SM2220 : DUAL UNIPOLAR STEPPER MOTOR DRIVER PROCESSOR

General Description

The SM2220 is unipolar stepper motor driver processor with up to 2 motors.

Three methods of driven can be configured by FULLSTEP and PHASE pin.

Driven motion controlled by PULSE and DIR signal that easy interface to microcontroller

Features

- TTL compatible logic level
- 2.7 to 6.0V opeartion range
- Opeartion with 4MHz clock
- Capable of driving 2 unipolar stepper motor
- 4 phase logic level output per motor
- Capable of driving 2 unipolar stepper motor
- 3 modes driven selectable : Full step 1 or 2 phases and Half step
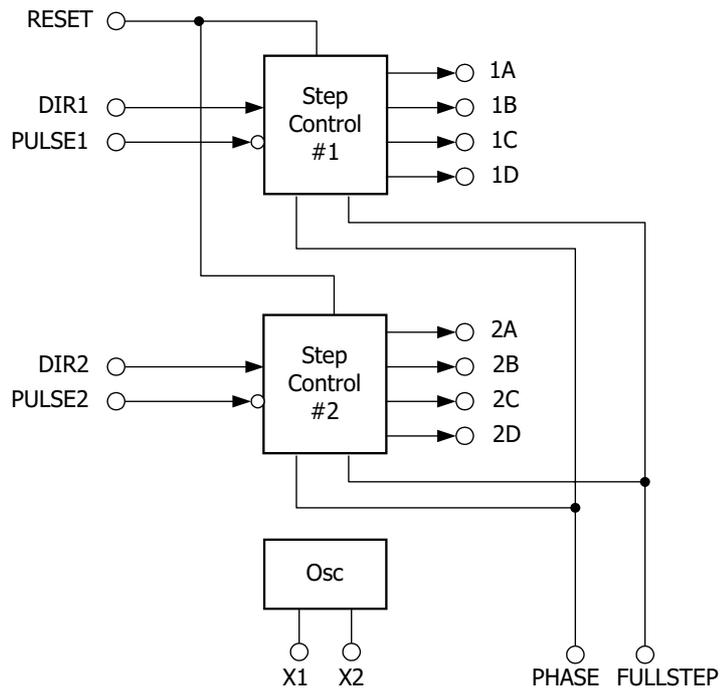- Packaged in 20-pin DIP

Application

- Unipolar stepper motor drivers
- Factory automation robots
- Numerically controlled machinery
- Ring counter

Connection Diagram
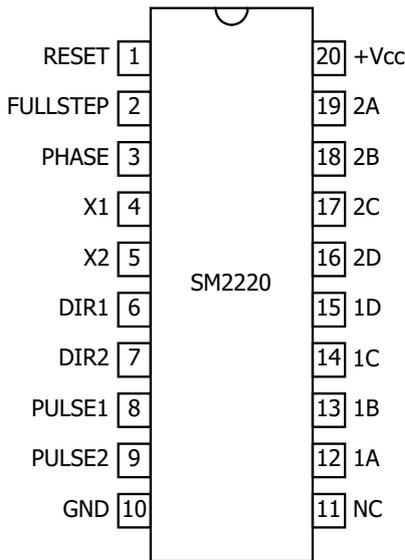
Functional Diagram

Stepper driven method selected on SM2220

Method control pin		Driven method
FULLSTEP	PHASE	
0	0	Double Phase
0	1	Single Phase
1	X	Half step

X = Don't care logic

Step change by pulse and direction on SM2220

Control pin		Direction of Movement
PULSEs	DIRs	
↓	0	Counter clockwise
↓	1	Clockwise
1	X	Not changed

s = Step control group #1 or #2
X = Don't care logic

Pin Description

Pin	Description	Logic '0'	Logic '1'	Comment
1	RESET	Reset	Run	When reset, all outputs are logic '1'
2	FULLSTEP	Full step	Half step	
3	PHASE	2 phase	1 phase	Don't care if FULLSTEP pin as '1'
4	X1			Connect XTAL or ceramic resonator pin 1
5	X2			Connect XTAL or ceramic resonator pin 2
6	DIR1	Backward	Forward	
7	DIR2	Backward	Forward	
8	PULSE1	Step run	Stop	Active low
9	PULSE2	Step run	Stop	Active low
10	GND			Ground system
11	NC			No connect
12	1A			Phase 1 of motor #1
13	1B			Phase 2 of motor #1
14	1C			Phase 3 of motor #1
15	1D			Phase 4 of motor #1
16	2D			Phase 4 of motor #2
17	2C			Phase 3 of motor #2
18	2B			Phase 2 of motor #2
19	2A			Phase 1 of motor #2
20	+Vcc			Power supply

STEP	Phase A	Phase B	Phase C	Phase D
1	ON	-	-	-
2	-	ON	-	-
3	-	-	ON	-
4	-	-	-	ON

Table 1 Single phase driven

STEP	Phase A	Phase B	Phase C	Phase D
1	ON	ON	-	-
2	-	ON	ON	-
3	-	-	ON	ON
4	ON	-	-	ON

Table 2 Double phase driven

For

clockwise operation 1->2->3->4->1 ...

counter clockwise operation 4->3->2->1->4 ...

STEP	Phase A	Phase B	Phase C	Phase D
1	ON	-	-	-
2	ON	ON	-	-
3	-	ON	-	-
4	-	ON	ON	-
5	-	-	ON	-
6	-	-	ON	ON
7	-	-	-	ON
8	ON	-	-	ON

Table 3 Half step driven

For

clockwise operation 1->2->3->4->5->6->7->8->1...

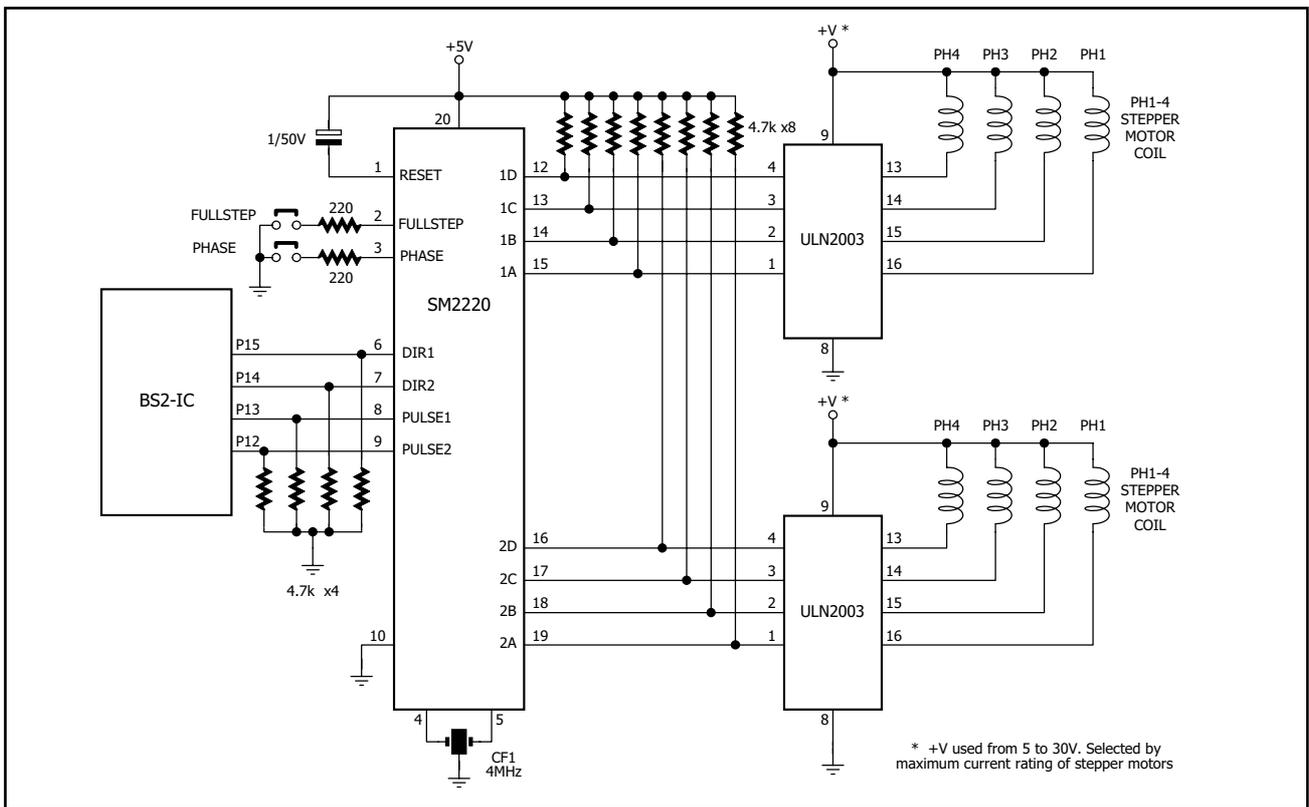counter clockwise operation 8->7->6->5->4->3->2->1->8...

Figure 1. Interfacing two unipolar stepper motors and SM2220 with BASIC Stamp 2
Power driver ULN2003 output sink current approx. 500mA (continuous)

Example subroutine programming on BASIC Stamp 2 (Refer to Figure 1)

```
'Connect P12 to PULSE2
'Connect P13 to PULSE1
'Connect P14 to DIR2
'Connect P15 to DIR1
Pulse2    con    12
Pulse1    con    13
Dir2      con    14
Dir1      con    15
N         var    byte

main:    FOR      N = 1  to 48
         GOSUB    DUAL_CW
         NEXT
         FOR      N = 1  to 48
         GOSUB    DUAL_CCW
         NEXT
         '...... anything you want
         GOTO     main

'Clockwise driving for dual motors
DUAL_CW:        HIGH     Dir1
                HIGH     Dir2
                LOW      Pulse1
                LOW      Pulse2
                PAUSE    10
                HIGH     Pulse1
                HIGH     Pulse2
                PAUSE    10
```

```
'Counter clockwise driving for dual motors
DUAL_CCW:       LOW      Dir1
                LOW      Dir2
                LOW      Pulse1
                LOW      Pulse2
                PAUSE    10
                HIGH     Pulse1
                HIGH     Pulse2
                PAUSE    10
                RETURN


'Clockwise driving for motor #1
M1_CW:          HIGH     Dir1
                LOW      Pulse1
                PAUSE    10
                HIGH     Pulse1
                PAUSE    10
                RETURN


'Counter clockwise driving for motor #2
M2_CCW:         LOW      Dir2
                LOW      Pulse2
                PAUSE    10
                HIGH     Pulse2
                PAUSE    10
```
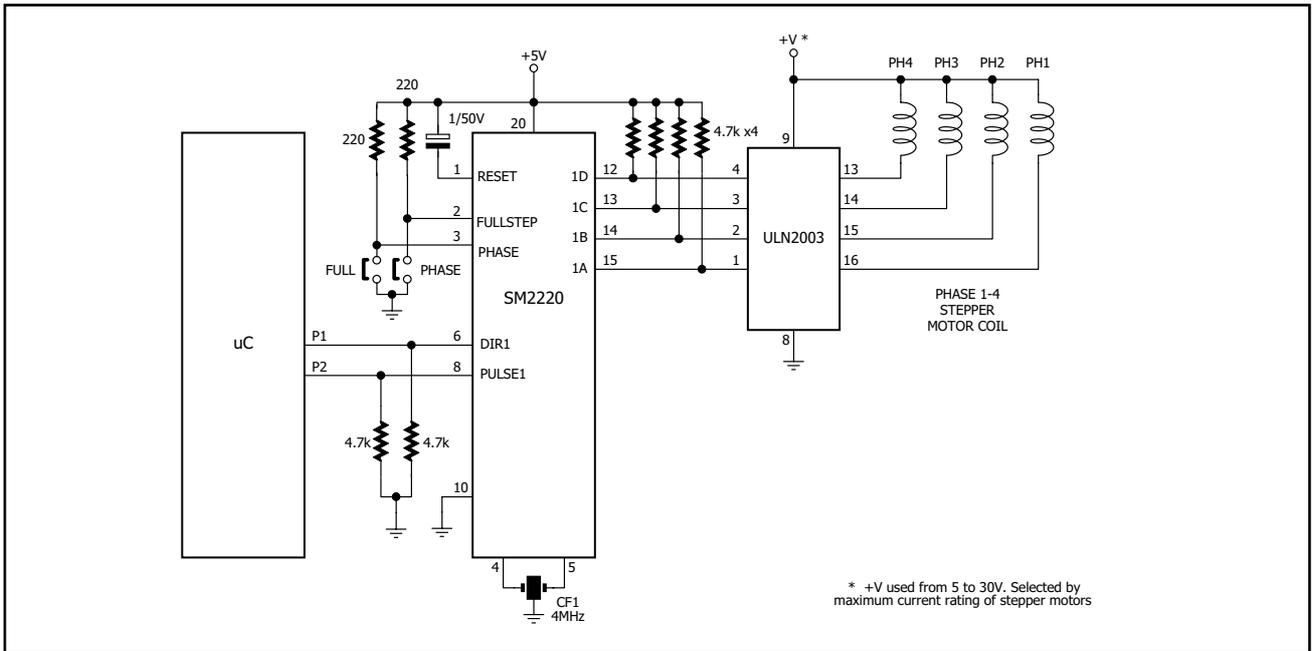
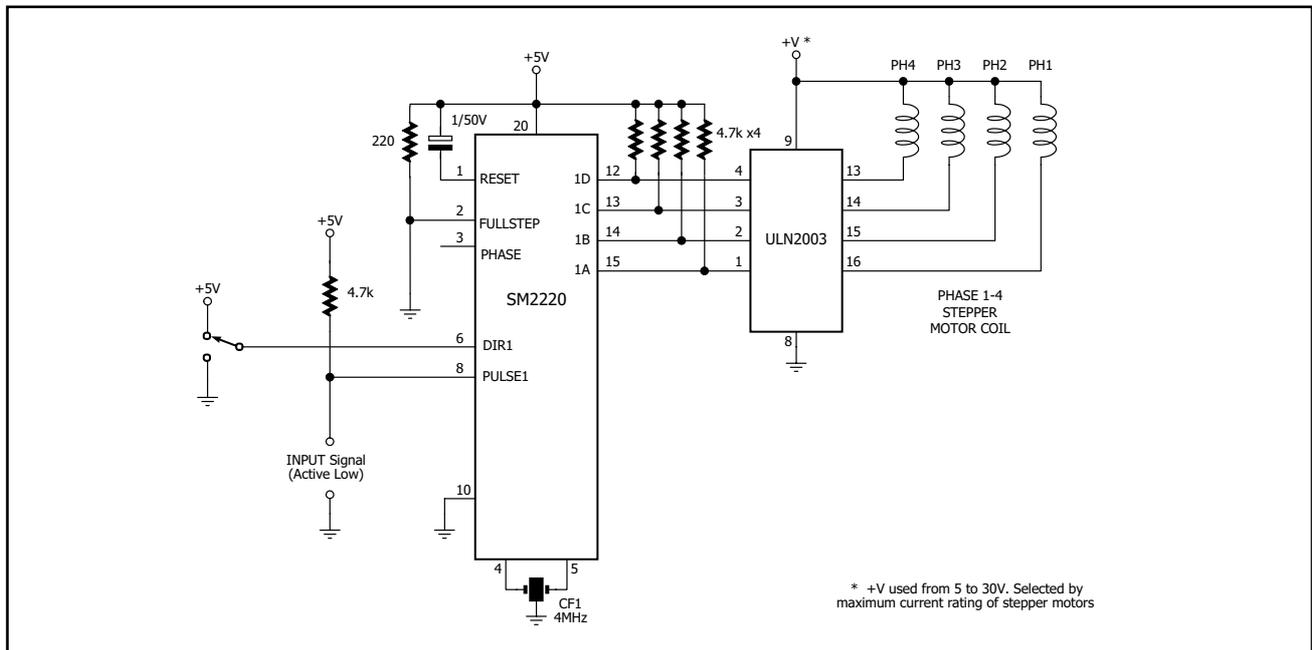**Figure 2. Interfacing a unipolar stepper motors and SM2220 with other microcontroller**

Figure 3. Interfacing a unipolar stepper motors and SM2220 with External logic