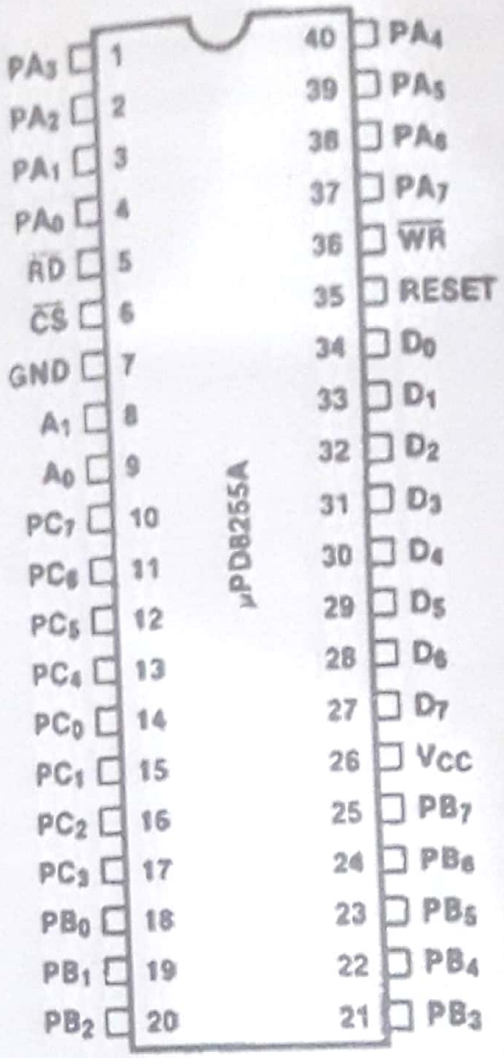
IO PERIPHERALS

The IO mapping of 8255 as given below:-

Function 8255-I	Address	Function 8255-II	Address
port A	40	port A	60
port B	42	port B	62
port C	44	port C	64
control register	46	control register	66

STS 8086LCD uses two 8255 Ic's for getting total of 48 IO pins.The Intel 8255 (or i8255) Programmble Peripheral Interface chip is a peripheral chip originally developed for the Intel 8085 microprocessor, and as such is a member of a large array of such chips, known as the MCS-85 Family. This chip was later also used with the Intel 8086 and its descendants. It was later made (cloned) by many other manufacturers. It is made in DIP 40 and PLCC 44 pins encapsulated versions.

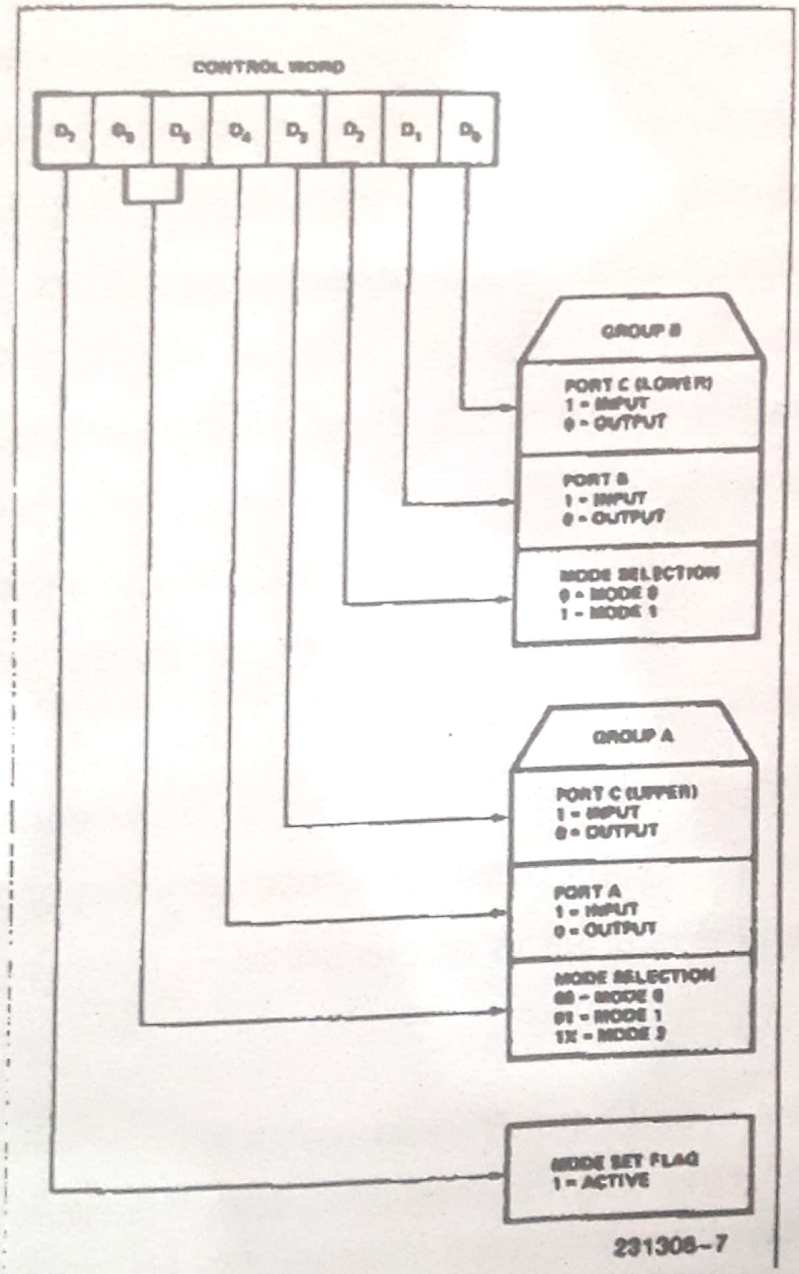


The 8255 has 24 input/output pins in all. These are divided into three 8-bit ports. Port A and port B can be used as 8-bit input/output ports. Port C can be used as an 8-bit input/output port or as two 4-bit input/output ports or to produce handshake signals for ports A and B.

The three ports are further grouped as follows:

1. Group A consisting of port A and upper part of port C.

2. Group B consisting of port B and lower part of port C.



Eight data lines (D0 - D7) are available (with an 8-bit data buffer) to read/write data into the ports or control register under the status of the "¬RD" (pin 5) and **WR**" (pin 36), which are active low signals for read and write operations respectively. The control signal "'*CS" (pin 6) is used to enable the 8255 chip. It is an active low signal, i.e., when* CS = '0' , the 8255 is enabled.

INTRODUCTION

Digital control systems have come to stay. They are entering into all branches of engineering. There are many systems to monitor various processes and give out control signals in the form of digits but there is only one device to convert these digital pulses into precise incremental motion and that device is stepping motor. Stepper motor is a device which converts digital pulses into precise angular or linears steps of desired value.

SPECIFICATION

- Permanent Magnet D.C. Stepping Motors two phase Bifilar wound.
- Step angle : 1.8° +/- 5% Non-cumulative.
- Step/Revolutions : 200

FEATURES

- Instantaneous response to control pulses.
- Holds on to the position infinitely in static condition.
- No burn-out due to locked rotor.
- Speed can be varied over a wide margin from 0-10,000 steps/sec. Equivalent to 0-3,000 RPM.
- High torque to inertia ratio. Can be over-driven without damage.
- Can be programmed in three parameters namely, speed, direction and number of steps.

pping motors differ from conventional Servo Motors in following pect:

- There is no control winding in stepping motors. Both windings are identical.
- The stepping rate (speed of rotation) is governed by frequency of switching and not supply voltage.
- A pulse input two phase clock (instead of continuous pulses) will move the shaft of motor by one step for every pulse, thus number of steps be moved can be precisely controlled.
- When there is no pulse input, the rotor will remain locked up in the portion in which the last step was taken since at any

time two windings always energized which lock the rotor electromagnetically.

- Stepping motors can be programmed in three parameters namely:
  a) Direction
  b) Speed and
  c) Number of Steps

WORKING OF STEPPING MOTOR

The stepping action is caused by sequential switching of supply to the two phases of the motor as described in switching diagram. All stepping motors are of bifilar type with six leads. Watch of the two Phases of motor has double winding with a center tap switching the supply from one side to another of a phase causes reversal of magnetic polar without actually reversing the polarity of supply. For step input sequence gives 1.8°(full) after and eight step input sequence give 0.9°(half) step function.

The program initializes the 8255 (P1) in order to make port. A as output port. The PA0 to PA3 is connected through buffer and driving circuit to the winding of the stepper motor. The codes for clockwise movement of stepper motor are FA, F6, F5 and F9 (refer switching sequence). These code are to be output in the sequence they are written. In case of anti-clock wise movement of the stepper motor, output codes are as F9, F5, F6 and F4. The delay routine is called to generate the delay (max.of about 1 Sec.) between the steps. This delay can be changed to make faster steps. The minimum delay depends upon the maximum speed of the stepper motor specified.

The following is program for STS -8086 LCD Kit.

Starting address of the program :

```
0400: B0 80          MOV AL,80H      ;initialize port
0402: E6 66          OUT 66H,AL
0404: B1 04  LOOP2:  MOV CL,04       ;loop count
0406: BB 00 05       MOV BX,500H     ;table location
0409: 8A 07  LOOP1:  MOV AL,[BX]     ;get from table
040B: E6 60          OUT 60H,AL      ;place to port
040D: E8 05 00       CALL DELAY      ;rotation data
0410: 43             INC BX          ;inc pointer
0411: E0 F6          LOOPNZ LOOP1
0413: EB EF          JMP LOOP2       ;repeat
0415: 51     DELAY:  PUSH CX         ;save CX
0416: B9 FF FF       MOV CX,0FFFFH   ;delay loop count
0419: E0 FE  HERE:   LOOPNZ HERE
041B: 59             POP CX          ;retrieve
041C: C3             RET
```

DATA
FORWARD
0500:0A 06 05 09
REVERSE
0500:09 05 06 0A