82C55

Q] Draw the basic structure of 82C55 & describe it.

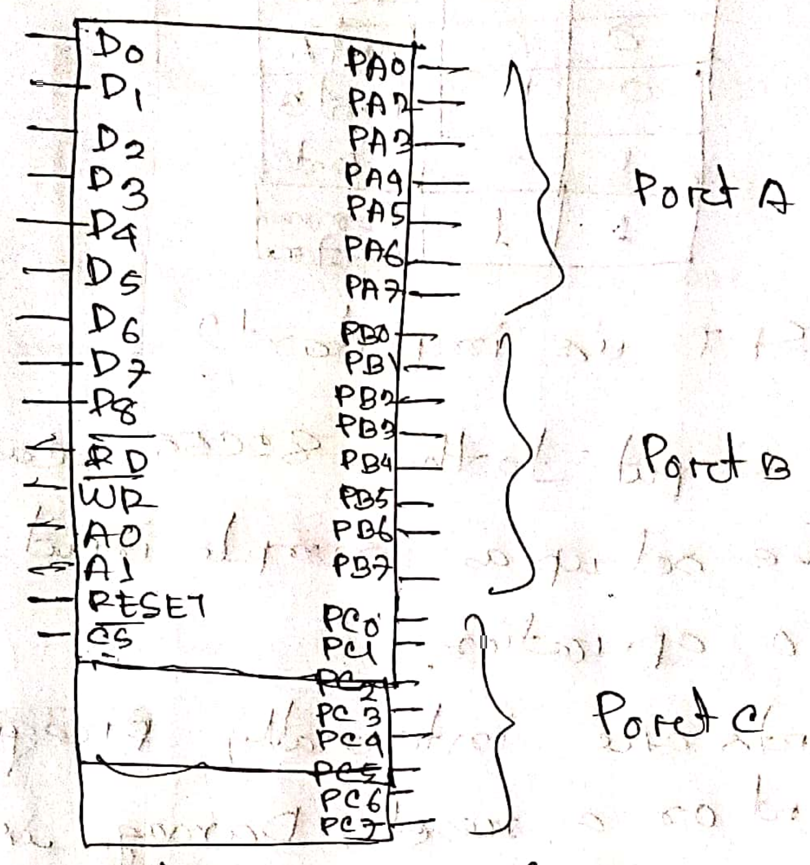


Fig: Pinout of 82C55

→ 82C55 uses 3 I/O ports, labeled as A, B, C and programmed in a group of 12 pins.

1. Group A consists of Port A (PA7 - PA0) & upper ports of C (PC7 - PC4)
2. Group B consists of Port B (PB7 - PB0) & lower ports of C (PC3 - PC0)
3. → Selected by $\overline{CS}$ pin programming & writing

→ A0 & A1 pins are used to select internal registers for programming & operations.

A1	A0	Function
0	0	Port A
0	1	Port B
1	0	Port C
1	1	Command registers

Q) Why RESET is important?

A RESET input to the 82C55 causes all ports to be set up as simple input port using mode 0 operation.

Because ports are internally programmed as Input port on a reset. Damage is prevented when power is first applied to system by RESET pin.

Q) Different mode of operation in 82C55

There are 3 modes of operation.

(i) mode 0

(ii) mode 1

(iii) mode 2

Q) Mode 0: i) It is basic input/output mode.
ii) functions as either buffered input

or latched output.

iii) Available for both Group A & Group B.

Mode 1:

i) Strobed operation mode.

ii) Data are provided by port A & port B

iii) Handshaking signals are provided by port C.

Mode 2:

i) Available for only for Group A

ii) Bidirectional mode of operation for port A.

~~iii)~~

Q) Why 8255 is easy to program?

Because it only contains two command registers command Byte A & B.

The bit position 7 is used to select those command byte.

When it is 1, command byte A is selected.

When it is 0, " " B " ".

Significances

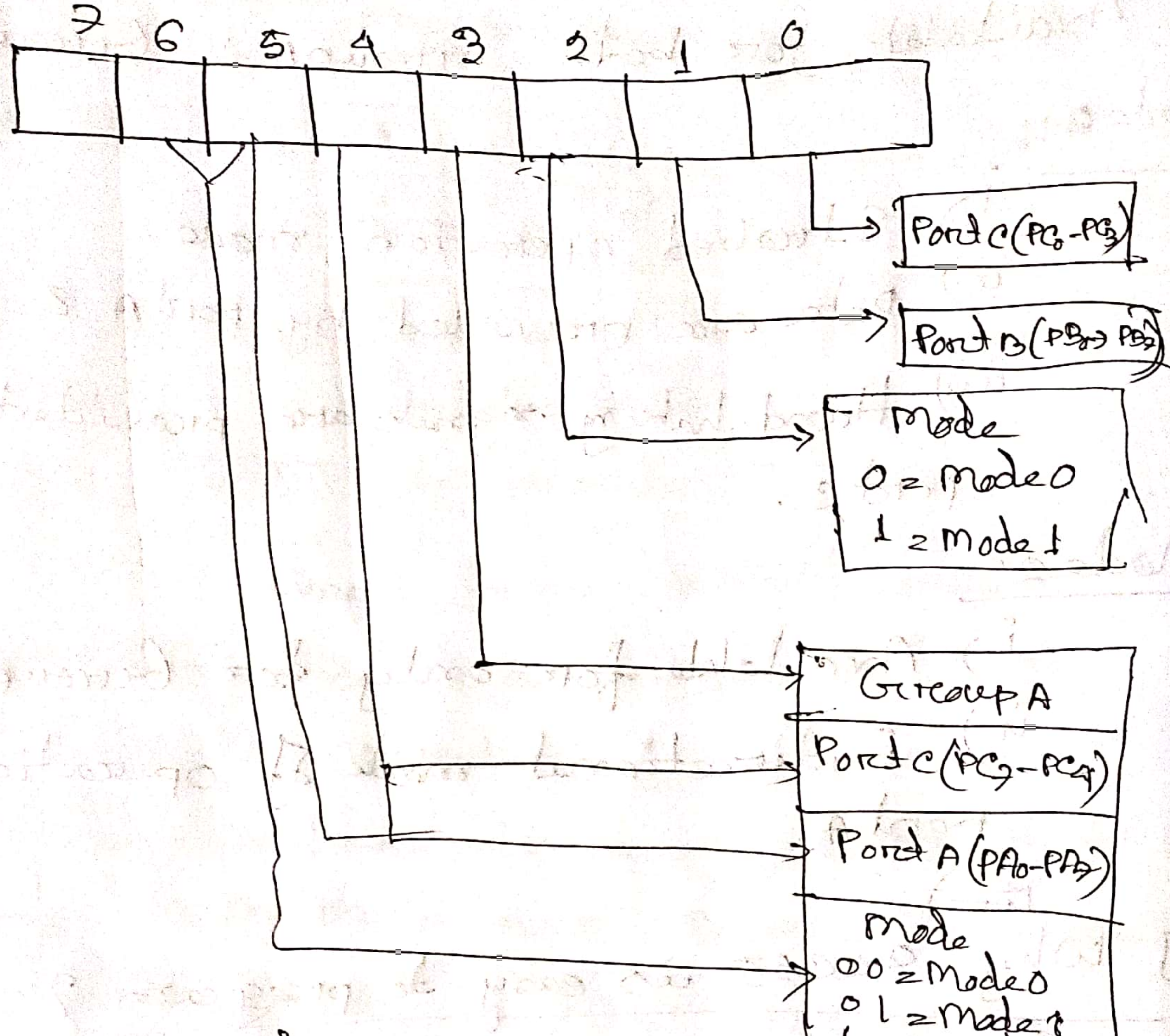


fig: command byte A

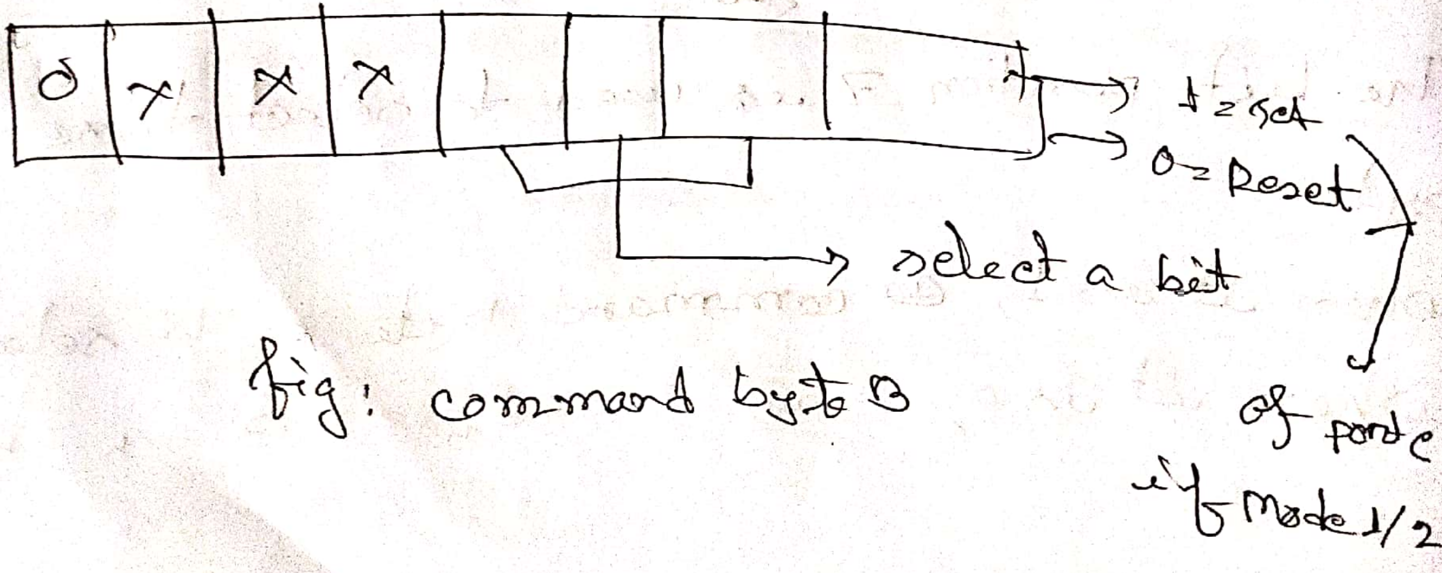


fig: command byte B

Stepper motor

A stepper motor is called digital motor because it moves discrete steps as it traverse through 360°.

Inexpensive stepper motor is geared to 15° per step
Expensive " " " 1° "

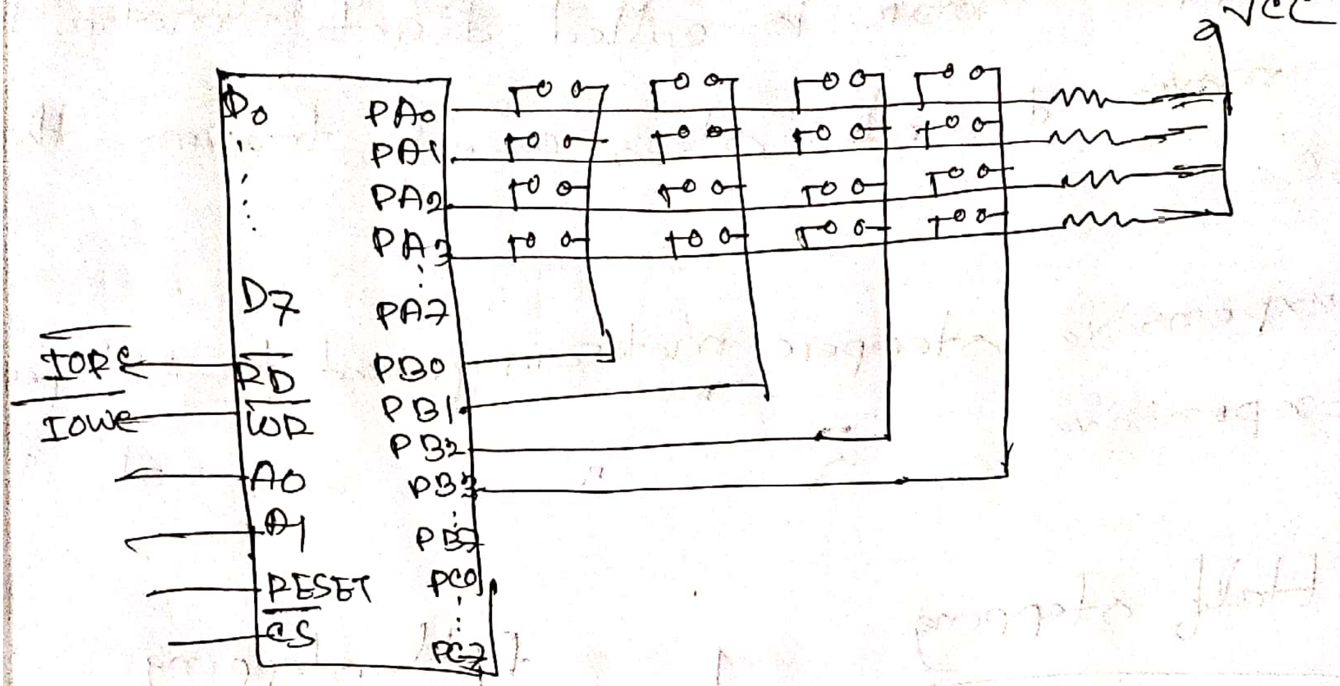
Half stepping

Angle	Code sequence
0°	11H
90°	22H
180°	44H
270°	88H

Full stepping

Angle	Code sequence
45°	33H
135°	66H
225°	CC H
315°	99H

Draw a 4x4 keyboard Matrix



i) Here port A is programmed as input port to read the rows.

ii) Port B is programmed as output port to select column.

iii) If 1110 data is sent to port B, then column 0 is selected & any of key is pressed from this column output will be at port A

port A → Row

port B → column

Strobed Input for a keyboard

A strobed input device is a keyboard

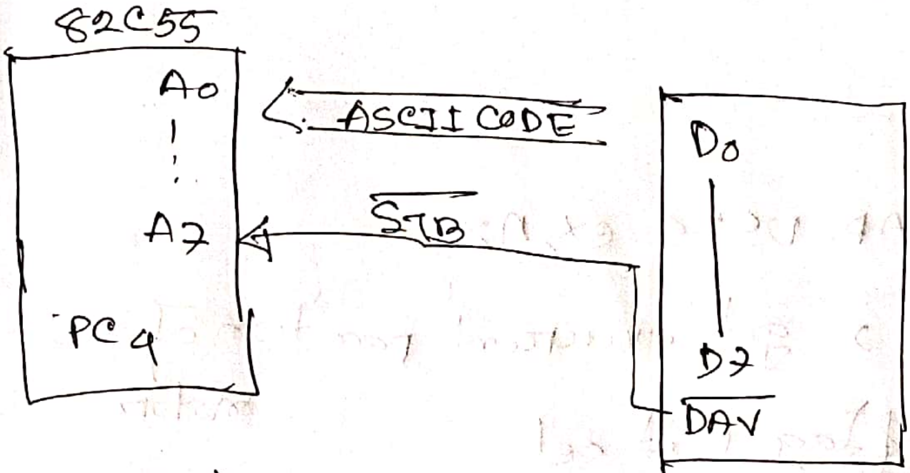


fig: strobed i/p operation of keyboard

i) The keyboard encoder provides a strobe signal when key is pressed.

ii) The $\overline{DAV}$ signal is connected to the $\overline{STB}$ input of keyboard.

iii) Each time a key is pressed, data is strobbed into port A. Then STB signal activate IBF signal initiates that data are in port A.

Procedure to control the step motor (full step): to the port A (40 H) of 82C55

```
PORT EQU 40H
~~SEP~~
STEP PROC NEAR USES CX, AX
   MOV AL, POS ; get current position of motor
   OR CX, CX ; flag bit set
   IF! ZERO ?
   IF! SIGN?        if no sign
   'REPEAT
      ROL AL, 1 ; rotate step left
      OUT PORT, AL
      CALL DELAY ; wait 1ms
   UNTIL CXZ        delay call untill cxz
   ELSE
   AND CX, 7FFFH ;
   'REPEAT
   ROR AL, 1 ; rotate step right
   OUT PORT, AL
   CALL DELAY ; wait 1ms
   UNTIL CXZ
   ENDIF
  ENDIF
  MOV POS, AL
    RET
  ~~EN~~ STEP ENDP
```

The circuit for driving the full step operation when motor is interfaced to port A (40H) of 82C55 PPI:

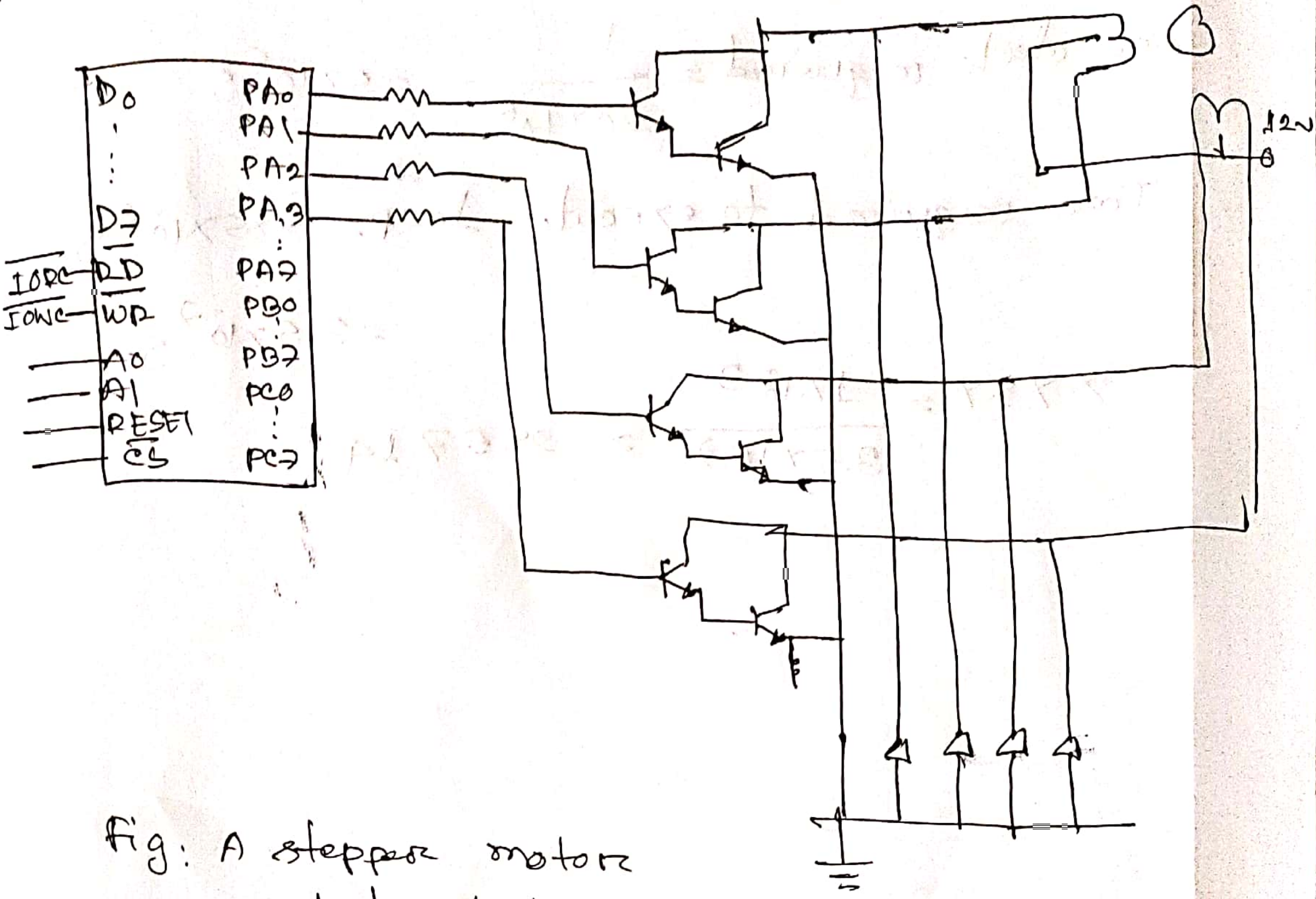


Fig: A stepper motor Interfaced to 82C55

Delay:

$$XXXX = \frac{\text{Delay time}}{\text{time for loop}}$$

```
DELAY PROC NEAR USES CX
      MOV CX, XXXX
      D1: LOOP D1
      RET
DELAY ENDP
```

Q) 8086 running with 20MHz clock loop requires 7 clocks what'll be the value of count for creating 1 ms time delay.

one clock required $= \dfrac{1}{20\times10^{6}} = 5\times10^{-8}$ s

Time required to execute loop $= 7\times5\times10^{-8}$ s

$= 3.5\times10^{-7}$ s

$XXXX = \dfrac{1\times10^{-3}}{3.5\times10^{-7}} = 2857.14$