Input/output Interface

Demultiplexing circuit

- Two 74F373 octal latches are used to form a 16-bit address latch. These devices latch the address A_0 to A_{15} synchronously with the ALE pulse. The latches address outputs are labeled A_{0L} through A_{15L} .
- A_{16} through A_{19} are not involved in the I/O interface.
- Data bus transceiver buffer in 8086 system is implemented using 74F245 octal bus IC's, where the control inputs 'DIR' and 'G' is used to control the data flow ($A_n \rightarrow B_n$) or ($B_n \rightarrow A_n$).
- Figure (1) shows the block circuit diagram of 8-bit Data bus transceiver buffer IC. Also $\bar{G}$ input is used to enable the buffer operation , when DIR input selects the direction of intended data transfer.

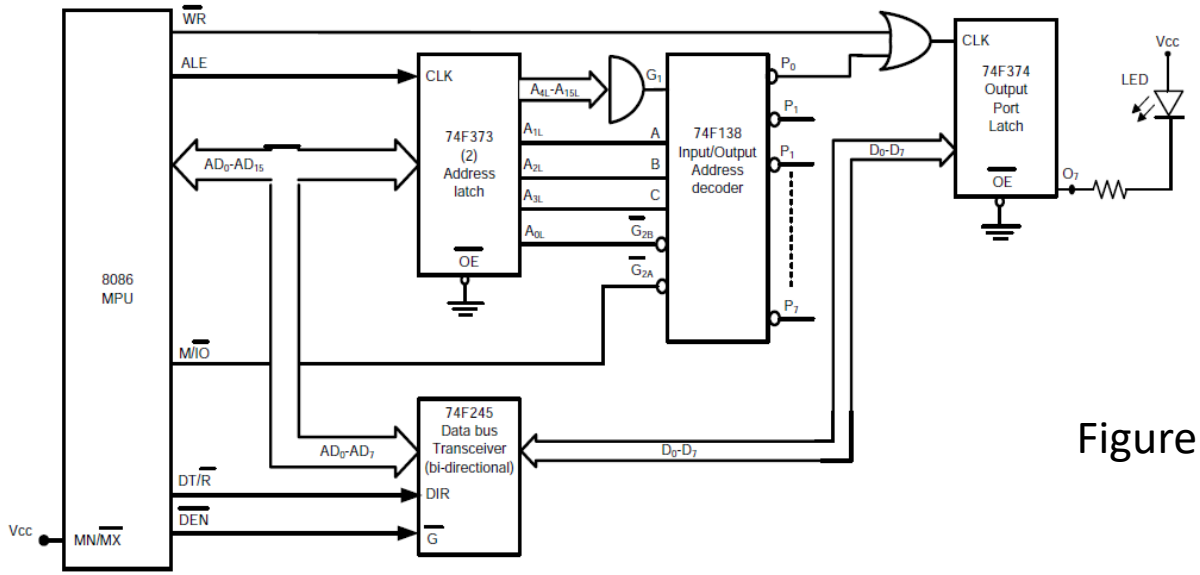

WR
ALE
AD0-AD15
M/IO
DT/R
DEN
MN/MX
Vcc
8086
MPU
CLK
74F373
(2)
Address
latch
OE
A4L-A15L
G1
A1L
A2L
A3L
A0L
A
B
C
G2B
G2A
74F138
Input/Output
Address
decoder
P0
P1
P1
P7
74F245
Data bus
Transceiver
(bi-directional)
DIR
G
AD0-AD7
D0-D7
D0-D7
CLK
74F374
Output
Port
Latch
OE
O7
Vcc
LED

Figure (1)

Time Delay Loop and Blinking an LED at an Output Port

The circuit in figure (1) show how attach a LED to output port Q_7 of parallel port 0. The port address FFF0H and the LED corresponds to bit 7 of the byte of data that is written to port 0. The circuit use 74LS374 (edge clocked octal latch).

For the LED to turn on,O_7 must be switched to logic 0, and it will remain on until this output is switched back to 1. The 74LS374 is not an inverting latch, therefore to make O_7 logic 0, simply write 0 to that bit of octal latch.

Polling Technique

In practical applications, it is sometimes necessary with an I/O service routine to repeatedly read the value at an input port and test the value at input line and test this value at specific logic level.

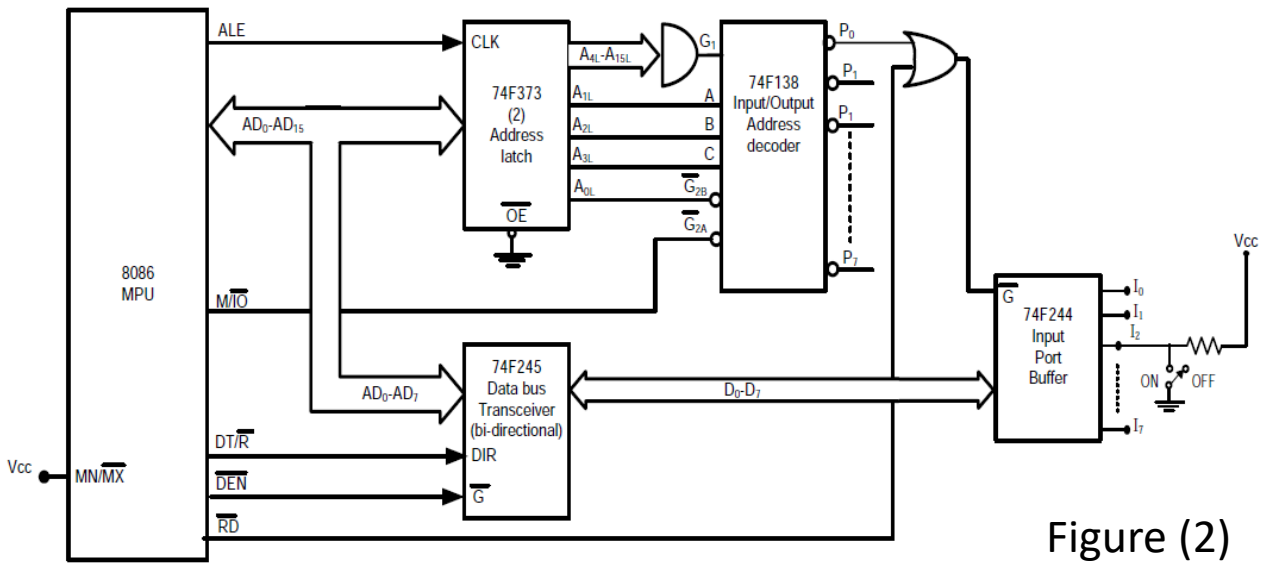
Let us assume that we want to read the contents of port 0, and the input at I_3 at this port is the line that is being polled.

The circuit in figure (2) show how to attach a switch to input I_2 of parallel port 0. The port address is FFF0H, and the switch corresponds to bit2 of the byte of data that is read from port 0. The circuit use 74LS244 (unidirectional octal buffer).

- It is common practice to poll a switch like this with software waiting for it to close. The instruction sequence that follows will poll the switch I_2 :

```
    MOV CL,03H
    MOV DX,FFF0H
POLL_I2:IN AL,DX
        SHR AL,CL
        JC POLL_I2
        CONTINUE
```

If the switch is open , then bit 2 in AL is 1 and this value is shifted into CF. The program will still loop until the switch is closed. If the switch closed , then the polling operation is complete and the instruction following the JC is executed.


8086
MPU
ALE
AD0-AD15
M/IO
DT/R
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(2)
Address
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A4L-A15L
A1L
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74F138
Input/Output
Address
decoder
P0
P1
P1
P7
74F245
Data bus
Transceiver
(bi-directional)
DIR
G
AD0-AD7
D0-D7
G
74F244
Input
Port
Buffer
I0
I1
I2
I7
Vcc
ON
OFF

Figure (2)