MICROCONTROLLER

UNIT-IV

Lecture-2

Using Programmable Logic

- Other widely used decoders are programmable logic chips such as PAL and GAL chips
- One disadvantage of these chips is that one must have access to a PAL/GAL software and burner, whereas the 74LS138 needs neither of these
- The advantage of these chips is that they are much more versatile since they can be programmed for any combination of address ranges

INTERFACING EXTERNAL ROM

- The 8031 chip is a ROM-less version of the 8051
- It is exactly like any member of the 8051 family as far as executing the instructions and features are concerned, but it has no on-chip ROM
- To make the 8031 execute 8051 code, it must be connected to external ROM memory containing the program code

Contd.

- 8031 is ideal for many systems where the on-chip ROM of 8051 is not sufficient, since it allows the program size to be as large as 64K bytes
- For 8751/89C51/DS5000-based system, we connected the EA pin to Vcc to indicate that the program code is stored in the microcontroller's on-chip ROM
- To indicate that the program code is stored in external ROM, this pin must be connected to GND

Contd.

- Since the PC (program counter) of the 8031/51 is 16-bit, it is capable of accessing up to 64K bytes of program code
- In the 8031/51, port 0 and port 2 provide the 16-bit address to access external memory
- P0 provides the lower 8 bit address A0 – A7, and P2 provides the upper 8 bit address A8 – A15

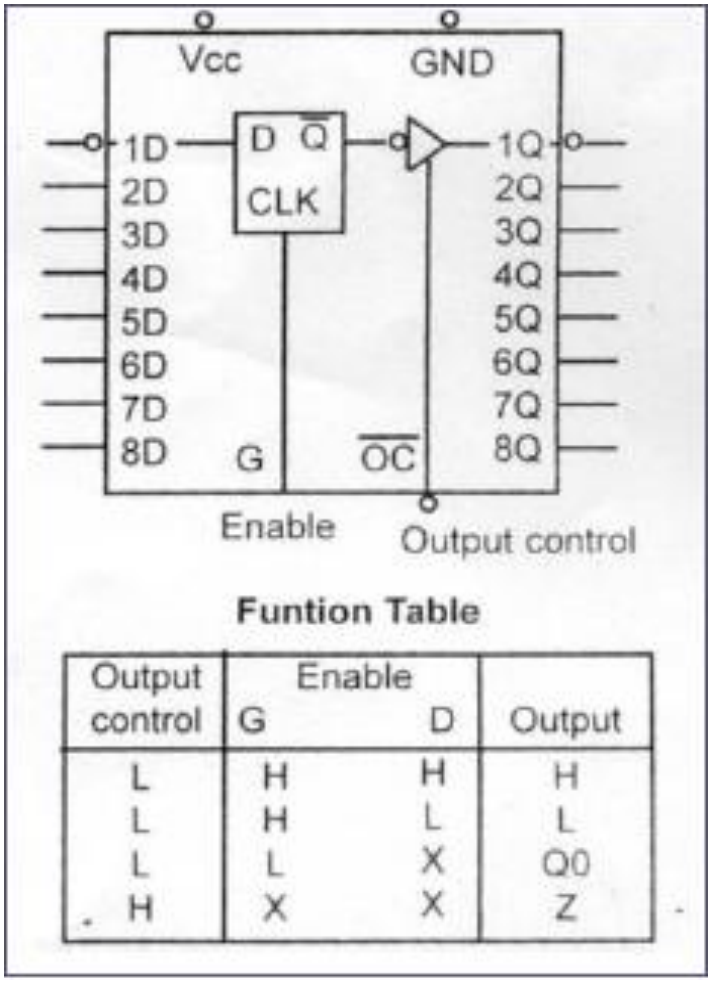
Contd.

- P0 is also used to provide the 8-bit data bus D0 – D7
- P0.0 – P0.7 are used for both the address and data paths
- address/data multiplexing
- ALE (address latch enable) pin is an output pin for 8031/51
- ALE = 0, P0 is used for data path
- ALE = 1, P0 is used for address path

Contd.

- To extract the address from the P0 pins we connect P0 to a 74LS373 and use the ALE pin to latch the address P1.0
- Normally ALE = 0, and P0 is used as a data bus, sending data out or bringing data in
- Whenever the 8031/51 wants to use P0 as an address bus, it puts the addresses A0 – A7 on the P0 pins and activates ALE = 1

Contd.



Funtion Table

Output control	Enable G	D	Output
L	H	H	H
L	H	L	L
L	L	X	Q0
H	X	X	Z

Contd.

- PSEN (program store enable) signal is an output signal for the 8031/51 microcontroller and must be connected to the OE pin of a ROM containing the program code

Address/Data Multiplexing