

ICE 3102

Microprocessor and Interfacing Lab

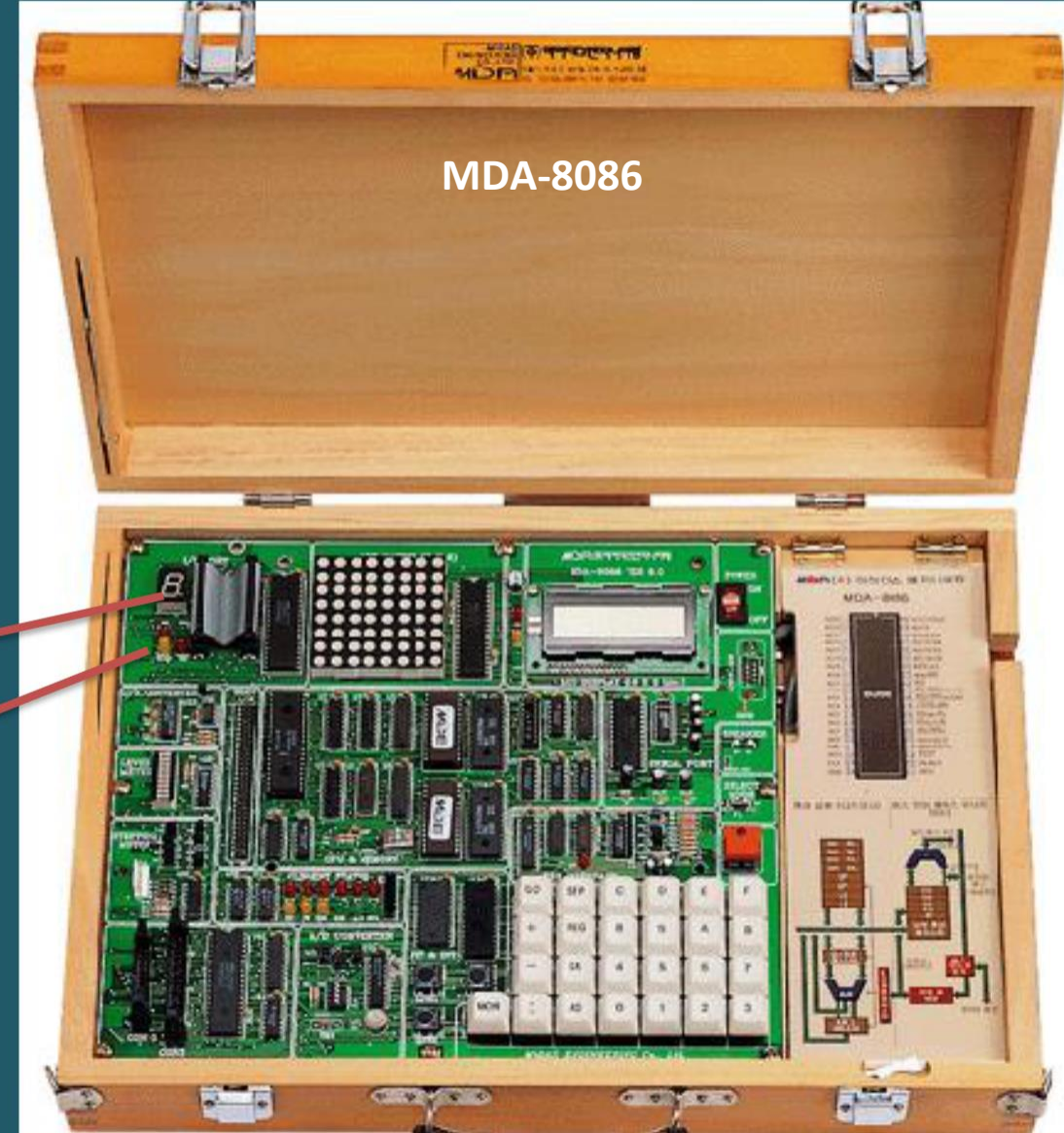
Interfacing of LED and 7-segment display with 8086 microprocessor

Objectives

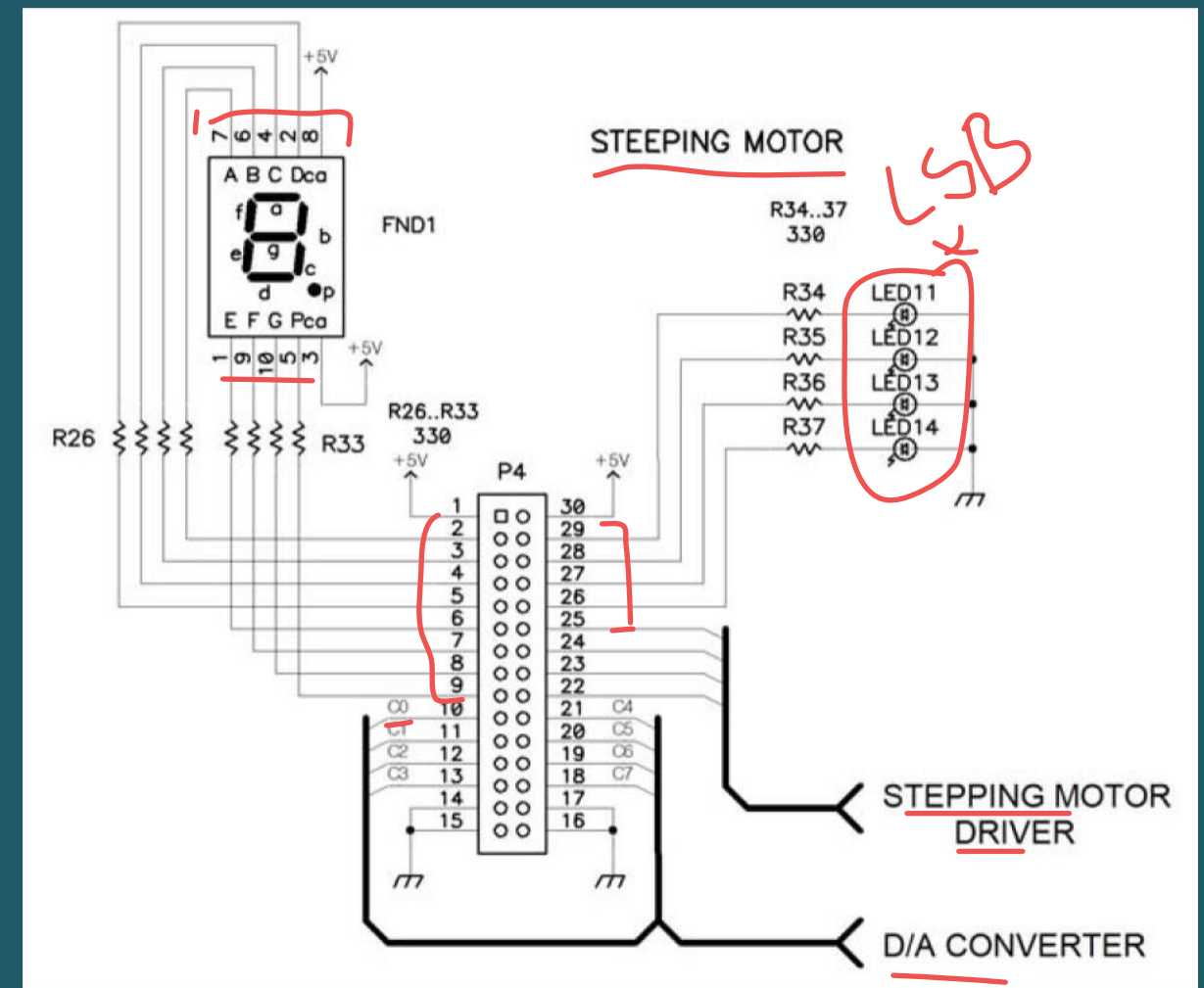
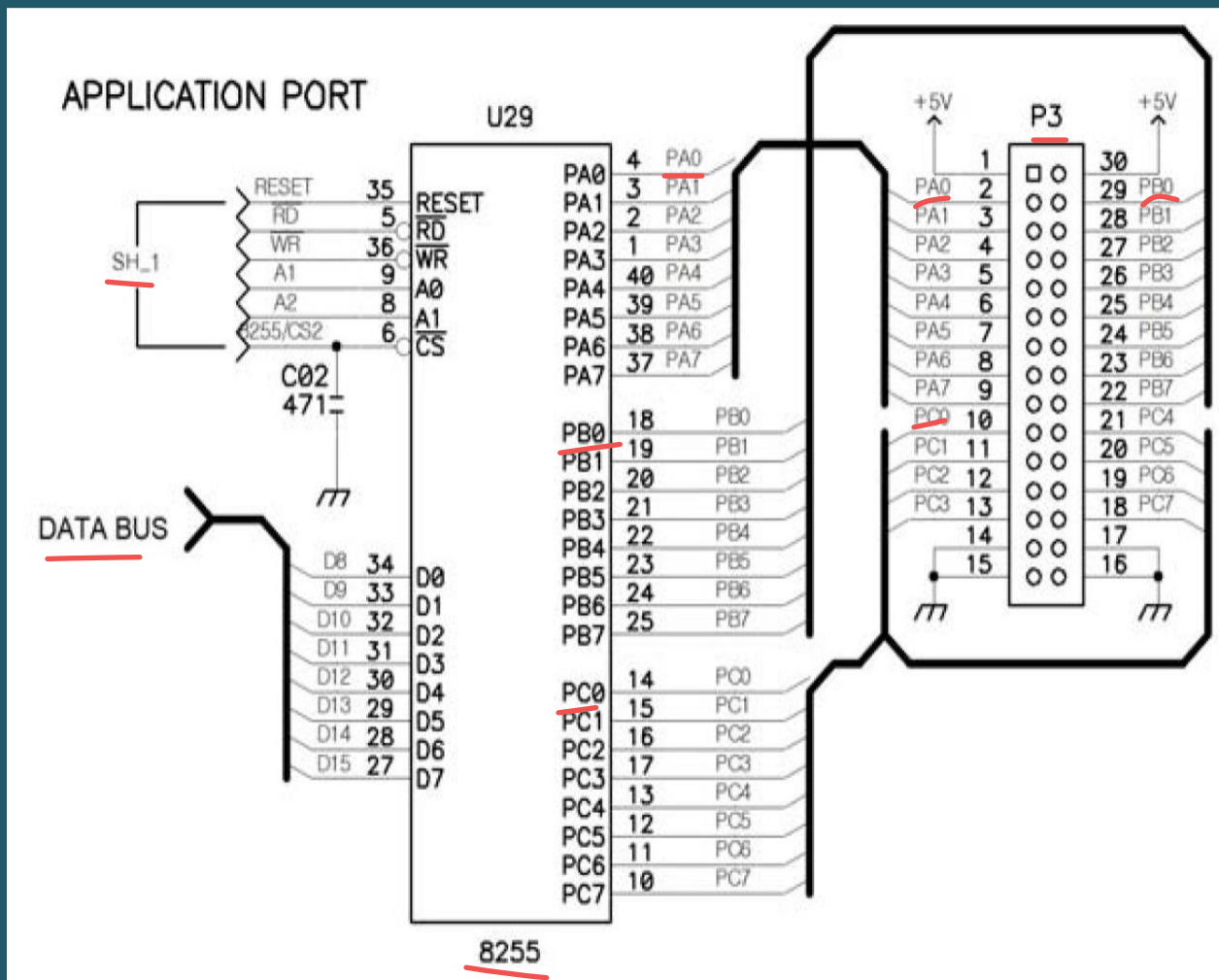
- 1) To interface LED with 8086 microprocessor by 8255 PPI.
- 2) To interface 7-segment display with 8086 microprocessor by 8255 PPI.

7-segment Display

LED



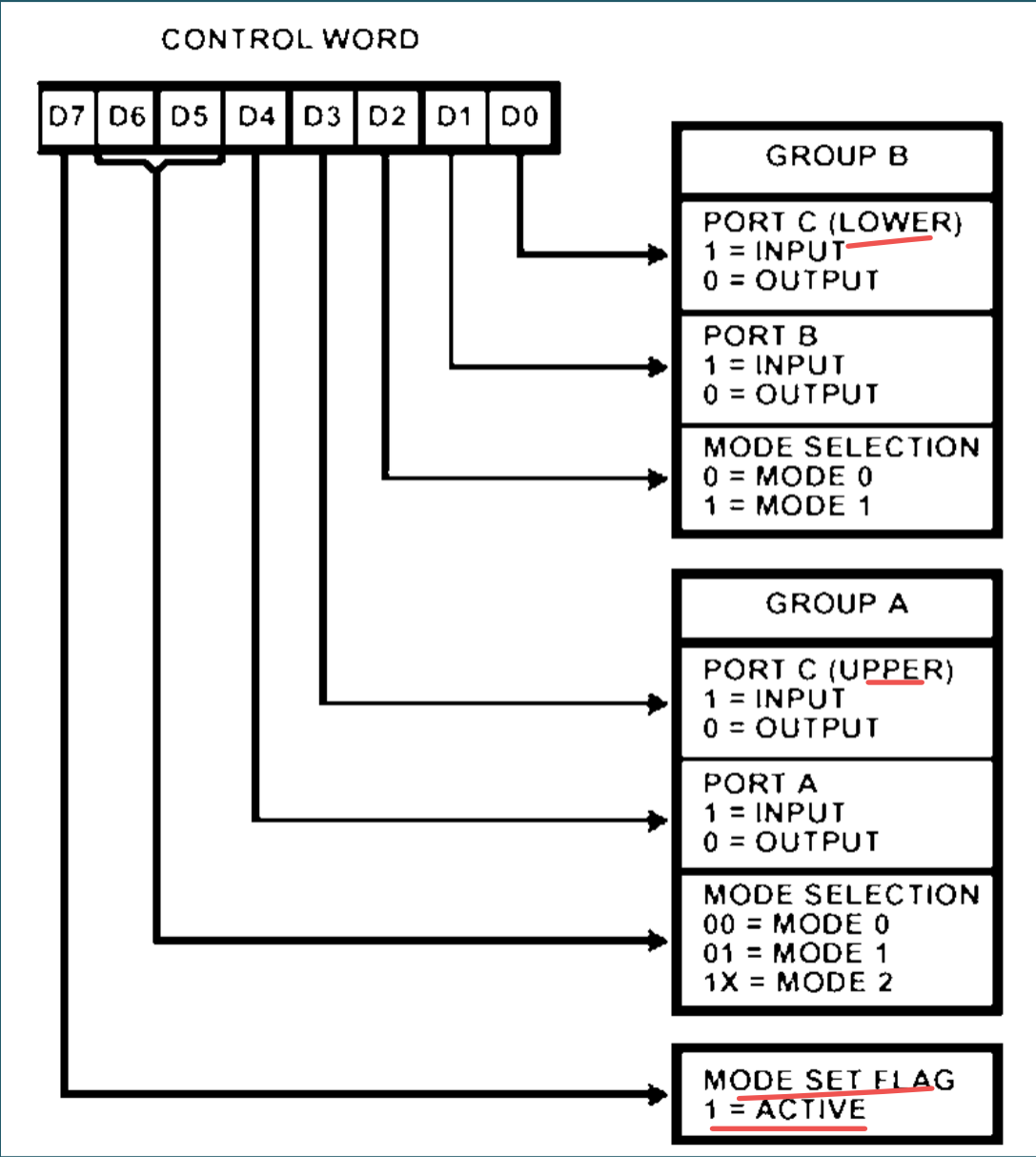
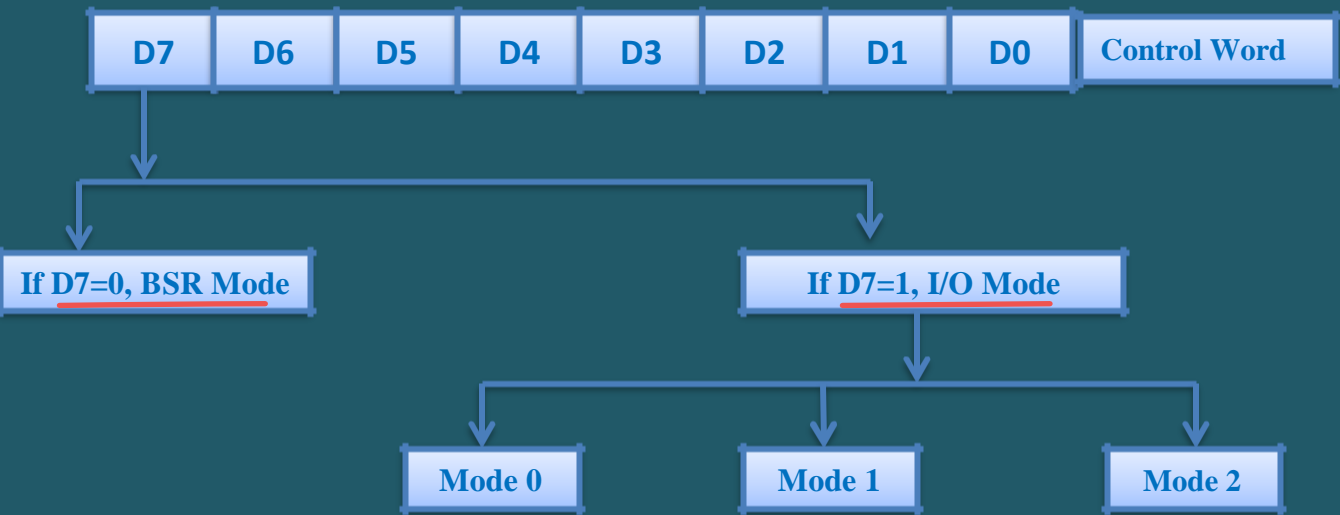
Schematic of LED and 7-segment display interface with 8086



Address of the internal registers of 8255 (In MDA-8086)

✓ 18H ~ 1FH	8255A-CS1/	8255A-CS1(<u>DOT</u> & ADC INTERFACE)
	8255A-CS2	18H : A PORT DATA REGISTER 1AH : B PORT DATA REGISTER 1CH : C PORT CONTROL REGISTER 8255-CS2(LED & STEPPING MOTOR) 77528 19H : A PORT DATA REGISTER 1BH : B PORT DATA REGISTER 1DH : C PORT CONTROL REGISTER 1FH : CONTROL REGISTER

Control Word for LED Interfacing



LED Blinking

```
CODE      SEGMENT
          ASSUME CS:CODE,DS:CODE,ES:CODE,SS:CODE
```

```
PPIC_C    EQU      1FH
PPIC       EQU      1DH
PPIB       EQU      1BH
PPIA       EQU      19H
```

```
          ORG      1000H
          MOV      AL,10000000B
          OUT      PPIC_C,AL
```

```
L1:        MOV      AL,00000001B
          OUT      PPIB,AL
          CALL     DELAY
          MOV      AL,00000000B
          OUT      PPIB,AL
          CALL     DELAY
          JMP      L1
```

```
DELAY:     MOV      CX,1111111111111111B
TIMER1:    NOP
          NOP
          NOP
          LOOP     TIMER1
          RET
```

```
CODE       ENDS
          END
```

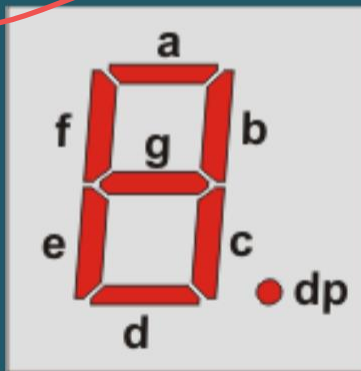
LED

LSB

167

7-segment Display

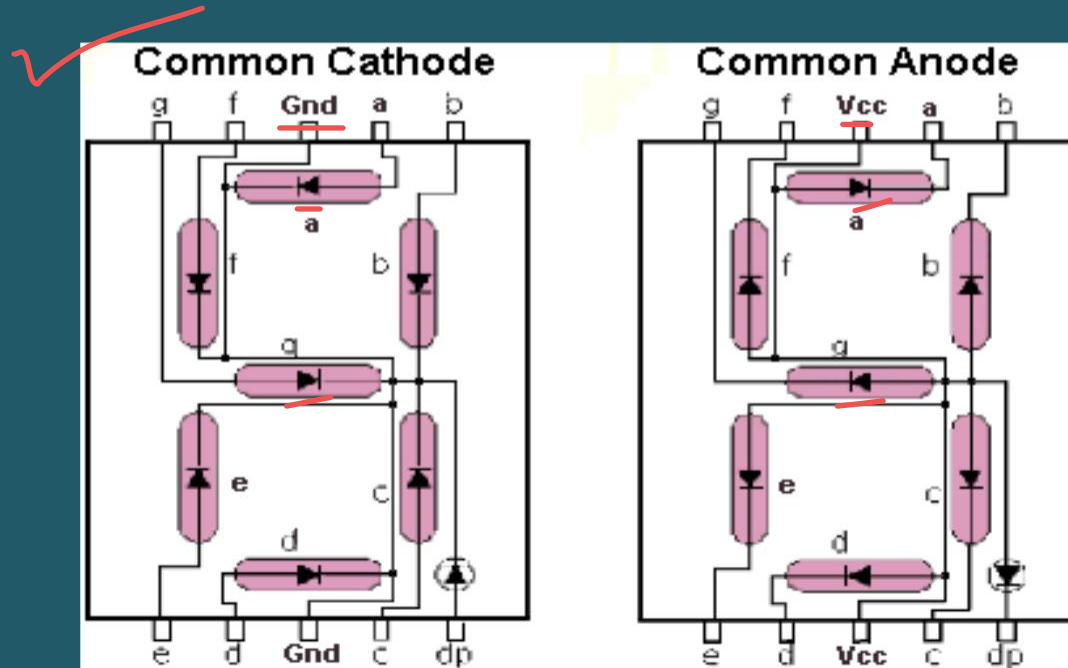
The 7-segment display, also written as "seven segment display", consists of seven LEDs (hence its name) arranged in a rectangular fashion as shown. Each of the seven LEDs is called a segment because when illuminated the segment forms part of a numerical digit (both Decimal and Hex) to be displayed. An additional 8th LED is sometimes used within the same package thus allowing the indication of a decimal point, (DP) when two or more 7-segment displays are connected together to display numbers greater than ten.

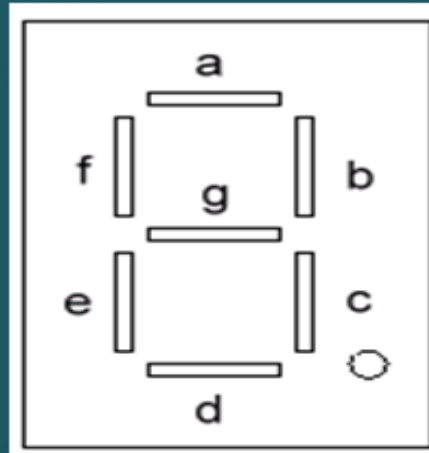


Common Anode and Common Cathode 7-segment Display

The Common Cathode (CC) – In the common cathode display, all the cathode connections of the LED segments are joined together to logic “0” or ground. The individual segments are illuminated by application of a “HIGH”, or logic “1”

The Common Anode (CA) – In the common anode display, all the anode connections of the LED segments are joined together to logic “1”. The individual segments are illuminated by applying a ground, logic “0” or “LOW”



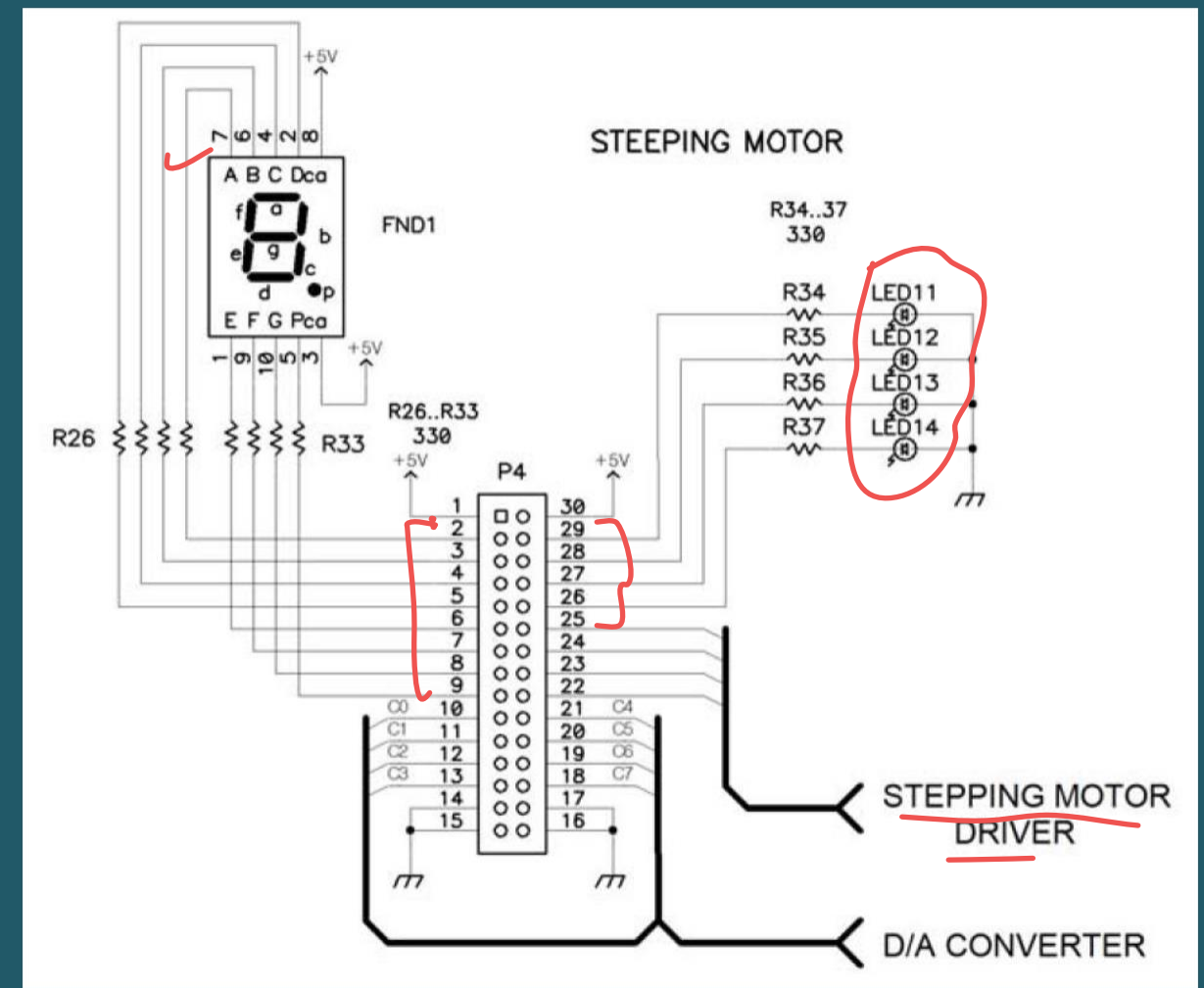
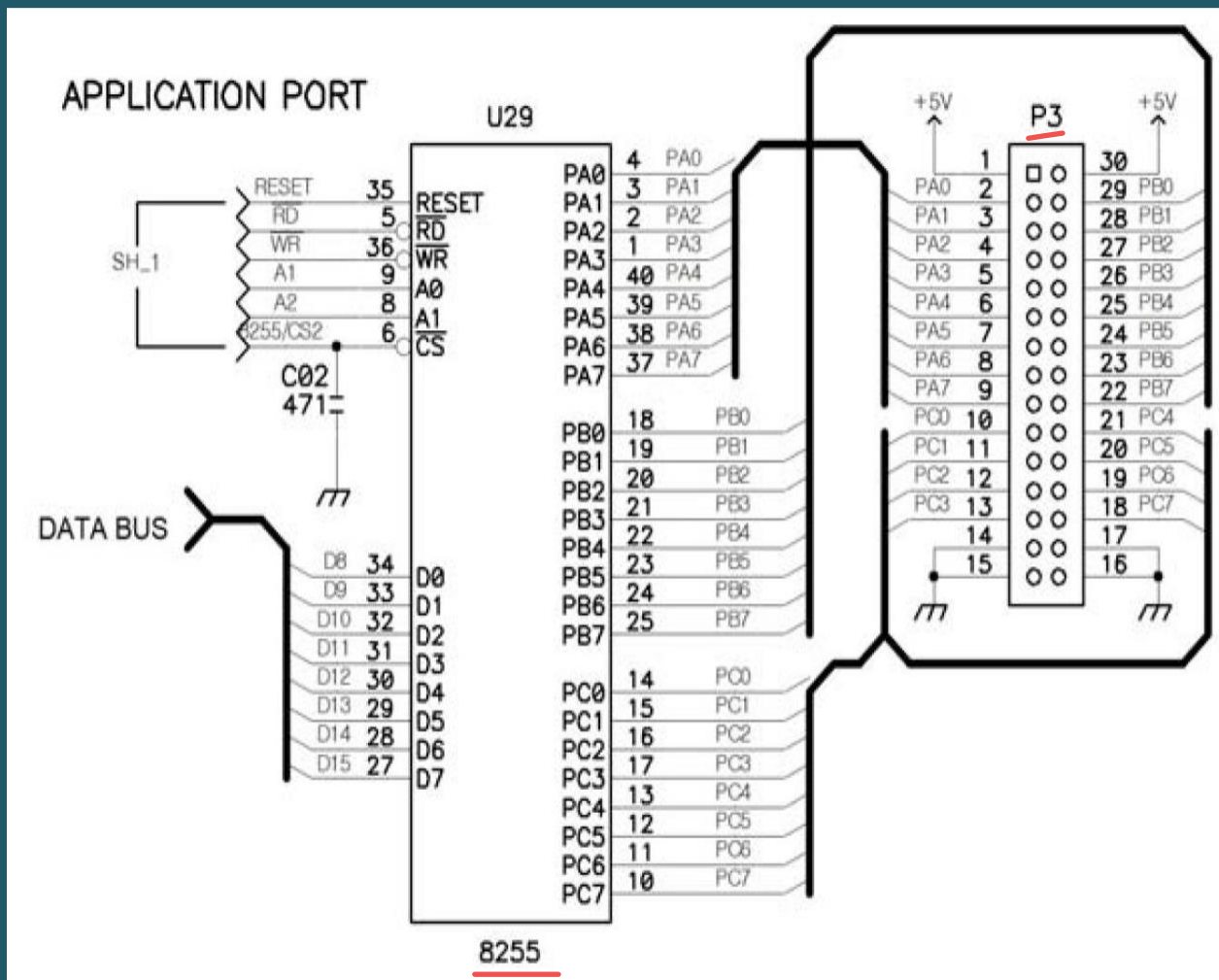


8	4	2	1	8	4	2	1		
dp	g	f	e	d	c	b	a		
0	0	0	0	0	0	0	0	DECIMAL VALUE	HEX VALUE
1	1	1	1	1	0	0	1	1	F9
1	0	1	0	0	1	0	0	2	A4
1	0	1	1	0	0	0	0	3	B0
1	0	0	1	1	0	0	1	4	99
1	0	0	1	0	0	1	0	5	92
1	0	0	0	0	0	1	0	6	82
1	1	1	1	1	0	0	0	7	F8
1	0	0	0	0	0	0	0	8	80
1	0	0	1	0	0	0	0	9	90

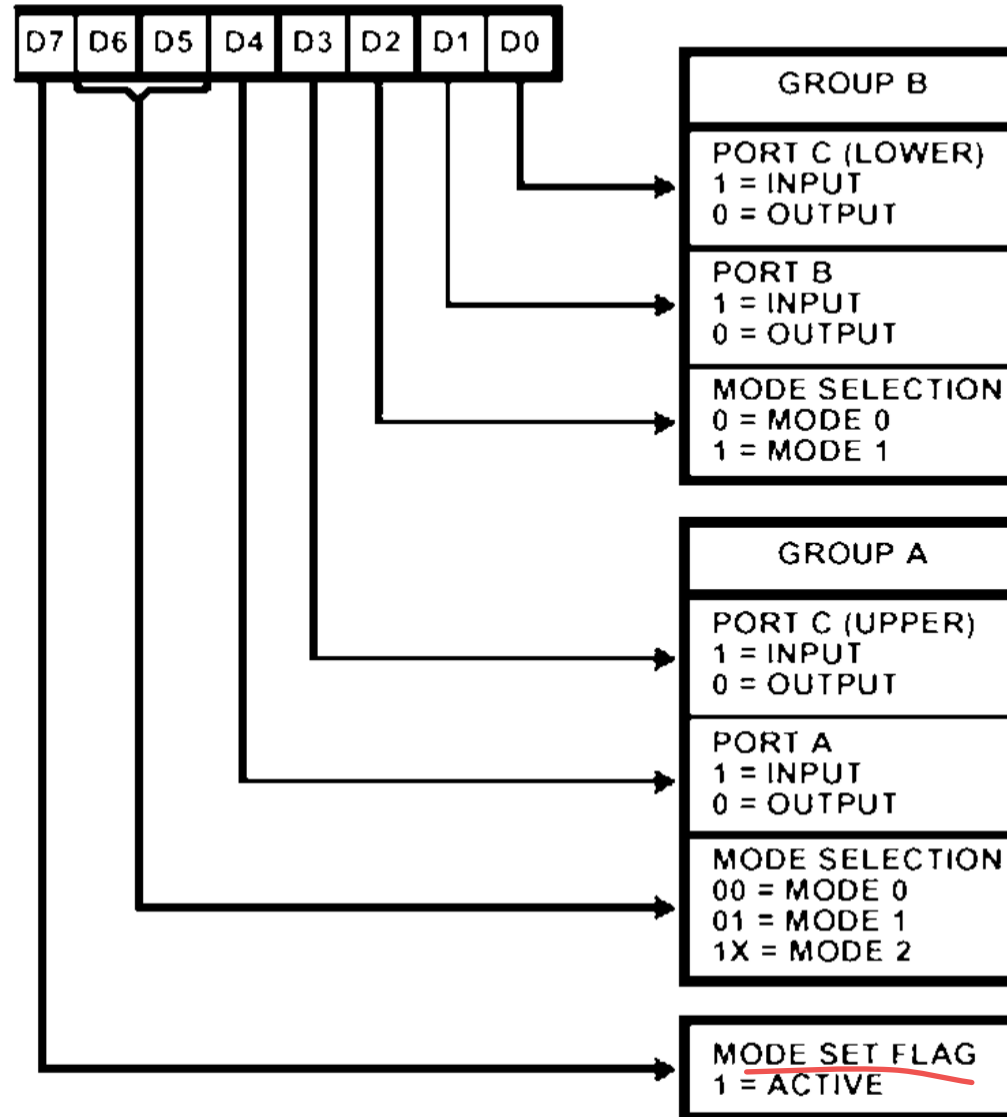
0 → ON
1 → OFF

Figure: Displaying number for CA configuration

Schematic of LED and 7-segment display interface with 8086



CONTROL WORD



7-Segment Display

```
CODE    SEGMENT
        ASSUME CS:CODE,DS:CODE,ES:CODE,SS:CODE
```

```
PPIC_C  EQU    1FH
PPIC     EQU    1DH
PPIB     EQU    1BH
PPIA     EQU    19H
```

```
        ORG     1000H
        MOV     AL,10000000B
        OUT     PPIC_C,AL
```

```
L1:      MOV     AL,01000000B → A
        OUT     PPIA,AL
        CALL    DELAY
        MOV     AL,11111001B → 1
        OUT     PPIA,AL
        CALL    DELAY
        JMP     L1
```

```
        DELAY:  MOV     CX,1111111111111111B
        TIMER1: NOP
                NOP
                NOP
                NOP
                LOOP   TIMER1
                RET
```

```
CODE    ENDS
        END
```

