DIGITAL SYSTEMS

LAB-6

MUX 4:1 implementation

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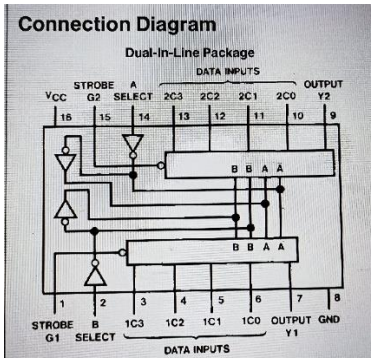
Aim: Implementation of given SOP using 4:1 MUX

Summary of the experiment:
Implementing 4:1 MUX circuit using **DM74153 Dual 4-Line to 1-Line IC**

Components used:
DM74153 IC,AND gate IC(DM7408) switches, LED, breadboard, power supply, 1k ohm resistor

Design:

Connection diagram of DM74153 IC with it's functional table



Function Table

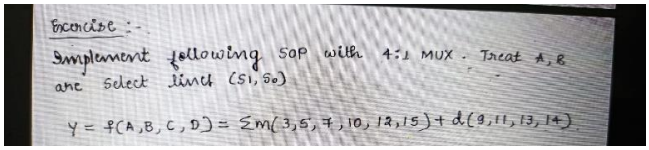
Select Inputs		Data Inputs				Strobe	Output
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Select inputs A and B are common to both sections.
H = High Level, L = Low Level, X = Don't Care

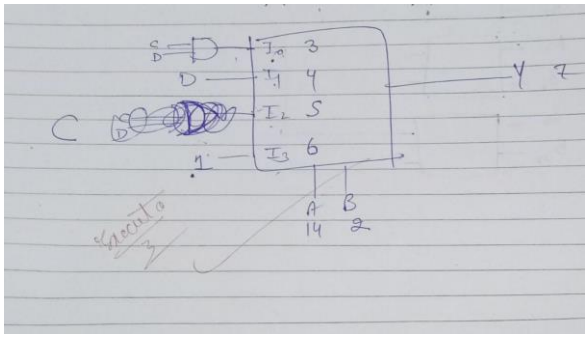
According to this connection diagram we used strobe **G1**
As mentioned to **activate G1 we have to keep it '0' all the time**

Now,
we got a question in which we have to implement a 4:1 MUX for the

given SOP

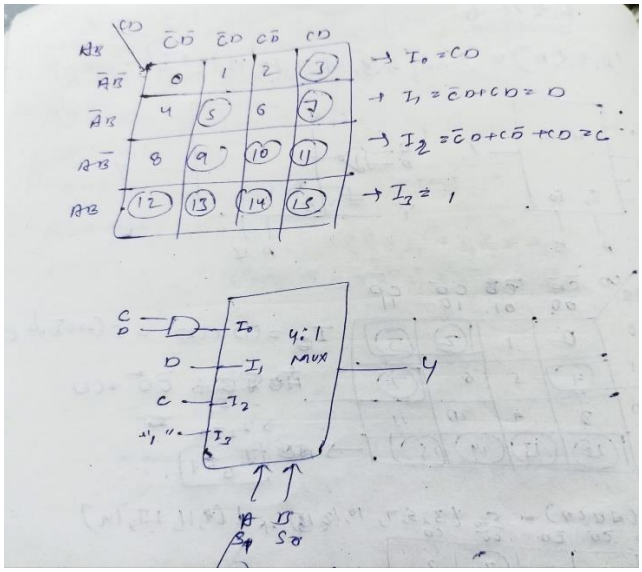


Circuit diagram of 4:1 MUX with pin numbers of IC to which it is connected



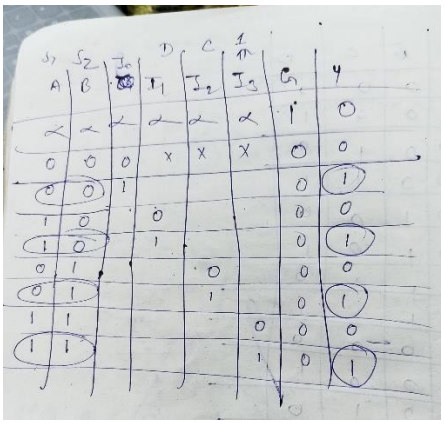
Here we used one MUX IC and one AND gate.

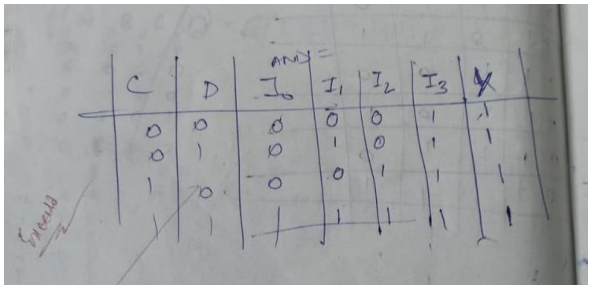
Considering A,B as select lines ,
expression for i0,i1,i2,i3 in terms of C,D are as follows.
Here **we have used don't care** terms to make simplification easier



Here as i3=1 this implies it will always remain **ON**

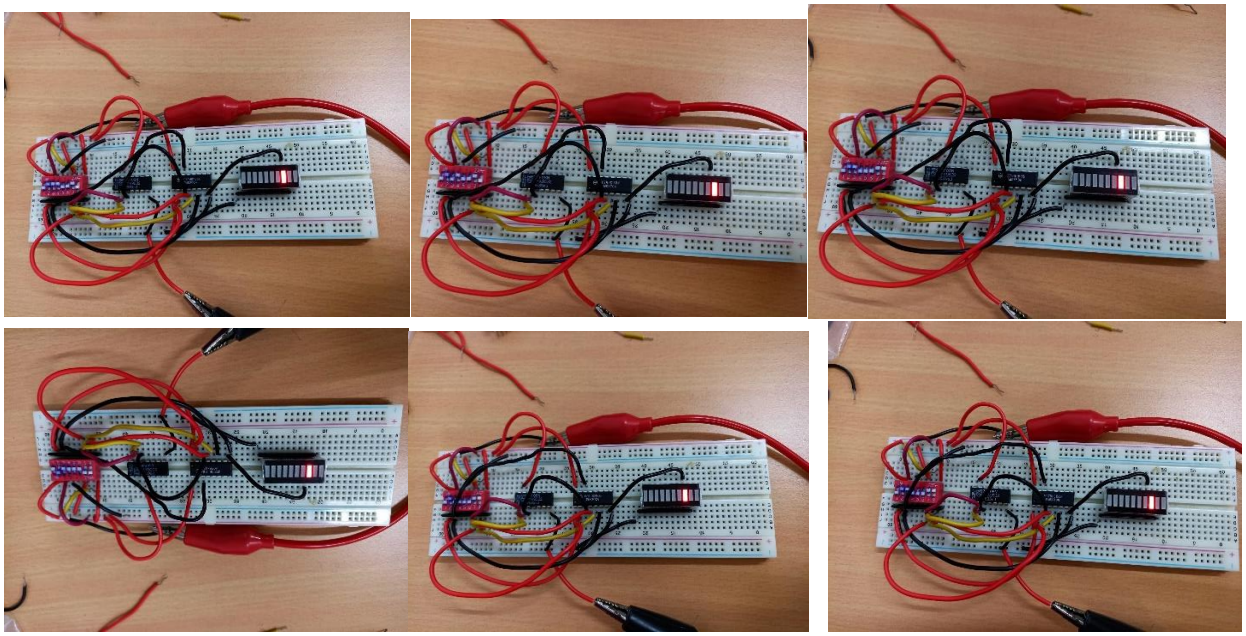
I0=CD ,I1=D ,I2=C ,I3=1





so according to right table which is same as functinal table of IC
if A=B=’0’ i0 will glow which means C=D=’1’
A=1,B=’0’ i1 will glow which means C=D=’1’ **OR** C=0,D=1
A=0,B=’1’ i2 will glow which means C=D=’1’ **OR** C=1,D=0
A=B=’1’ i3 will glow which means C=D=’1’ **OR** C=0,D=1 **OR** C=0,D=0 **OR** C=1,D=0 as i3 is always 1

Hardware:



Discussions:

Through out the experiment we discussed many things, like this is the MUX so truth table of 4:1 MUX , circuit diagram of 4:1 MUX ,which strobe should we use, should we use don’t care terms, etc and in these discussions we learnt many things.

Conclusion/results:

In this experiment we learnt how to implement 4:1 MUX with given SOP

We learnt how to use 4 inputs to give one output, whom to consider select line whom to inputs. We also learnt how to use strobe in MUX.

And since 3:8 decoder is similar to MUX so with this experiment we also learnt how to implement decoder.

We learnt how to work with a 16 pin IC, as it is quite different with 8/14 pin.