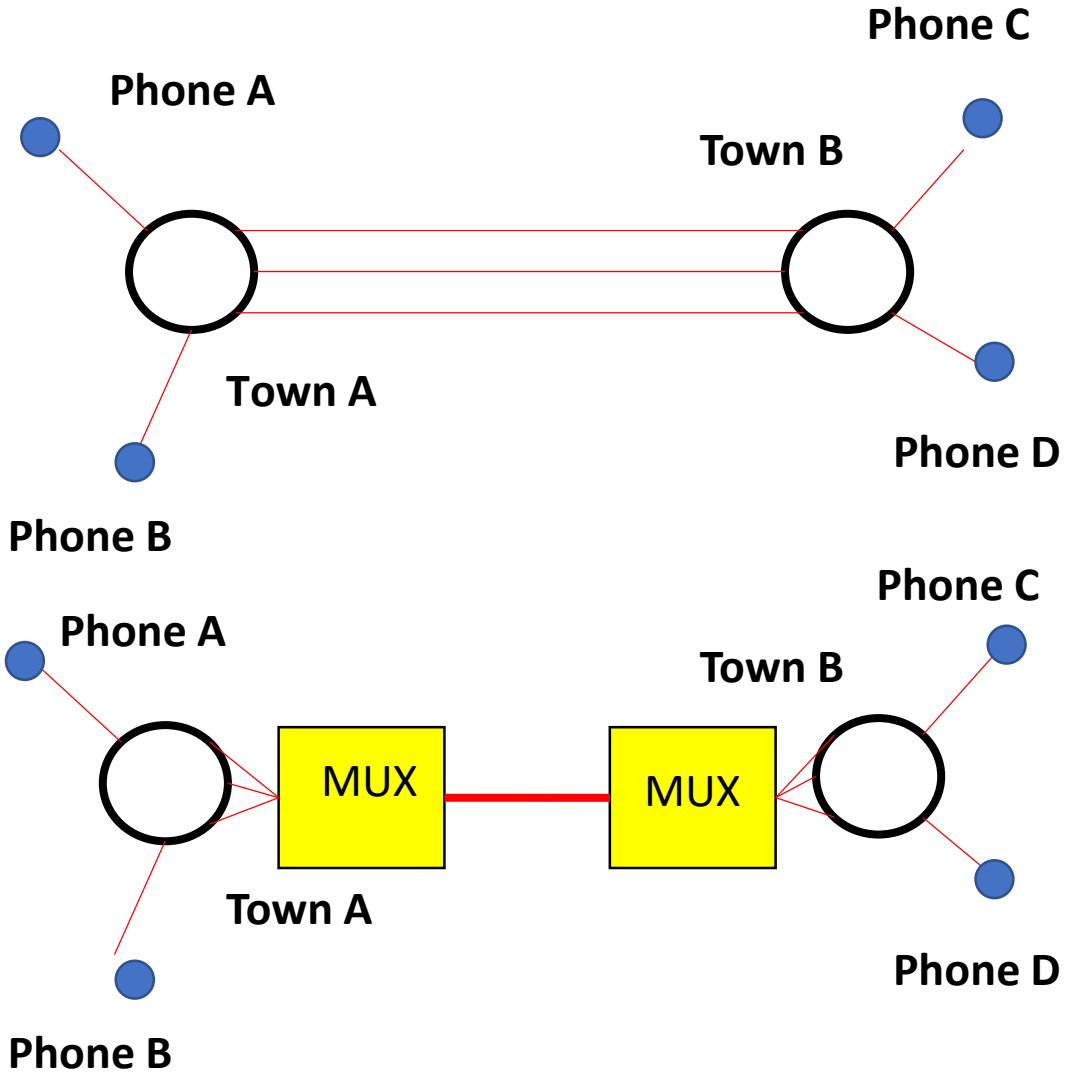
AMPLITUDE MODULATION APPLICATION FOR MULTIPLEXING – MATLAB EXAMPLE

ECE 328 – PRINCIPLES OF COMMUNICATION SYSTEMS

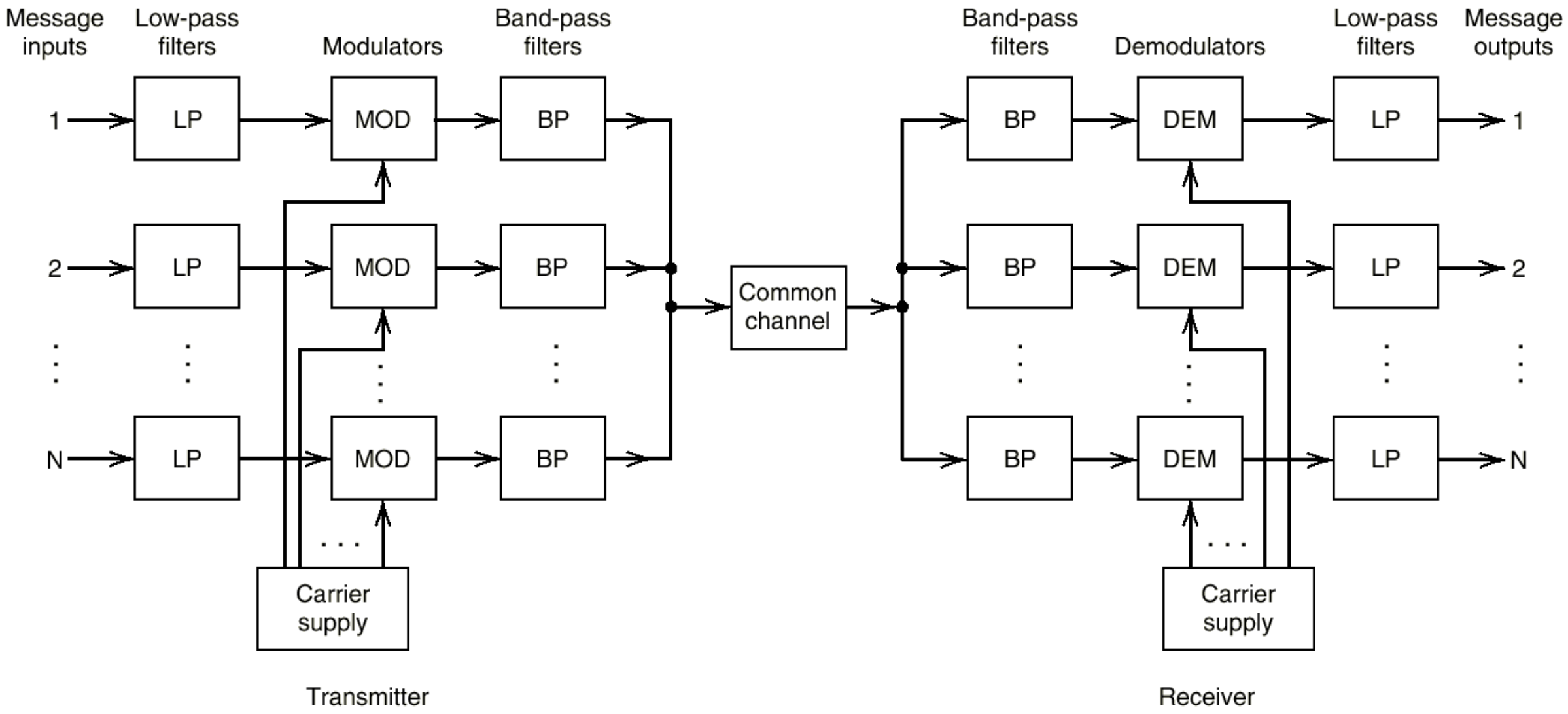
THE GENESIS OF TELECOM MULTIPLEX PROBLEM

- Early in the last decade, more and more people started to use the telephone.
- As a result, there was need to build telecommunication lines between towns.
- The first systems used one line (2 pairs) to carry one telephone conversation.

- The problem was that as traffic increased, there was need for more telephone wires thus posing a serious maintenance problem.
- The advent of the radio made this problem even more evident.
- Radio required all the voice channels from town A to be multiplexed to a single radio carrier frequency and vice versa.



A BASIC TELEPHONE MULTIPLEX SYSTEM



ASSIGNMENT

1. Set the Sampling frequency fs = 8,000

2. Set the number of samples N = 1024

3. Generate twelve sinusoidal signals as shown below:

$$x_1(n) = 1.0 \times sin(2\pi \times 2000 \times t)$$
$$x_2(n) = 1.2 \times sin(2\pi \times 2000 \times t)$$
$$x_3(n) = 1.4 \times sin(2\pi \times 2000 \times t)$$

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$$x_{12}(n) = 2.4 \times sin(2\pi \times 2000 \times t)$$

4. Use the signals to amplitude modulate the following carrier frequencies:

$$f_{c1} = 60KHz, f_{c1} = 64KHz, f_{c1} = 68KHz, \ldots, f_{c1} = 104 \text{ KHz}$$

5. Display the composite signal.

6. Take a discrete Fourier transform of the signal.

7. Display the spectrum of the signal.