

INTERFACING STEPPER MOTOR WITH 8051 MICROCONTROLLER

We are using Port P0 of 8051 for connecting the stepper motor. Here ULN2003 is used. This is basically a high voltage, high current Darlington transistor array. Each ULN2003 has seven NPN Darlington pairs. It can provide high voltage output with common cathode clamp diodes for switching inductive loads.

The Unipolar stepper motor works in three modes.

- **Wave Drive Mode** – In this mode, one coil is energized at a time. So all four coils are energized one after another. This mode produces less torque than full step drive mode.

The following table is showing the sequence of input states in different windings.

Steps	Winding A	Winding B	Winding C	Winding D
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1

- **Full Drive Mode** – In this mode, two coils are energized at the same time. This mode produces more torque. Here the power consumption is also high

The following table is showing the sequence of input states in different windings.

Steps	Winding A	Winding B	Winding C	Winding D
1	1	1	0	0
2	0	1	1	0
3	0	0	1	1
4	1	0	0	1

- **Half Drive Mode** – In this mode, one and two coils are energized alternately. At first, one coil is energized then two coils are energized. This is basically a combination of wave and full drive mode. It increases the angular rotation of the motor

The following table is showing the sequence of input states in different windings.

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

The circuit diagram is like below: We are using the full drive mode.

