Interfacing 8085 µp with 7-Segment Display

Basic of 7 Segment Display :-

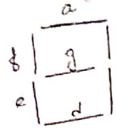


fig (a)

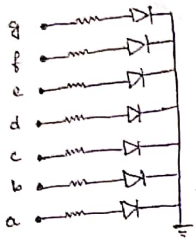


fig (b)

Common-Cathode 7 Seg. Display

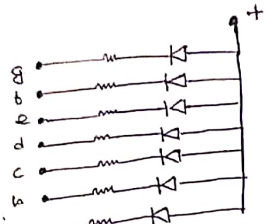


fig (c)

Common-anode 7 Seg. Display

7 Seg. display is multiple display using LED. It can display all decimal numbers and some letter. There are diff. same kind of elcts in market like 9-segment LED, 14 Segment LED....

There are two types of 7-Segment display.

(i) Common Cathode — where +5V. d.c is applied to any segment to glow the corresponding LED. Similar to Active High i/p

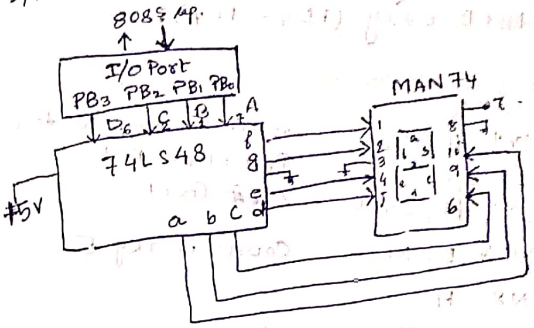
(ii) Common Anode — where 0V. or' Gnd connection is required to switch ON the Corresponding LED. Similar to Active Low i/p.

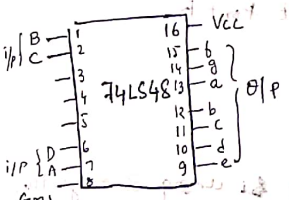
Thes 7-segment display device is not connected directly with I/O Ports. Theay are connected using Decoder Or' Buffers.

FND 500, FND 503 - (Common Cathode) 7 Segment display.
FND 507, FND 510 - Common Anode. " " "

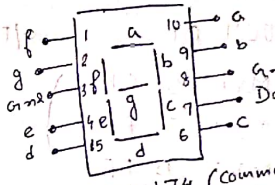
(4 To 8 Decoder)

BCD to 7 Seg ~~display~~ Decoder that is 74LS48 is used to interface betn. 7 Seg display device & I/O port (8255). The fig of Configuration is shown:





4:8 BCD to 7 Seg. Decoder



MAN74 (Common Cathode type) 7 Seg. display

Here we can note following:

(i) Port B is used to send data to 74LS48 chip. (DCBA) this how data comes at BCD - 7 seg display chip. Then 8 o/p signals are generated according to the value of i/p. These 8 o/p signals of BCD - 7 seg. goes directly to MAN74. (Common Cathode type 7-seg. dic chip). Then corresponding LED will blinks.

Prog.

```
MVI A 98H   [Control word as discussed in ADC Topic
OUT 03      ; Port B add: 01H. 05H data
MVI A 05H   ; Send to Port B.  0000 0101
                               Not used  DCBA
OUT 01                         Bits
HLT         ; In 4:8 Decoder, for i/p 0101,
            ; the o/p is 5
```

* If A, B, C, D value is ≥ 10 then Segment can't display random figures.

** We can parallely add another 7 segment display with Port B using (PB4 - PB7).

Write a program to display 0 – 9 decimal numbers

```
Ans:    MVI A, 98      Get Control word at Accumulator
        OUT 03         Initialize Port
ABOVE:  LXI H, 2500    Get Count
        MOV E, M       Count in reg E
LOOP:   INX H.
        MOV A M        Get next number
        OUT 01         o/p at Port B.
        MVI B 0F
GO2:    MVI C FF
GO1:    MVI D FF
GO:     DCR D          Delay using 3 registers.
        JNZ GO
        DCR C
        JNZ GO1
        DCR B
        JNZ GO2.
        DCR E          Decrement Count
        JNZ LOOP       Go to Loop to get next number
        JMP ABOVE      Go ABOVE to restart.
```

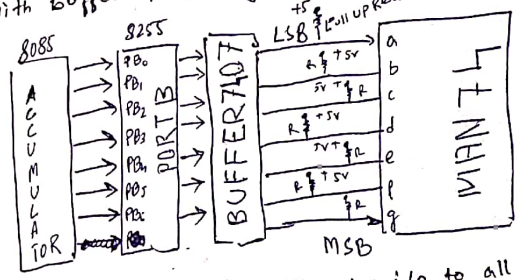
Intial Data at following locations

2500 – 0A (count value) ~~2505~~.

2501 – 00
2502 – 01
2503 – 02
2504 – 03
2505 – 04
2506 – 05
2507 – 06
2508 – 07
2509 – 08
250A – 09

Interfacing 7-segment Display using Buffer:

Buffer 7407 is used here for interfacing. It has six o/p pins which can be used to give direct i/p to the seven segment display chip. Here Port B is connected with buffer 7407 as given fig.



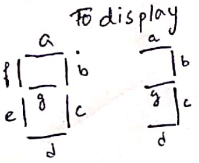
** As here we can directly give i/p to all segments of MAN74 chip so, the 7 segment representation Table is:

Digit	Hex Code Common Cathode		Hex Code Common Anode
0	3F	This section of data Should be preloaded in the memory locations.	40
1	06		79
2	5B		24
3	4F		30
4	66		19
5	6D		12
6	7D		02
7	07		78
8	7F		00
9	67		18.

Calculation: In case of BCD to 7Seg. Decoder, we need not think about the i/p Hex code. we can give all valid BCD numbers (0...9) so that we will get corresponding display

But here:

To display 3_{10}, the Hex code is $4F_H$ in Common Cathode 7 Seg.



g	f	e	d	c	b	a
1	0	0	1	1	1	1
4				F	H.	
0	1	1	0	0	0	0
3				0		

That's how we calculate.

in Common Anode Method