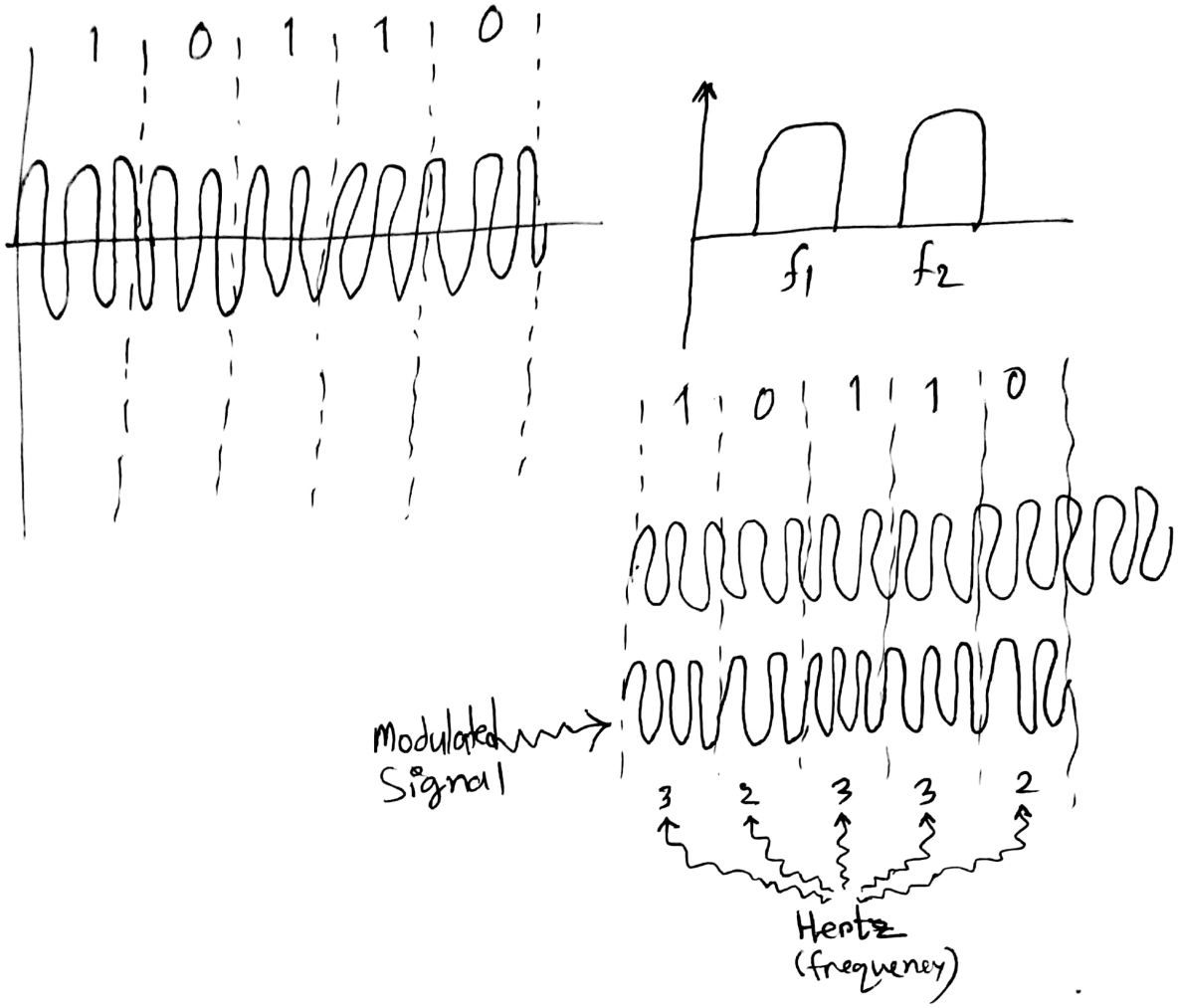


$$B = \left(\frac{L+H}{2}\right) \text{ KHz}$$

L = Lower freq.

H = Higher freq.





Phase Shift Keying

এখানে Amplitude, frequency same থাকে, তবে Phase টা change হয়। Noise দ্বারা সহজে প্রভাবিত হয় না। তবে Amplitude Shift Keying খুব সহজে Noise দ্বারা প্রভাবিত হয়। 0 বিট গেলে এক Phase এ থাকবে, 1 বিট গেলে আরেক Phase এ যাবে।

QAM

- 4টি Phase Angle দিয়ে signal যাবে।

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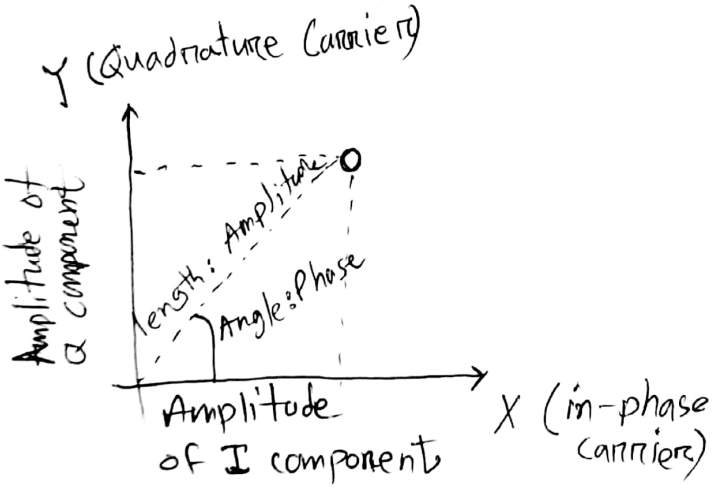
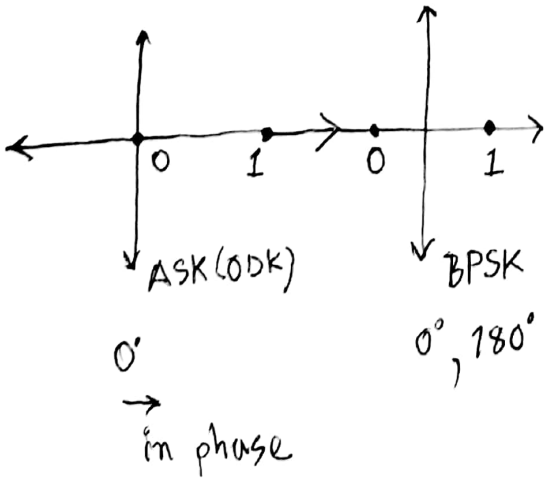
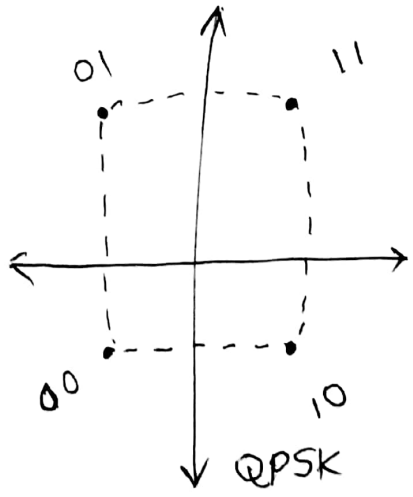
Constellation Diagram

✓ A constellation Diagram helps us define the amplitude and phase of a signal element particularly when we use two carriers (one-in-phase, and one quadrature)

✓ The diagram has two axes. The horizontal x-axes is related to the in-phase carrier, the vertical y axes is related to the quadrature carrier.

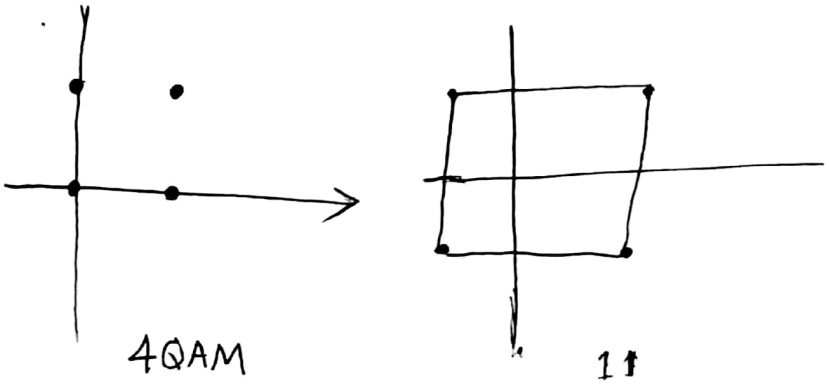






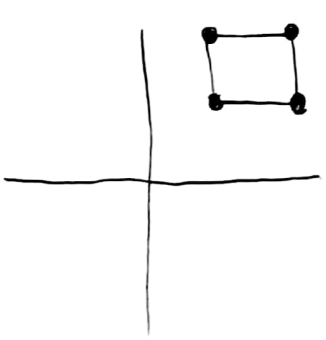
[45°, 135°, -135°, -45°]

⊛ QAM = ASK + PSK

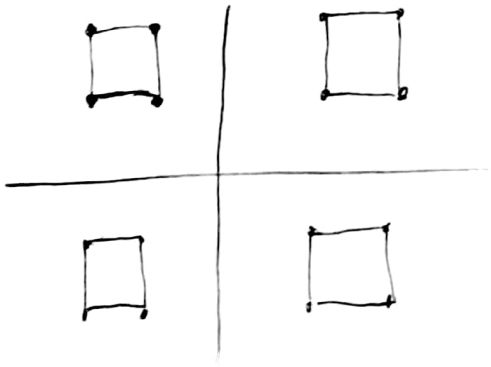


4QAM
(4 - different signal Element type using unipolar NRZ)

4QAM
(4 - different Signal Element using polar NRZ)

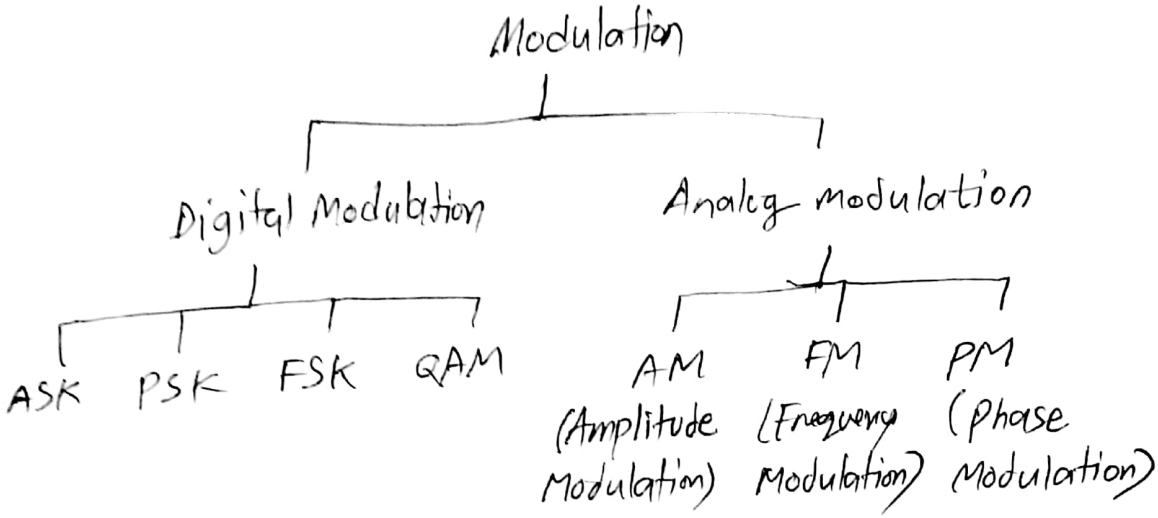


4QAM
modulates two carriers



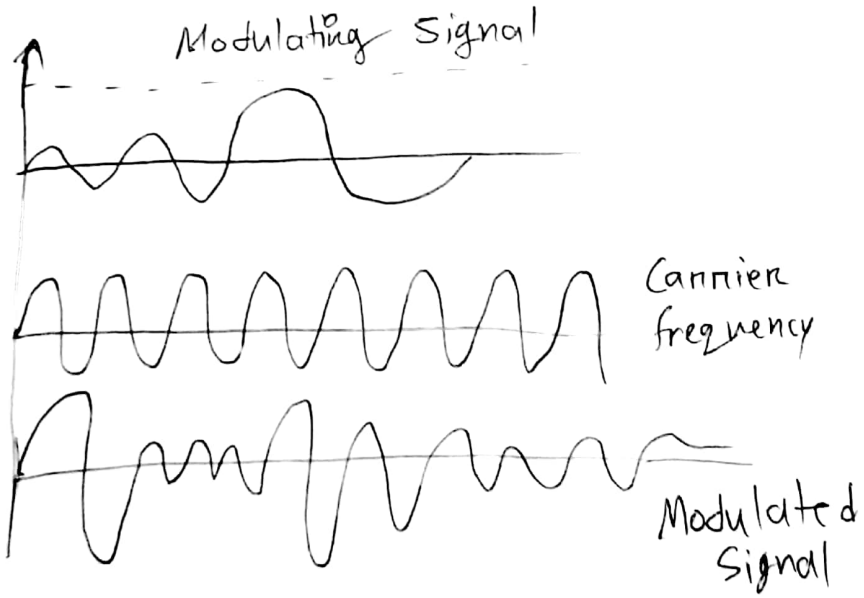
16 - QAM
modulates 4 carriers

Advantage of QAM over ASK and PSK.



Amplitude Modulation

In AM, the carrier signal is modulated so that its amplitude varies with the signal element changing amplitude of the modulating signal.



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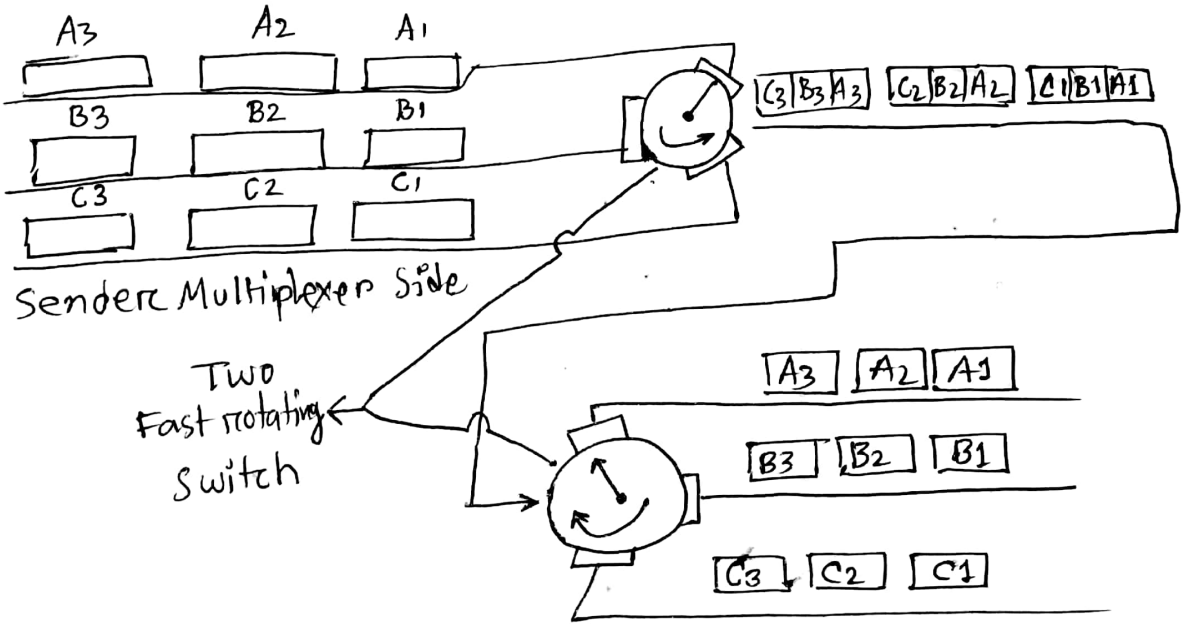
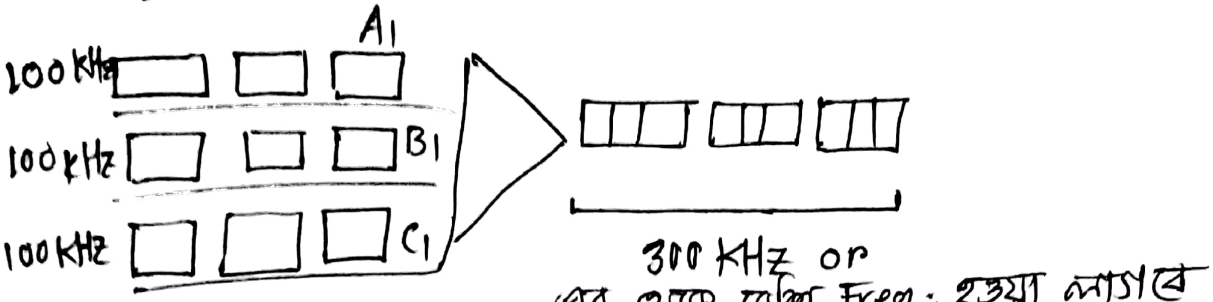


Receiver

demultiplexer

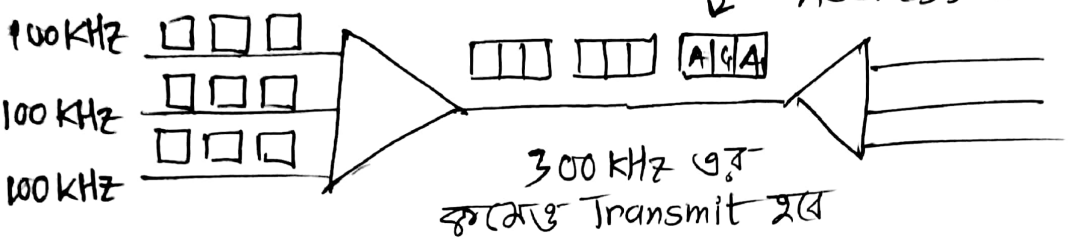
Side

Synchronous TDM



Statistical TDM

Frameএর সাথে Corresponding Receiver এর Address যায়।

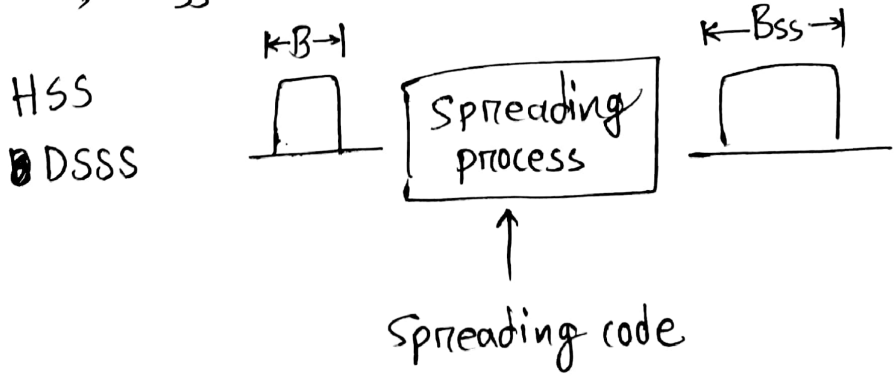


Time কম লাগে, This is a quite fast process.

Spread Spectrum (Very Important ***)

→ Wireless medium এর ক্ষেত্রে ব্যবহার করা হয়।

→ its techniques add redundancy, they spread the original spectrum needed for each station. If the required Bandwidth for each station is B, spread spectrum expands it to B_{ss}, such that, $B_{ss} > B$



CT-3

CHAPTER-5

MULTIPLEXING থেকে TDM এই এ পর্যন্ত