EMBEDDED PROGRAMMING LAB

LAB-8   DATE:31-10-2024

PREETHISH K R

1. Write a program to rotate the stepper motor in clockwise direction

Program:

```
#include <LPC17xx.H>

void clock_wise(void);

unsigned long int var1;
unsigned int i =0,j=0,k=0;

int main(void){

    SystemInit();
    SystemCoreClockUpdate();

    LPC_PINCON ->PINSEL4 = 0x00000000;
    LPC_GPIO2 -> FIODIR =0x0000000F;

    while(1)
    {
        for(j=0;j<50;j++)
         clock_wise();

}
}

void clock_wise(void)
{
    var1 = 0x00000001;
    for(i=0;i<=3;i++){

     LPC_GPIO2 -> FIOCLR = 0x0000000F;
     LPC_GPIO2 -> FIOSET = var1;
     var1 = var1<<1;
   for(k=0;k<15000;k++);
     }
}
```
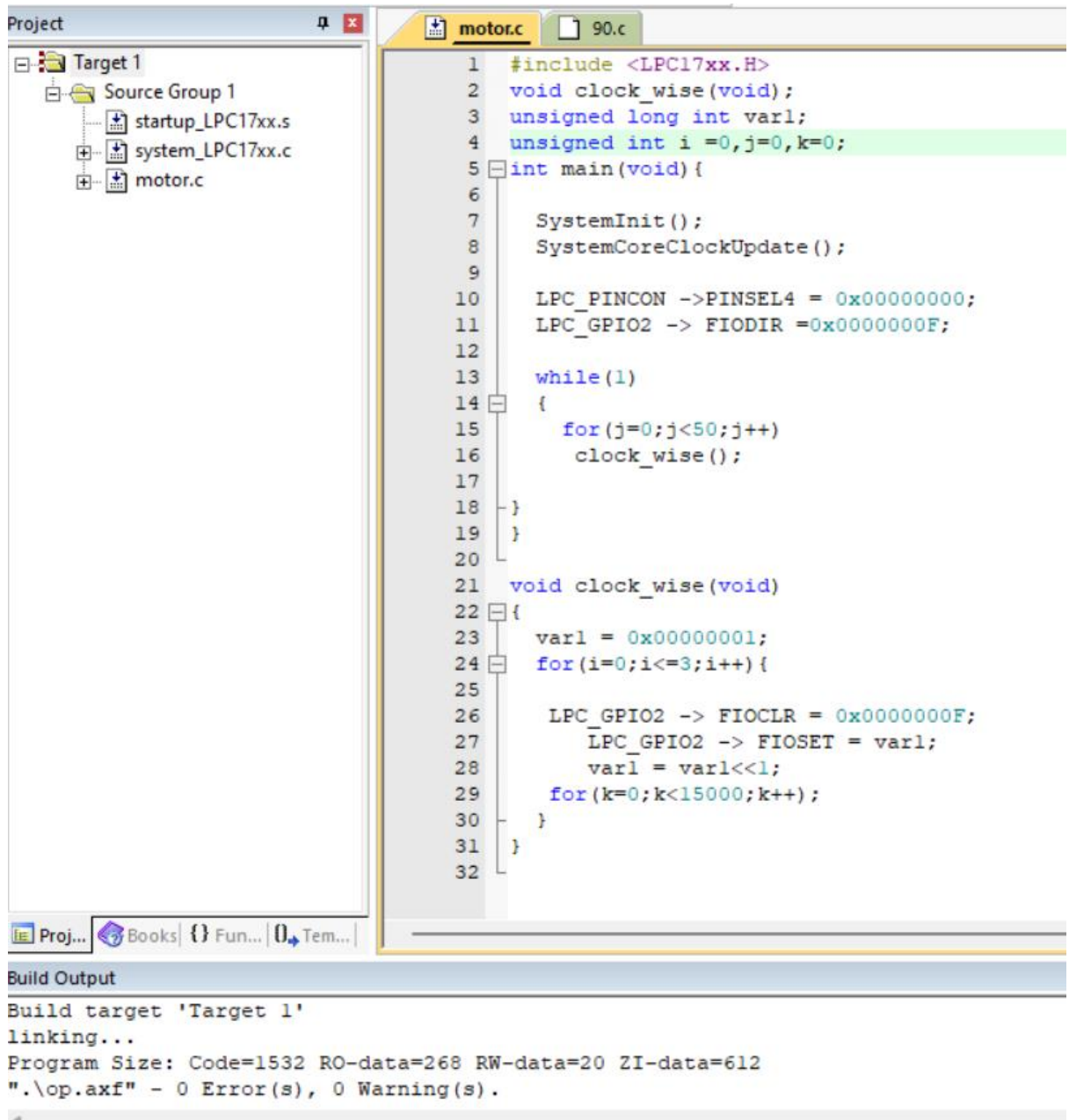
Fig-1 stepper motor clockwise

2. Write a program to rotate the stepper motor anticlockwise direction

Program:
```c
#include <LPC17xx.H>

void anti_clock_wise(void);

unsigned long int var1;
unsigned int i = 0,j=0,k=0;

int main(void)
{
```

```c
    SystemInit();
    SystemCoreClockUpdate();

    LPC_PINCON ->PINSEL4 = 0x00000000;
    LPC_GPIO2 -> FIODIR =0x0000000F;

    while(1)
    {

            for(j=0;j<50;j++)
              anti_clock_wise();

            for(k=0;k<65000;k++);
    }
}

void anti_clock_wise(void)
{
    var1 = 0x00000008;
    for(i=0;i<=3;i++)
    {
            LPC_GPIO2 -> FIOCLR = 0x0000000F;
            LPC_GPIO2 -> FIOSET = var1;
            var1 = var1>>1;
            for(k=0;k<100000;k++);//controlling the rate at which charging and
//discharging coil takes place
}
}
```
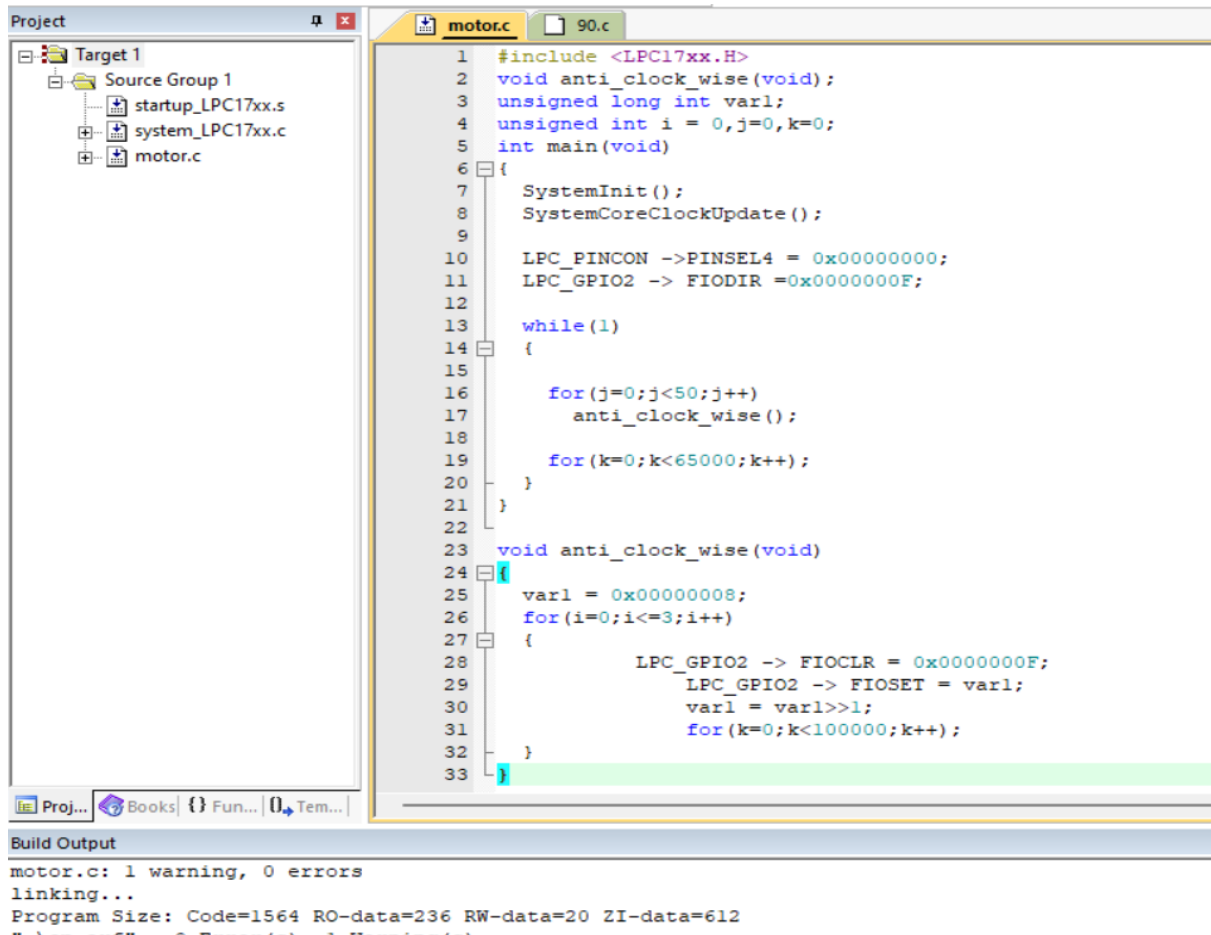
Fig-2 stepper motor anticlockwise

3. Write a program for stepper motor to rotate clockwise and anticlockwise.

Program:
```c
#include <LPC17xx.H>

void clock_wise(void);
void anti_clock_wise(void);

unsigned long int var1;
unsigned int i =0,j=0,k=0;

int main(void)
{
    SystemInit();
    SystemCoreClockUpdate();

    LPC_PINCON ->PINSEL4 = 0x00000000;
    LPC_GPIO2 -> FIODIR =0x0000000F;

    while(1)
```

```c
	{
		for(j=0;j<50;j++)
		 clock_wise();

		for(k=0;k<65000;k++);

		for(j=0;j<50;j++)
		  anti_clockwise();

		for(k=0;k<65000;k++);
	}
}

void clock_wise(void)
{
	var1 = 0x00000001;
	for(i=0;i<=3;i++)
	{
		LPC_GPIO2 -> FIOCLR = 0x0000000F;
   LPC_GPIO2 -> FIOSET = var1;
	 var1 = var1<<1;
  for(k=0;k<15000;k++);
	}
}
void anti_clock_wise(void)
{
	var1 = 0x00000008;
	for(i=0;i<=3;i++)
	{
		LPC_GPIO2 -> FIOCLR = 0x0000000F;
		LPC_GPIO2 -> FIOSET = var1;
		var1 = var1>>1;
		for(k=0;k<15000;k++);
	}
}
```
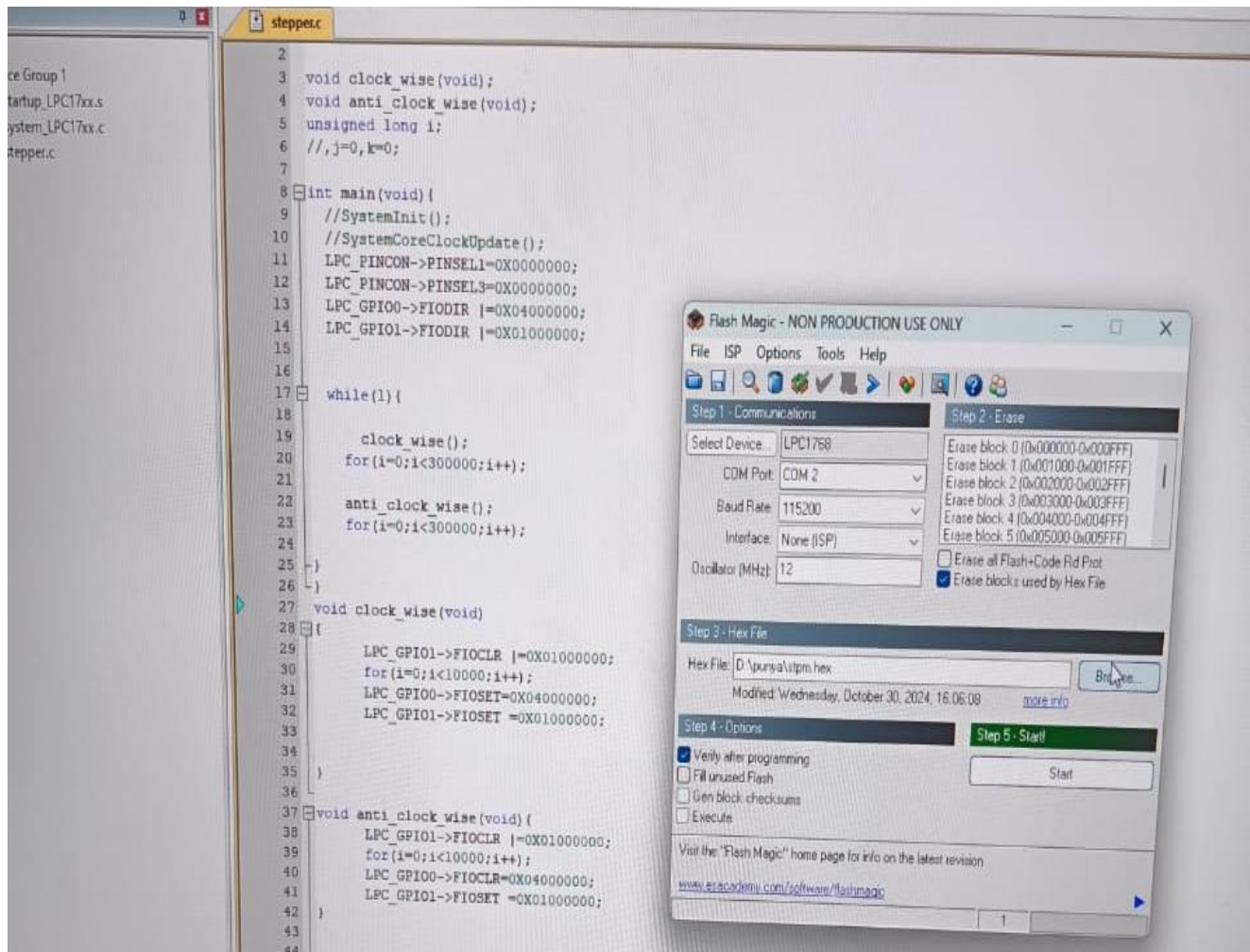
Fig-3 stepper motor clockwise and anticlockwise

4. Write a program to rotate stepper motor 360 degree only when EXT1 (switch 12) p2.11 is ON

Program:
```
#include <LPC17xx.H>

void clock_wise(void);

unsigned long int var1,var2;
unsigned int i = 0,j=0,k=0;

int main(void)
{
    SystemInit();
    SystemCoreClockUpdate();

    LPC_PINCON ->PINSEL4 = 0x00000000;
    LPC_GPIO2 -> FIODIR =0x0000000F;

    while(1)
    {
```

```c
        if(!(LPC_GPIO2 ->FIOPIN &0x00000800))
        for(j=0;j<50;j++)//50 for 360
         clock_wise();

        for(k=0;k<65000;k++);


    }
}

void clock_wise(void)
{
    var1 = 0x00000001;
    for(i=0;i<=3;i++)
    {
        LPC_GPIO2 -> FIOCLR = 0x0000000F;
        LPC_GPIO2 -> FIOSET = var1;
        var1 = var1<<1;
        for(k=0;k<15000;k++);
    }
}
```


Fig 4-stepper motor 360 degree when switch pressed

5. Write a program to rotate stepper motor 90 degree in clockwise direction only if EXT1(Switch 12) P2.1 pressed.

Program:

```
#include <LPC17xx.H>

void clock_wise(void);

unsigned long int var1,var2;
unsigned int i = 0,j=0,k=0;

int main(void)
{
    SystemInit();
    SystemCoreClockUpdate();

    LPC_PINCON ->PINSEL4 = 0x00000000;
    LPC_GPIO2 -> FIODIR =0x0000000F;

    while(1)
    {
        if(!(LPC_GPIO2 ->FIOPIN &0x00000800))
        for(j=0;j<13;j++) // 50/4=13 for 90
         clock_wise();

        for(k=0;k<65000;k++);


    }
}

void clock_wise(void)
{
    var1 = 0x00000001;
    for(i=0;i<=3;i++)
    {
        LPC_GPIO2 -> FIOCLR = 0x0000000F;
        LPC_GPIO2 -> FIOSET = var1;
        var1 = var1<<1;
        for(k=0;k<15000;k++);
    }
}
```
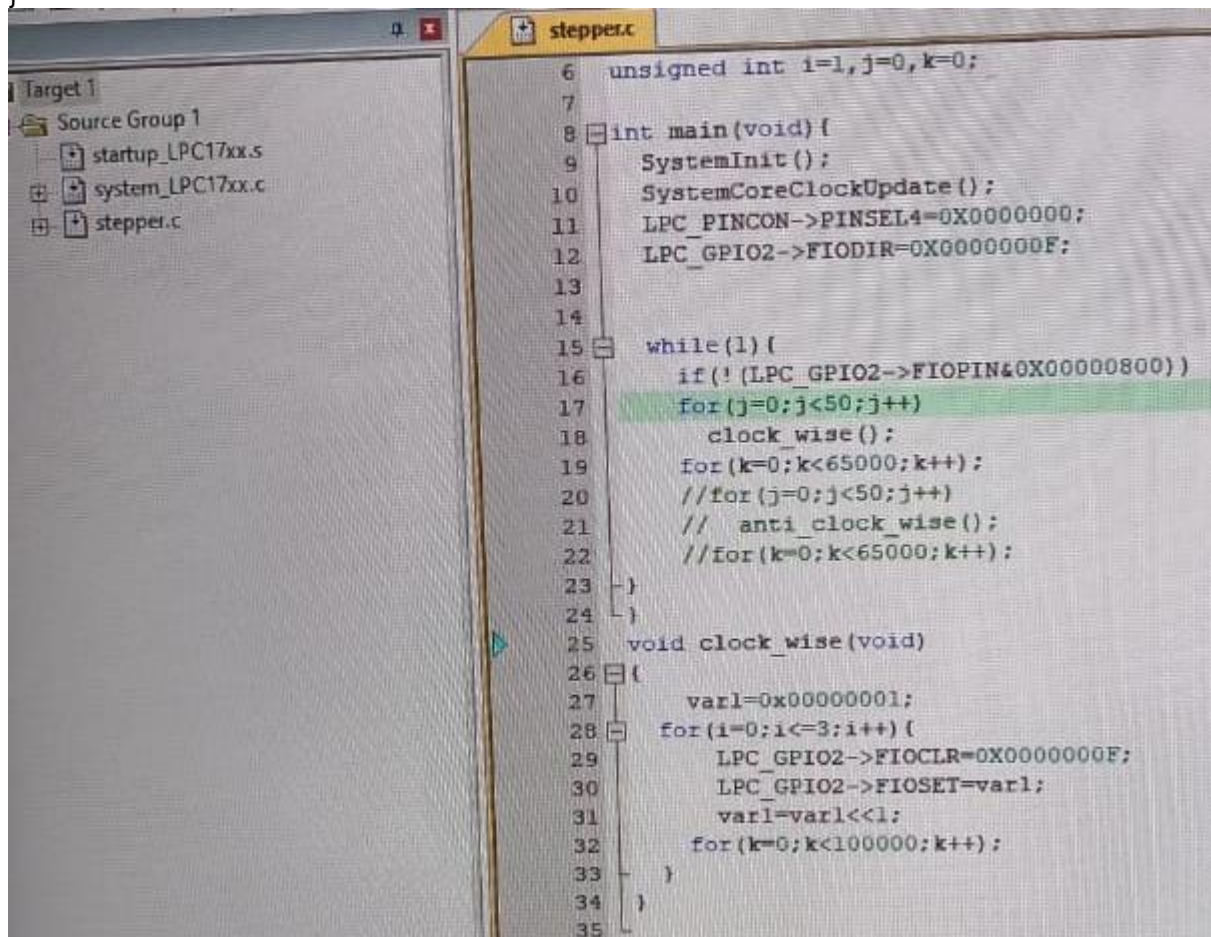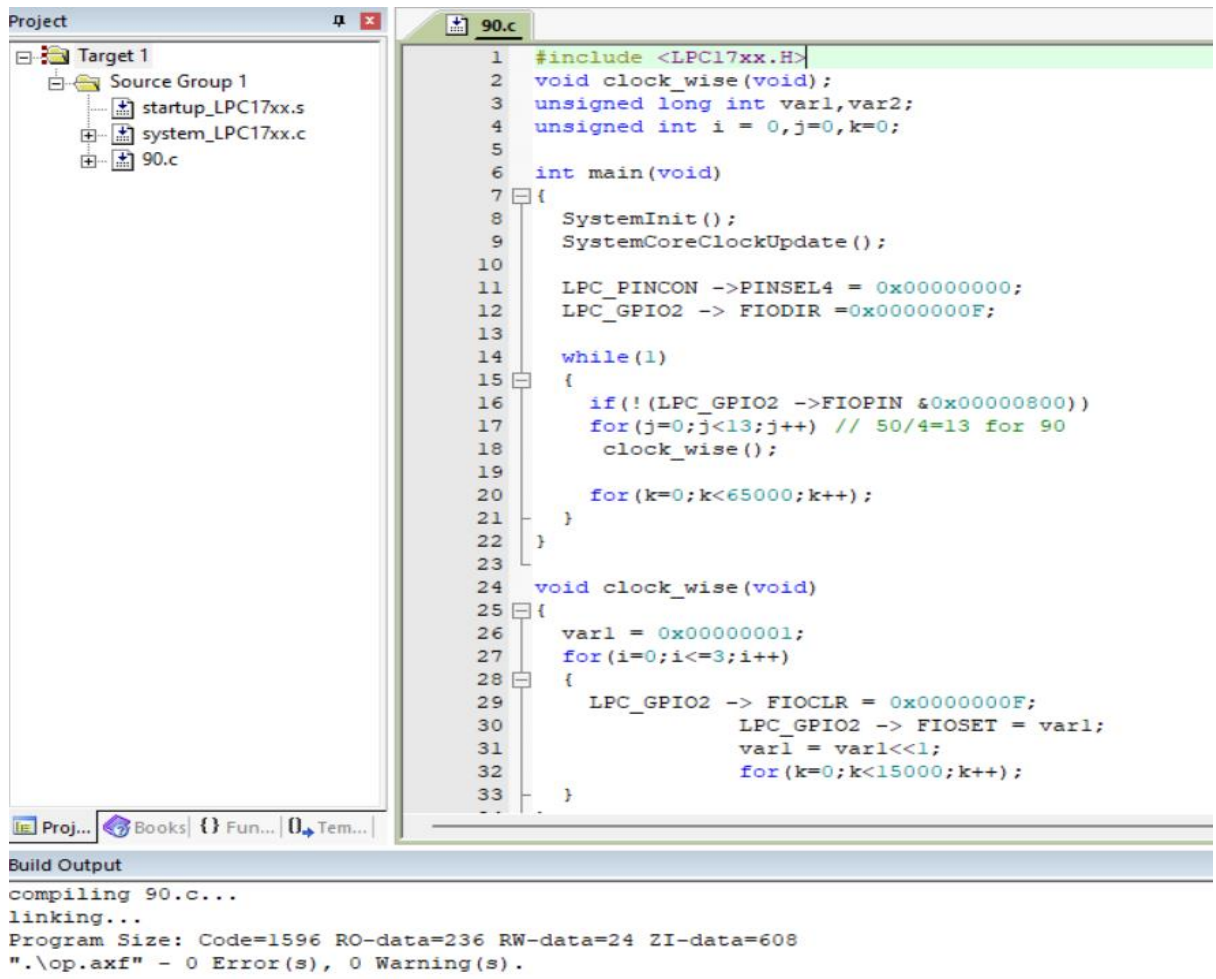
Fig 5-stepper motor 90 degree when switch pressed

6. Write a program to control direction of motor connected to LPC1768 through a relay at port lines p1.24 & p0.26 define 2 functions for clockwise & anticlockwise

Program:
```
#include<LPC17xx.H>
void clock_wise(void);
void anti_clockwise(void);

unsigned long i ;
int main(void)
{
    LPC_PINCON ->PINSEL1 = 0x00000000;
    LPC_PINCON ->PINSEL3 = 0x00000000;
    LPC_GPIO0 -> FIODIR |= 0x04000000;
    LPC_GPIO1 -> FIODIR |= 0x01000000;

    while(1)
    {
            Clock_wise();
```

9

```
        for(i=0;i<300000;i++);
        anti_clockwise();
        for(i=0;i<300000;i++);
    }
}
void clock_wise(void)
{
    LPC_GPIO1 -> FIOCLR | = 0x01000000;
    for(i=0;i<10000;i++);
    LPC_GPIO0->FIOSET = 0x04000000;
    LPC_GPIO1->FIOSET = 0x01000000;
}
void anti_clockwise(void)
{
    LPC_GPIO1 -> FIOCLR |= 0x01000000;
    for(i=0;i<10000;i++);
    LPC_GPIO0->FIOCLR = 0x04000000;
    LPC_GPIO1->FIOSET = 0x01000000;
}
```

```
Project                          relay.c*
Target 1                     1   #include<LPC17xx.H>
  Source Group 1             2   void clockwise(void);
    startup_LPC17xx.s        3   void anticlockwise(void);
    system_LPC17xx.c         4
    relay.c                  5   unsigned long i ;
                             6   int main(void)
                             7   {
                             8     LPC_PINCON ->PINSEL1 = 0x00000000;
                             9     LPC_PINCON ->PINSEL3 = 0x00000000;
                            10     LPC_GPIO0 -> FIODIR |= 0x04000000;
                            11     LPC_GPIO1 -> FIODIR |= 0x01000000;
                            12
                            13     while(1)
                            14     {
                            15       clockwise();
                            16       for(i=0;i<300000;i++);
                            17       anticlockwise();
                            18       for(i=0;i<300000;i++);
                            19     }
                            20   }
                            21   void clockwise(void)
                            22   {
                            23     LPC_GPIO1 -> FIOCLR = 0x01000000;
                            24     for(i=0;i<10000;i++);
                            25     LPC_GPIO0->FIOSET = 0x04000000;
                            26     LPC_GPIO1->FIOSET = 0x01000000;
                            27   }
                            28   void anticlockwise(void)
                            29   {
                            30     LPC_GPIO1 -> FIOCLR = 0x01000000;
                            31     for(i=0;i<10000;i++);
                            32     LPC_GPIO0->FIOCLR = 0x04000000;
                            33     LPC_GPIO1->FIOSET = 0x01000000;
```
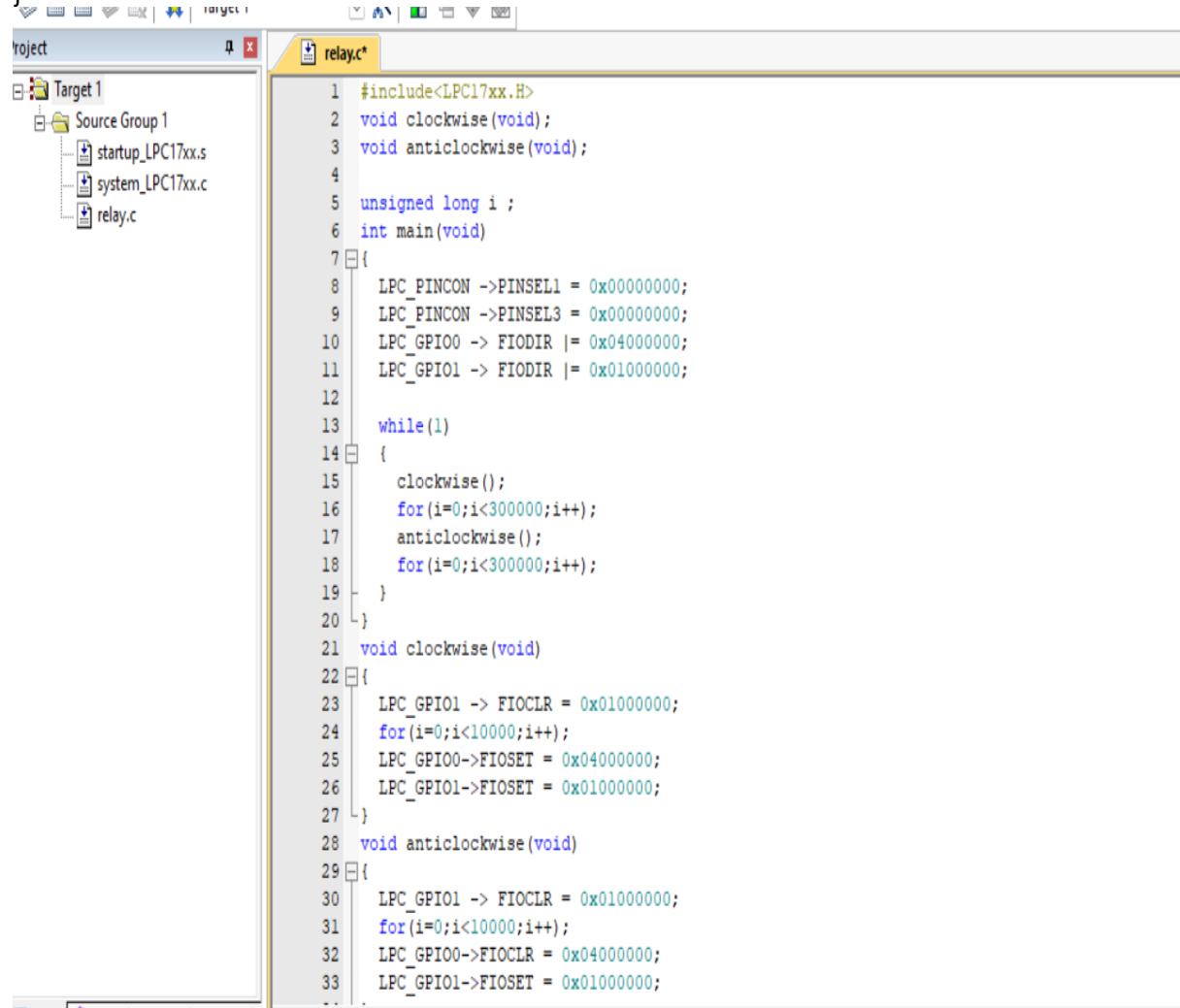
Fig 6-control direction of motor connected