

Dr. Annu Kumari

Dept. of Physics

H. D. Jain College, Ara

PG Sem III

Paper - MPHY CC-12

Electronics II

unit - 4, multiplexer

~~Shift~~ Re

Multiplexer

DATE

/ /

## Multiplexer (Data Selector)

A single transmission line can be used to carry several digital signals provided no two signals are sent exactly at the same time. Instead, line is used in short intervals at prescribed times by each signal. The circuitry which selects one of several signals at the transmitting end is referred to as a multiplexer. At the receiving end, a demultiplexer places the received signal on one of several output lines. Multiplexer and de-multiplexer must be coordinated to change in the same time for correct transmission which requires that one or more control lines must be provided in addition to the transmission line. We shall describe a digital multiplexer which will select one of several binary digital signals for transmission over a single line.

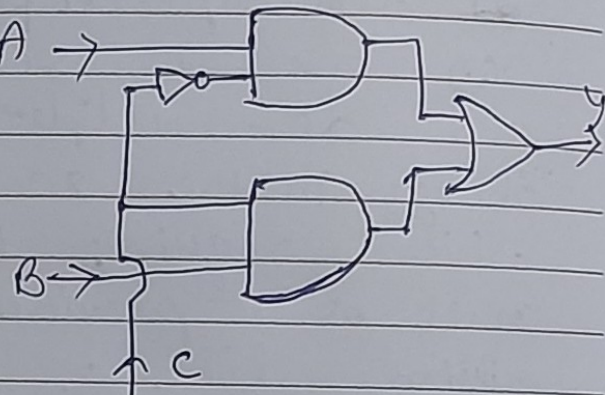
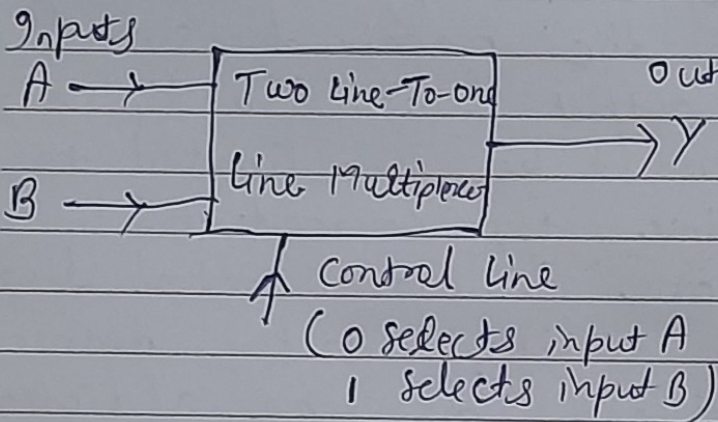
Consider the design of a two line-to-one line multiplexer, represented in fig (a). The operation is to allow a signal present on the selected line to pass to the output, while the unselected line is ignored. Let C represent control line, A and B the inputs, and Y the output, then eqn to describe the desired operation is

$$Y = \bar{C}A + CB$$

(i) if  $C = 0$  then  $\bar{C}B = 0$  and  $\bar{C}A = A$  so that input A is selected.

(ii) if  $C = 1$  then  $\bar{C}B = 0$  and  $\bar{C}A = 0$  so that input B is selected.

We note ~~that~~ only one input is selected at a time with the help of control line. Logic circuit of Fig 1(a) is given in Fig 1(b).



1(b) Logic circuit of two line to one line multiplexer

Following the same basic pattern a 4:1 multiplexer (four line-to-one) can be designed. It is shown in fig 1(c) with its truth table.

The output, Y, is expressed as

$$Y = \bar{C}_1 \bar{C}_0 D + \bar{C}_1 C_0 C + C_1 \bar{C}_0 B + C_1 C_0 A$$

### Truth table

$C_1$	$C_0$	$Y$
0	0	D
0	1	C
1	0	B
1	1	A

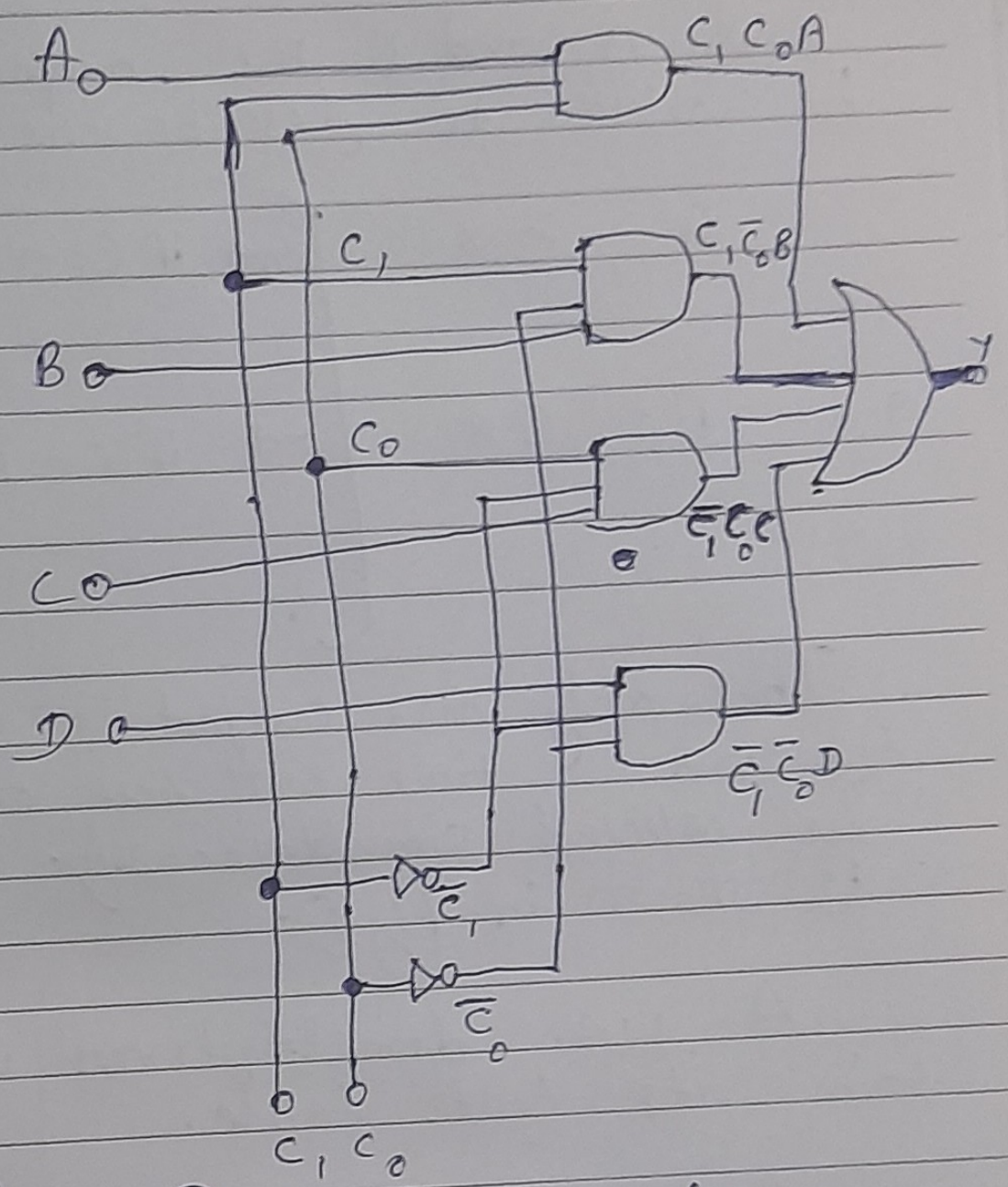


fig 1 © 4:1 multiplexer.