Step Sequence of Stepper Motor

Stepper motors can be driven in two different patterns or sqeunces. namely,

- Full Step Sequence

- Half Step Sequence

►Full Step Sequence

In the full step sequence, two coils are energized at the same time and motor shaft rotates. The order in which coils has to be energized is given in the table below.

Full Mode Sequence

Step	A	B	C	D
1	1	0	0	1
2	1	1	0	0
3	0	1	1	0
4	0	0	1	1

Full Step Sequence

►Half Step Sequence

In Half mode step sequence, motor step angle reduces to half the angle in full mode. So the angualar resolution is also increased i.e. it becomes double the angular resolution in full mode. Also in half mode sequence the number of steps gets doubled as that of full mode. Half mode is usually preffered over full mode. Table below shows the pattern of energizing the coils.

Half Mode Sequence

Step	A	B	C	D
1	1	0	0	1
2	1	0	0	0
3	1	1	0	0
4	0	1	0	0
5	0	1	1	0
6	0	0	1	0
7	0	0	1	1
8	0	0	0	1

Half Step Sequence

►Step Angle

Step angle of the stepper motor is defined as the angle traversed by the motor in one step. To calculate step angle,simply divide 360 by number of steps a motor takes to complete one revolution. As we have seen that in half mode, the number of steps taken by the motor to complete one revolution gets doubled, so step angle reduces to half.

As in above examples, Stepper Motor rotating in full mode takes 4 steps to complete a revolution, So step angle can be calculated as…

Step Angle $\o = 360° / 4 = 90°$

and in case of half mode step angle gets half so 45°.

So this way we can calculate step angle for any stepper motor. Usually step angle is given in the spec sheet of the stepper motor you are using. Knowing stepper motor's step angle helps you calibrate the rotation of motor also to helps you move the motor to correct angular position.

►Connecting Unipolar Stepper Motor with Microcontroller(PIC16F887) using ULN2003
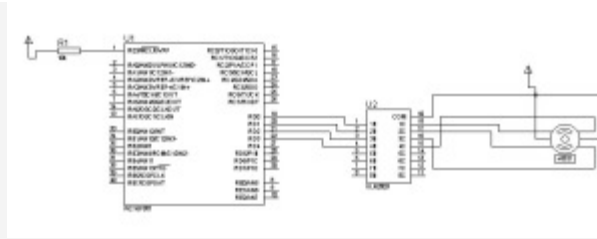
Stepper Motor Interfacing with microcontroller Using ULN2003

►Connecting Unipolar Stepper Motor with Microcontroller(PIC16F887) using L293D
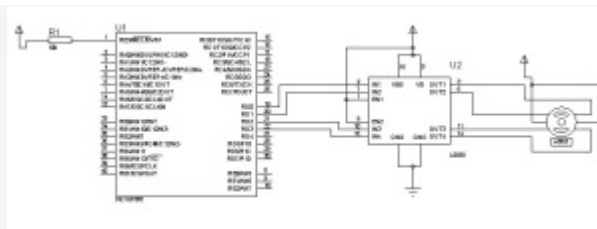
Stepper Motor Interfacing With microcontroller Using L293D

SOURCE CODE

Here,I have used PIC16F887 Microcntroller and Code is written in C using mikroC PRO for PIC.Adjusting the delay will increase or decrease the speed of the motor. Here just for demonstration i have taken some delay, you can change it as you want.

►Programming Full step Sequence

```
void main() {ANSEL  = 0;              // Configure AN pins as digital I/O
ANSELH = 0;
PORTD = 0;
TRISD = 0;              // Configure PORTD as output
while(1){
PORTD=0×09;
```

```
Delay_ms(500);
PORTD=0x0C;
Delay_ms(500);
PORTD=0x06;
Delay_ms(500);
PORTD=0x03;
Delay_ms(500);
}
}
```

► Programming Half step Sequence

```
void main() {
ANSEL  = 0;              // Configure AN pins as digital I/O
ANSELH = 0;
PORTD = 0;
TRISD = 0;               // Configure PORTD as output
while(1){
PORTD=0x08;
Delay_ms(500);
PORTD=0x0C;
Delay_ms(500);
PORTD=0x04;
Delay_ms(500);
PORTD=0x06;
Delay_ms(500);
PORTD=0x02;
Delay_ms(500);
PORTD=0x03;
```

```
Delay_ms(500);
PORTD=0x01;
Delay_ms(500);
PORTD=0x09;
Delay_ms(500);
}
}
```

Source : http://vshamu.wordpress.com/2011/03/23/stepper-motor-interfacing-with-microcontroller/