ICE-3102

Microprocessor and Interfacing Lab

Interfacing of Dot-Matrix LED display with 8086 microprocessor

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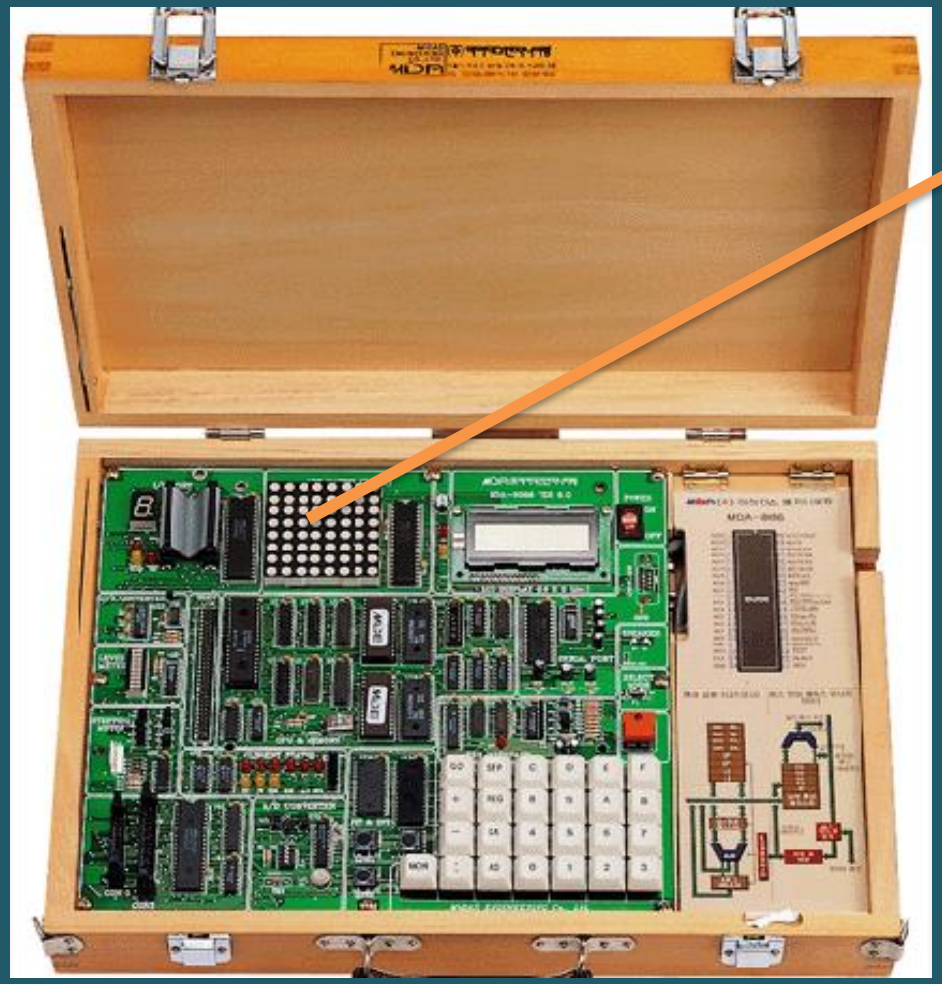
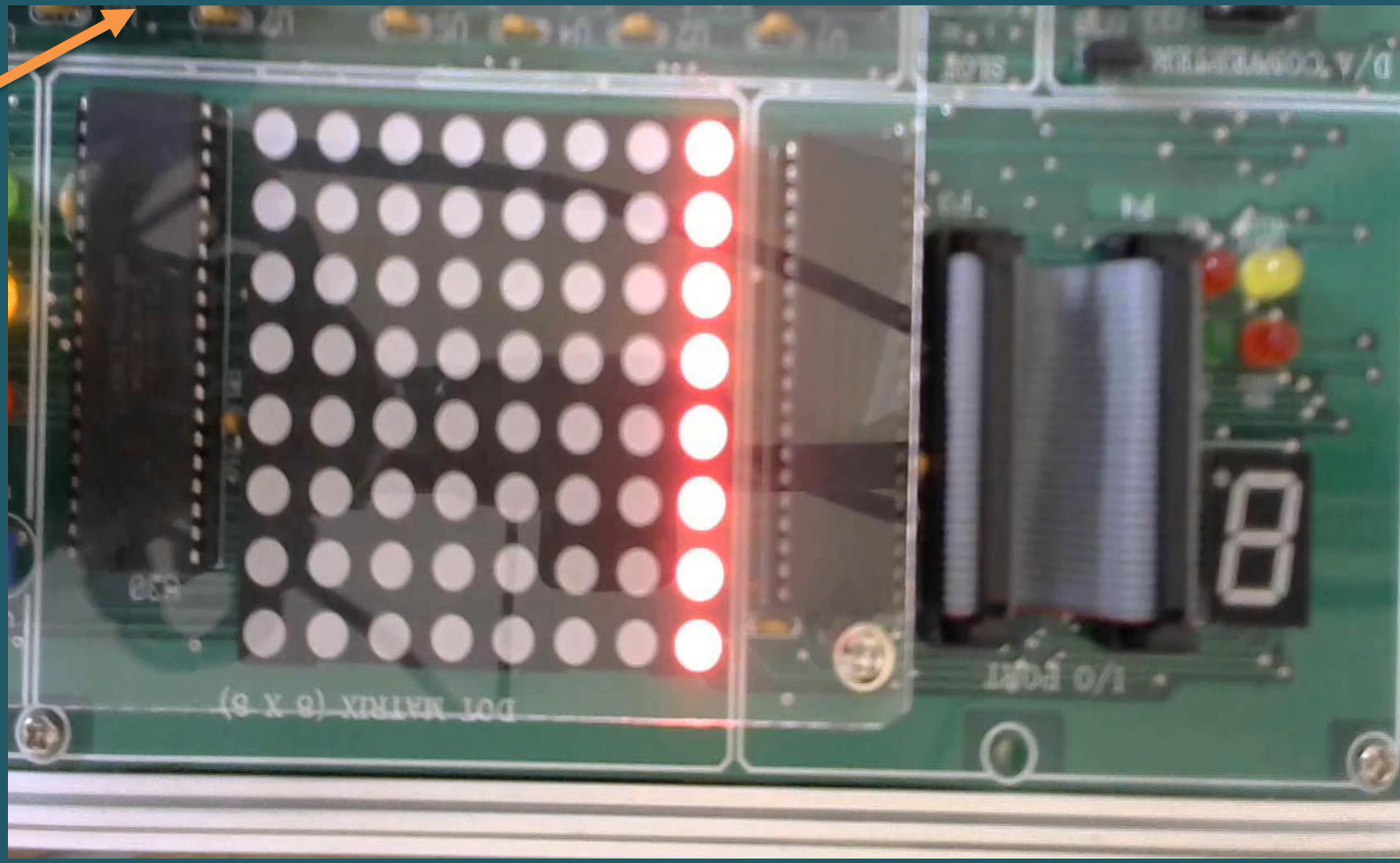
Objective-1

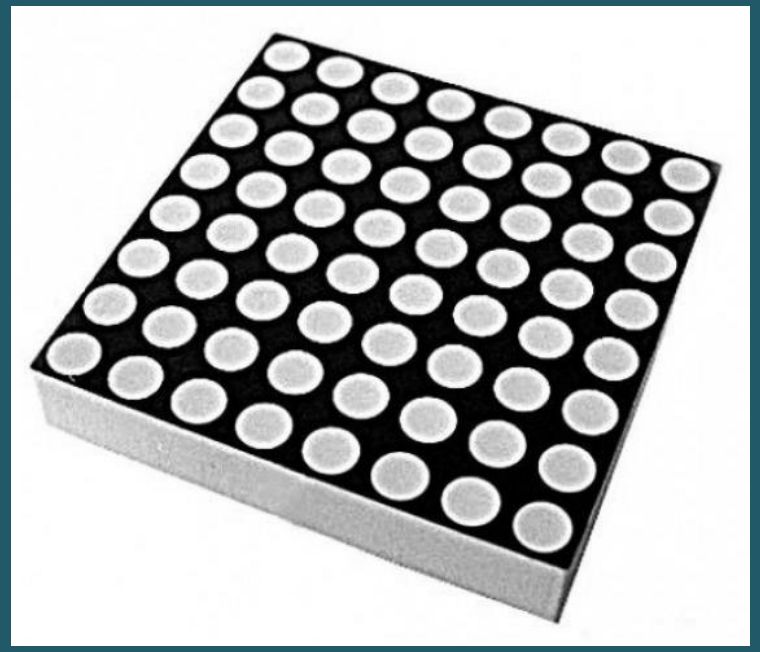
To interface Dot-Matrix LED display with 8086 microprocessor by 8255 PPI (in MDA-8086).

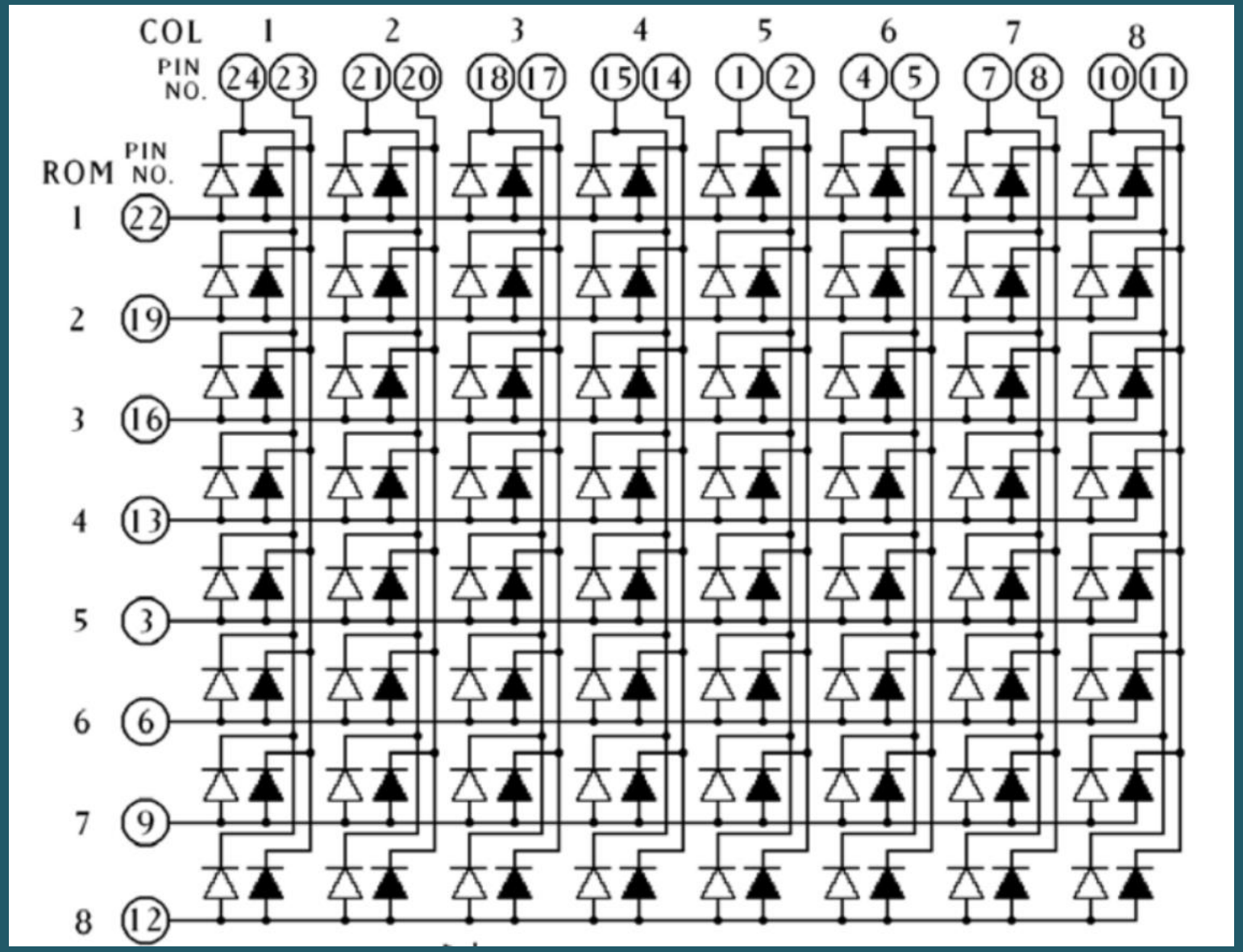


8X8 Dot Matrix Display

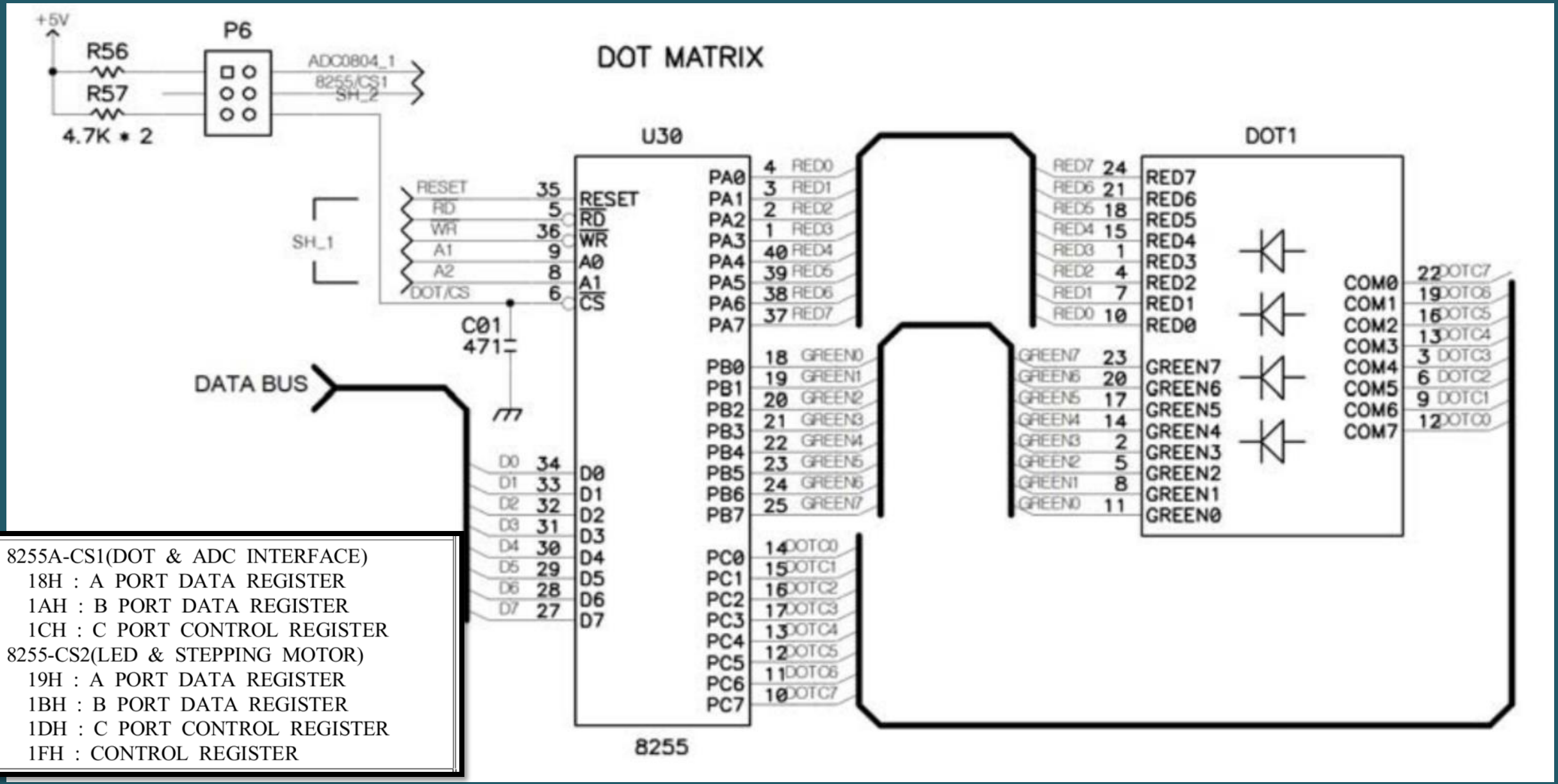


8X8 Bi-color Dot-Matrix Display



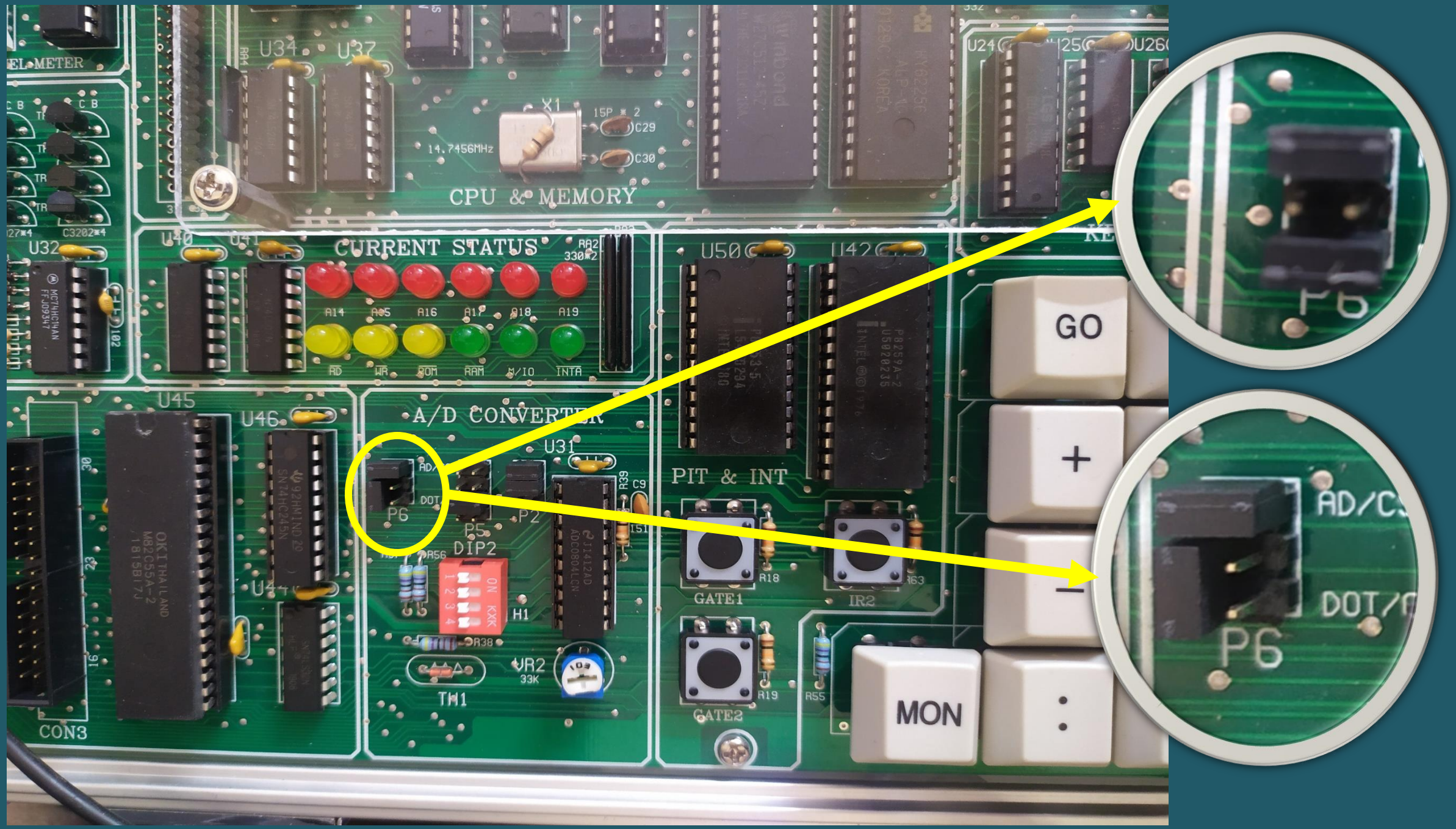


Schematic of Dot-Matrix display interface with 8086

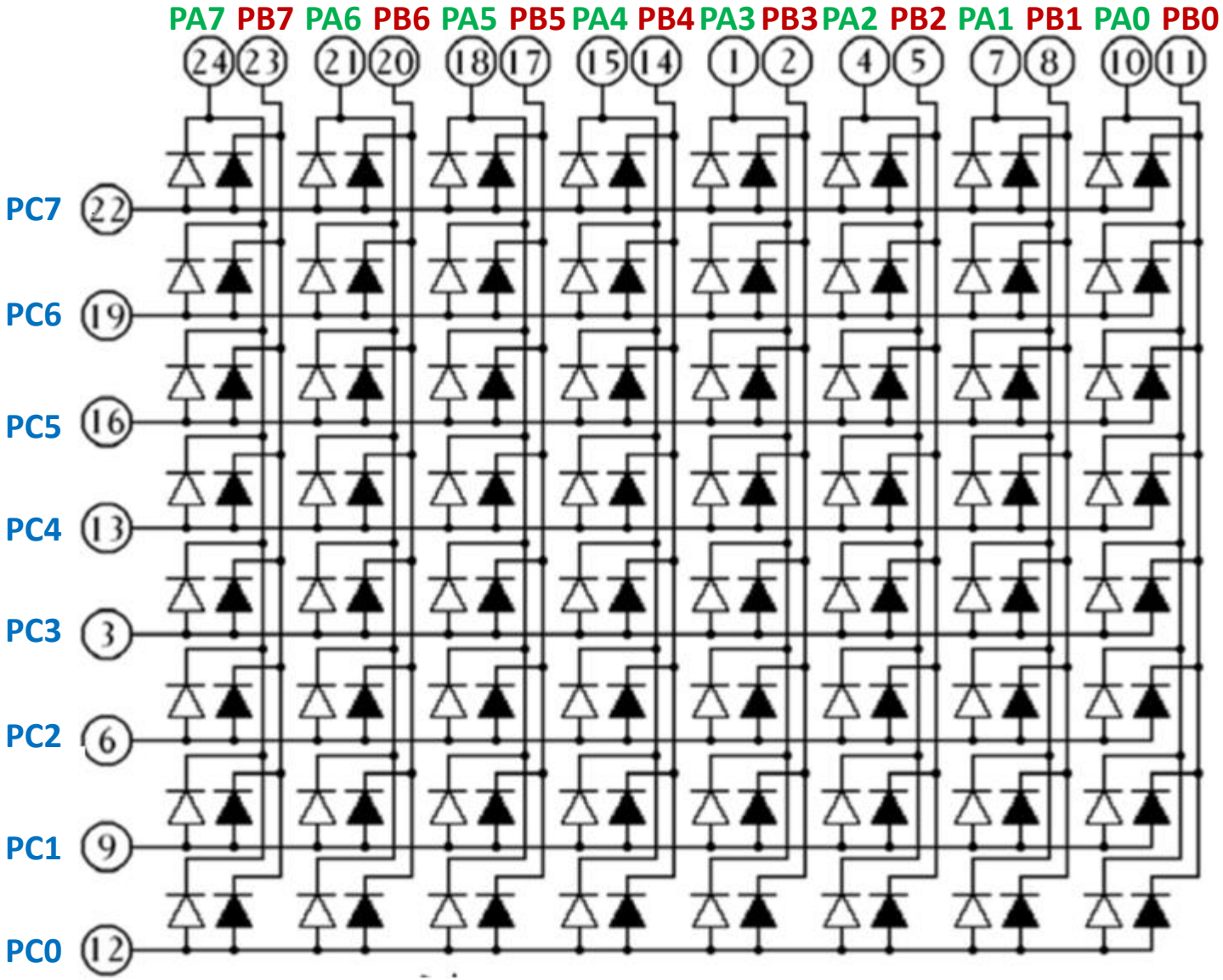


8255A-CS1(DOT & ADC INTERFACE)
- 18H : A PORT DATA REGISTER
- 1AH : B PORT DATA REGISTER
- 1CH : C PORT CONTROL REGISTER

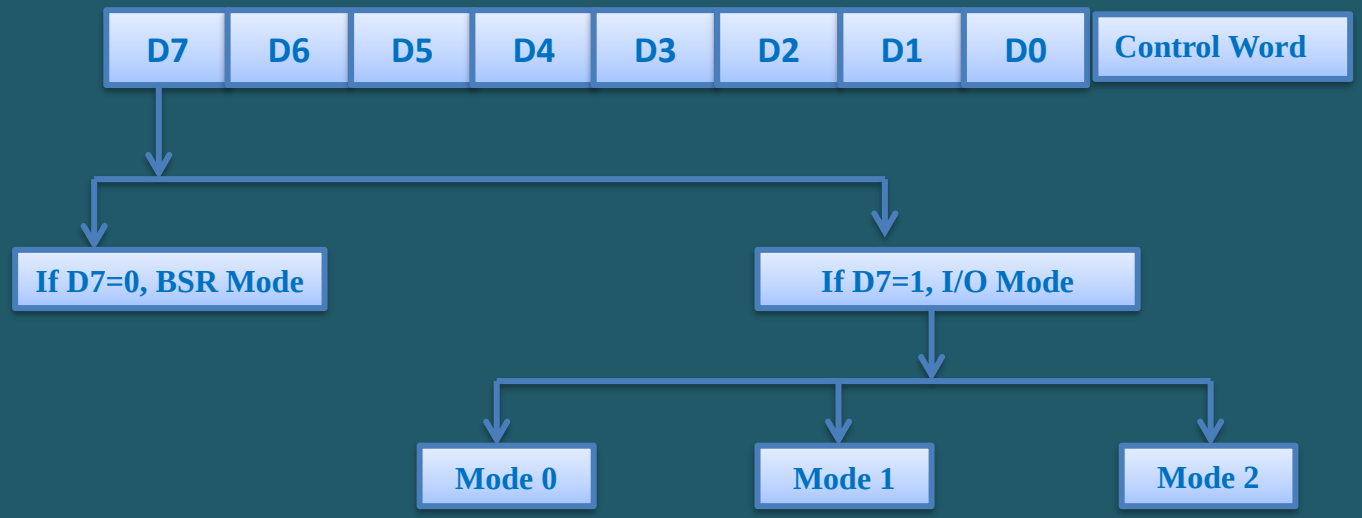
8255-CS2(LED & STEPPING MOTOR)
- 19H : A PORT DATA REGISTER
- 1BH : B PORT DATA REGISTER
- 1DH : C PORT CONTROL REGISTER
- 1FH : CONTROL REGISTER

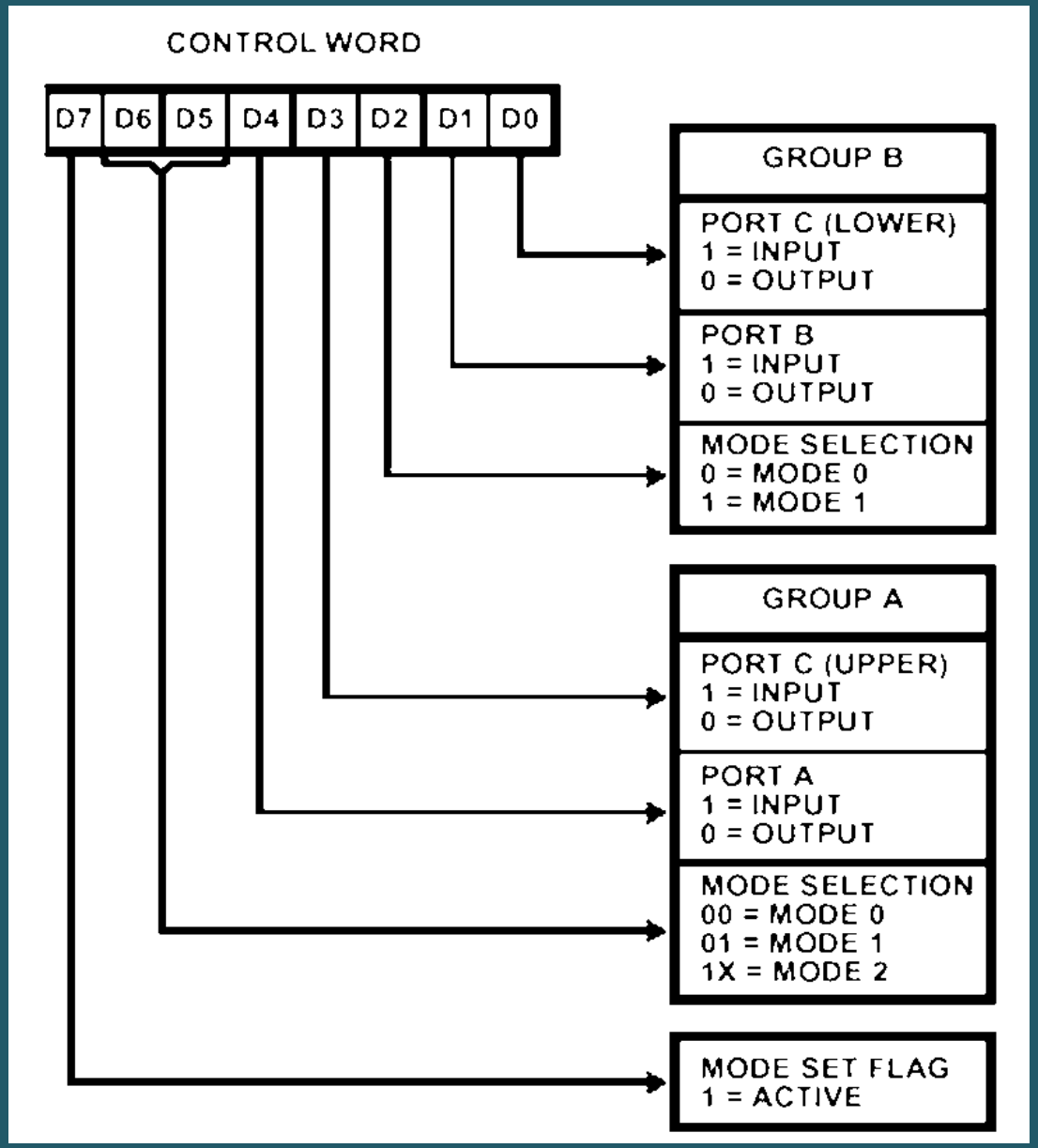

CPU & MEMORY
CURRENT STATUS
A/D CONVERTER
PIT & INT
P6
P5
P2
DIP2
H1
TH1
VR2
33K
GATE1
GATE2
IR2
CON3
GO
MON
+
−
:
AD/C
DOT/
P6

PORTA- GREEN
PORTB- RED

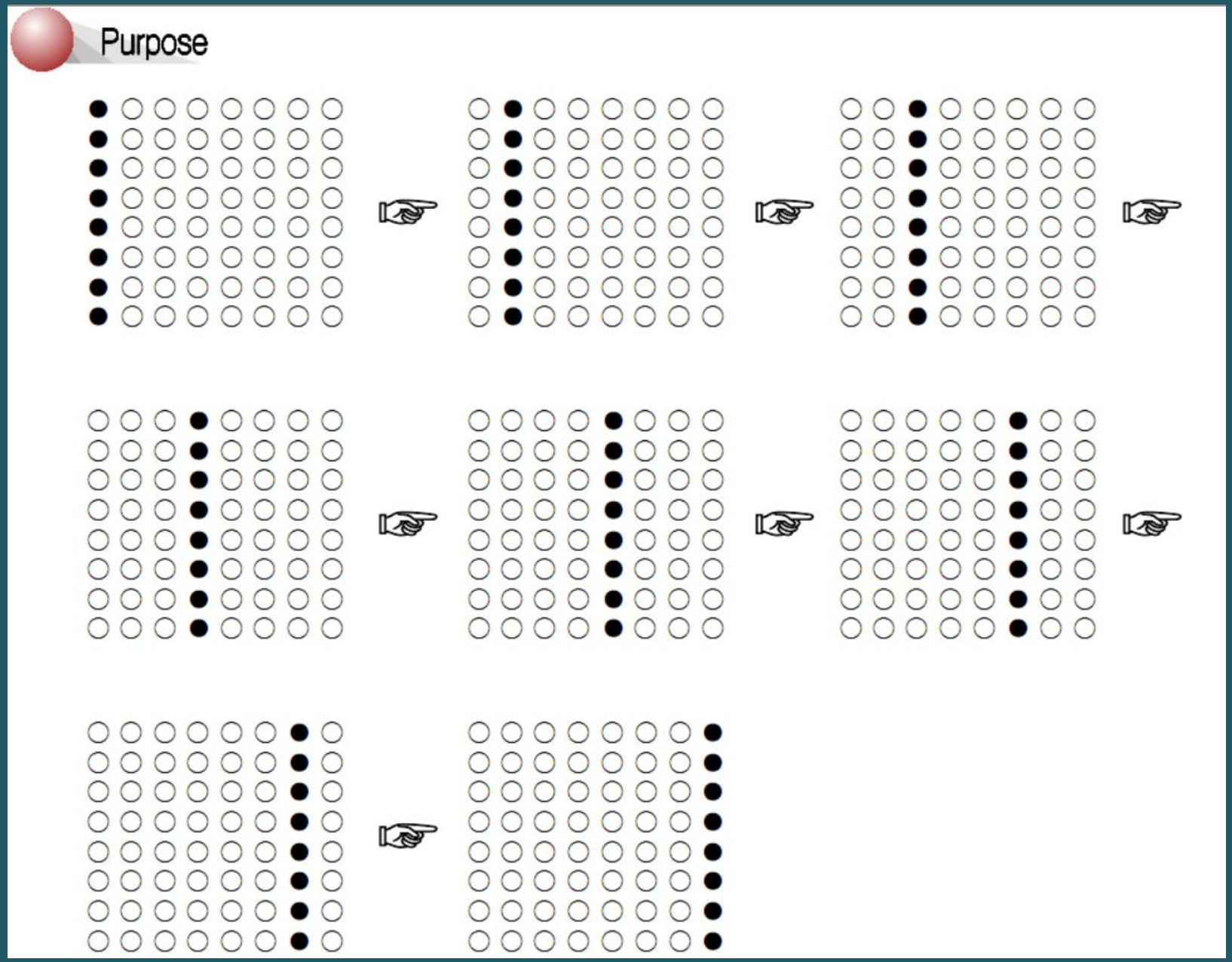


Control Word for Dot-Matrix Display Interfacing



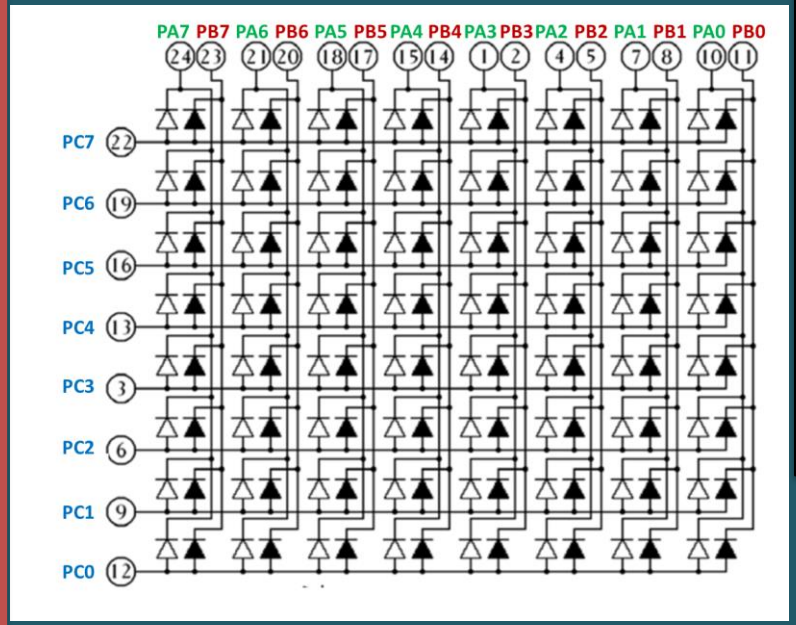


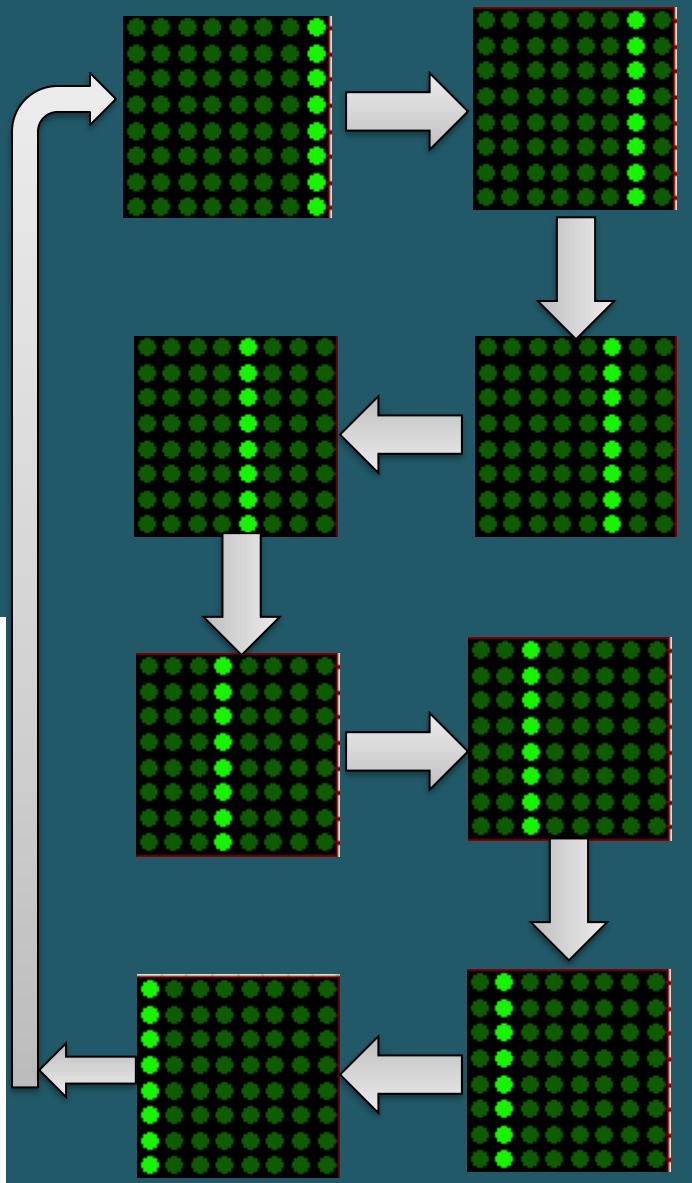
Purpose



Animation in Dot Matrix Display

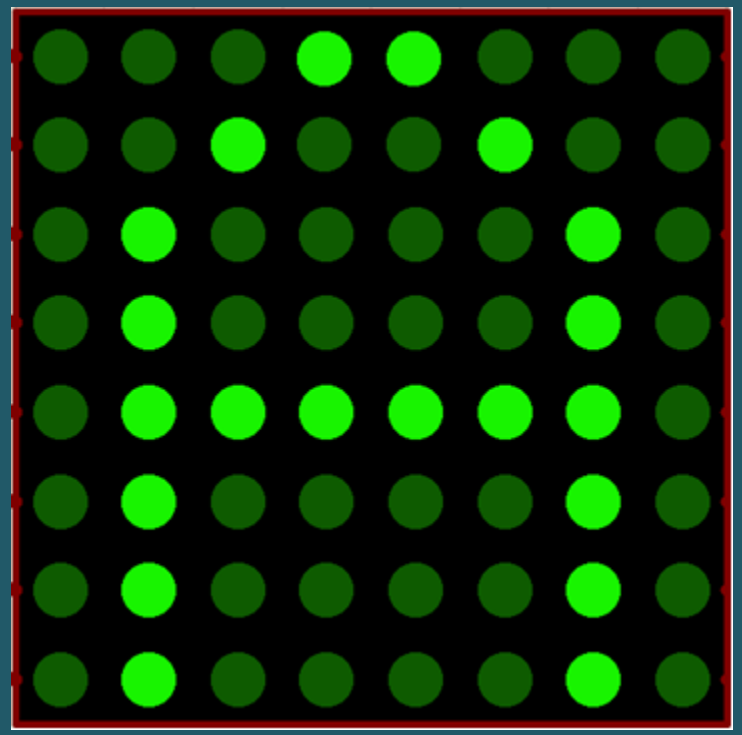
```
CODE    SEGMENT
ASSUME  CS:CODE,DS:CODE,ES:CODE,SS:CODE
        ;
PPIC_C  EQU     1EH ; control register
PPIC    EQU     1CH
PPIB    EQU     1AH
PPIA    EQU     18H
        ORG     1000H
        MOV     AL,10000000B
        OUT     PPIC_C,AL
        MOV     AL,11111111B
        OUT     PPIC,AL
        MOV     AL,11111111B
        OUT     PPIB,AL

L1:     MOV     AL,11111110B
L2:     OUT     PPIA,AL
        CALL    TIMER
        ROL     AL,1
        JC      L2
        JMP     L1

TIMER:  MOV     CX,0FFFFH
TIMER1: NOP
        NOP
        NOP
        NOP
        LOOP    TIMER1
        RET
CODE    ENDS
        END
```

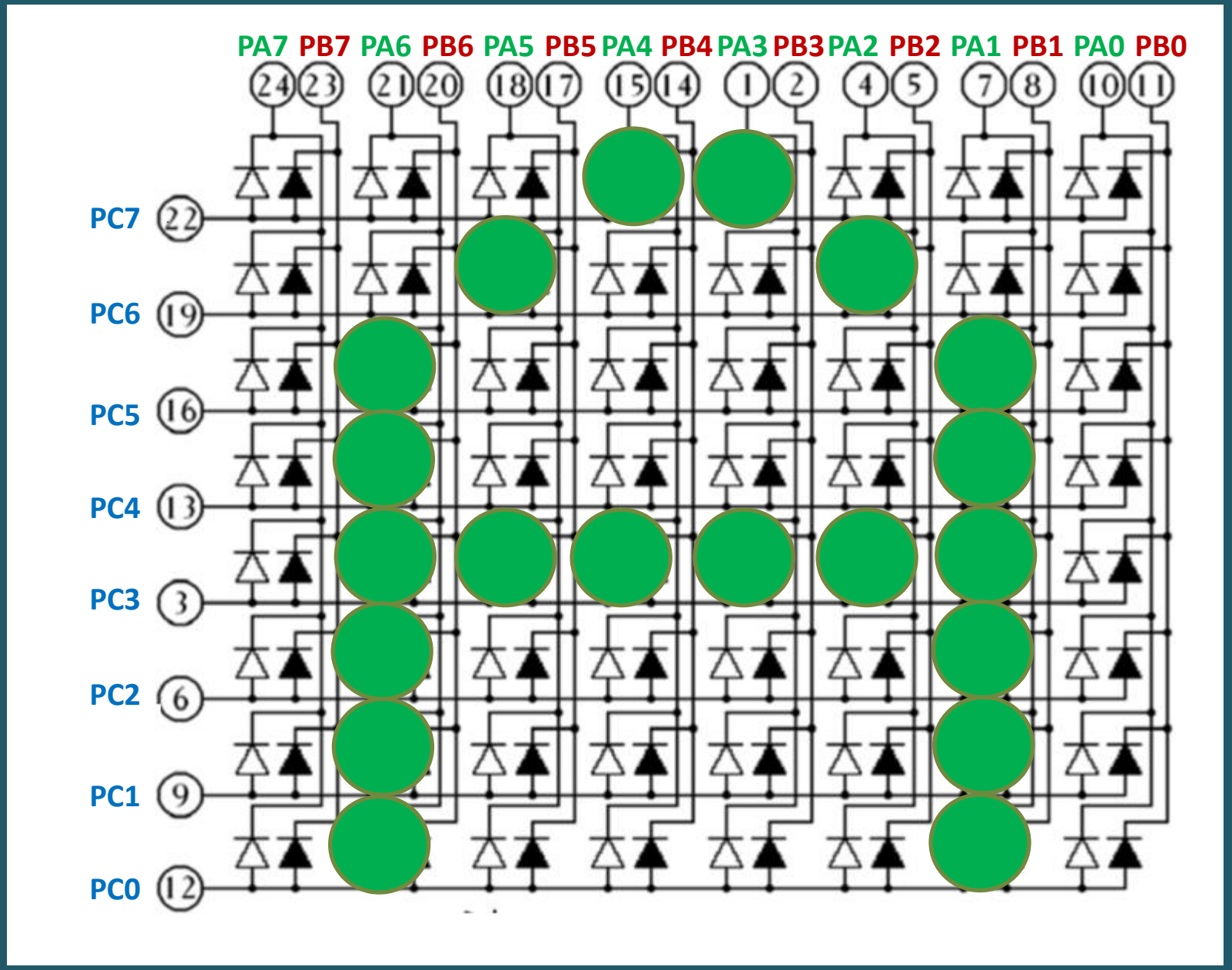


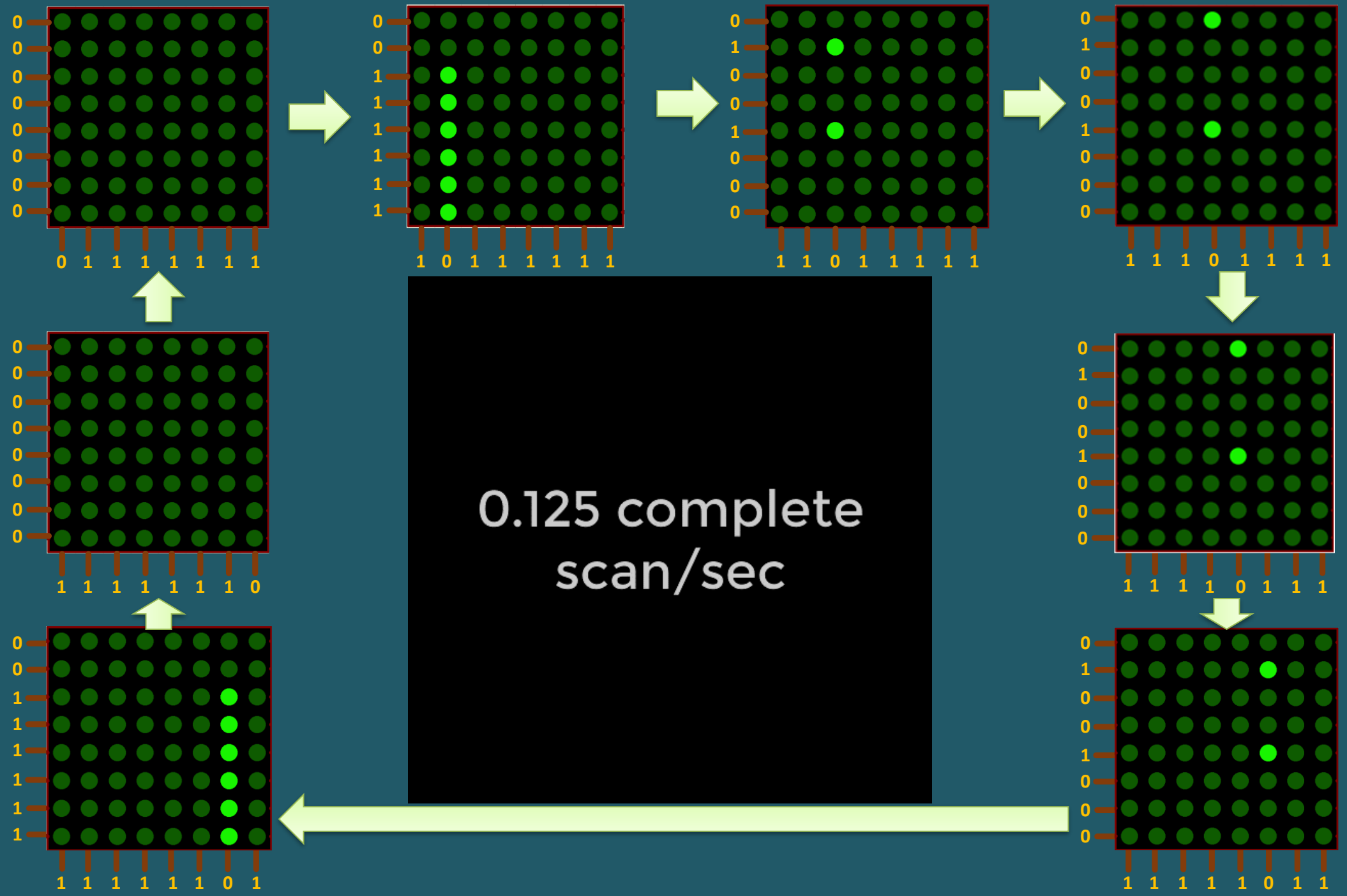


Showing alphabet in Dot Matrix Display (Concept of scanning)

- Individual control of LED in dot matrix display is possible for the LED's of same row or same column.






0 0 0 0 0 0 0 0
0 1 1 1 1 1 1 1
0 0 1 1 1 1 1 1
1 0 1 1 1 1 1 1
0 1 0 0 0 0 0 0
1 1 0 1 1 1 1 1
0 1 0 0 0 0 0 0
1 1 1 0 1 1 1 1
0 1 0 0 0 0 0 0
1 1 1 1 0 1 1 1
0 0 1 1 1 1 1 1
1 1 1 1 1 1 0 1
0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 0
0.125 complete scan/sec

Showing Alphabet ‘A’ in Dot Matrix Display

```
CODE    SEGMENT
ASSUME  CS:CODE,DS:CODE,ES:CODE,SS:CODE
        ;
PPIC_C  EQU     1EH ; control register
PPIC    EQU     1CH ; c port
PPIB    EQU     1AH
PPIA    EQU     18H
        ;
        ORG     1000H
        MOV     AL,10000000B
        OUT     PPIC_C,AL
        ;
        MOV     AL,11111111B
        OUT     PPIA,AL
        ;
L1:     MOV     SI,OFFSET FONT
        ;
        MOV     AH,11111110B
        ;
L2:     MOV     AL,BYTE PTR CS:[SI]
        OUT     PPIC,AL
        MOV     AL,AH
        OUT     PPIB,AL
        CALL    TIMER
        INC     SI
        CLC
        ROL     AH,1
        JC      L2
        JMP     L1

TIMER:  MOV     CX,300
TIMER1: NOP
        NOP
        NOP
        NOP
        LOOP    TIMER1
        RET
        ;

FONT:
        DB      00000000B
        DB      11111100B
        DB      00010010B
        DB      00010001B
        DB      00010001B
        DB      00010010B
        DB      11111100B
        DB      00000000B

CODE    ENDS
        END
```