EMBEDDED PROGRAMMING LAB

LAB-8 DATE:31-10-2024

PREETHISH K R

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

```
#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 \rightarrow PINSEL4 = 0x000000000;
   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++);
   }
}
```

```
Project
                         立 🔣
                                  motor.c
                                             90.c
□ 🔄 Target 1
                                         #include <LPC17xx.H>

☐ Group 1

                                      2
                                         void clock wise (void);
                                        unsigned long int varl;
                                     3
      - startup_LPC17xx.s
                                        unsigned int i =0, j=0, k=0;
     system_LPC17xx.c
                                     5 -int main (void) {
     motor.c
                                      6
                                     7
                                           SystemInit();
                                     8
                                           SystemCoreClockUpdate();
                                     9
                                    10
                                           LPC PINCON ->PINSEL4 = 0x000000000;
                                    11
                                           LPC GPIO2 -> FIODIR =0x0000000F;
                                    12
                                    13
                                           while (1)
                                    14 🖹
                                           -{
                                    15
                                             for (j=0; j<50; j++)
                                    16
                                              clock_wise();
                                    17
                                    18 -}
                                    19
                                         }
                                    20
                                    21
                                        void clock wise (void)
                                    22 ⊟ {
                                    23
                                           var1 = 0x000000001;
                                    24
                                           for (i=0; i<=3; i++) {
                                    25
                                    26
                                            LPC GPIO2 -> FIOCLR = 0x0000000F;
                                    27
                                               LPC GPIO2 -> FIOSET = varl;
                                               var1 = var1<<1;</pre>
                                    28
                                    29
                                            for (k=0; k<15000; k++);
                                    30
                                    31
                                         }
                                    32
E Proj... 

Books {} Fun... □ Tem...
Build Output
Build target 'Target 1'
linking...
Program Size: Code=1532 RO-data=268 RW-data=20 ZI-data=612
".\op.axf" - 0 Error(s), 0 Warning(s).
```

Fig-1 stepper motor clockwise

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

```
#include <LPC17xx.H>
void anti_clock_wise(void);
unsigned long int var1;
unsigned int i = 0,j=0,k=0;
int main(void)
```

```
SystemInit();
   SystemCoreClockUpdate();
   LPC_PINCON \rightarrow PINSEL4 = 0x000000000;
   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 \rightarrow FIOCLR = 0x00000000F;
         LPC_GPIO2 -> FIOSET = var1;
         var1 = var1 >> 1;
         for(k=0;k<100000;k++);//controlling the rate at which charging and
//discharging coil takes place
}
```

```
Project
                                  motor.c 90.c
🖃 🛅 Target 1
                                        #include <LPC17xx.H>
  🖹 🚗 Source Group 1
                                        void anti_clock_wise(void);
      startup_LPC17xx.s
                                     3
                                        unsigned long int varl;
                                        unsigned int i = 0,j=0,k=0;
     system_LPC17xx.c
                                        int main(void)
     motor.c
                                     6 □ {
                                           SystemInit();
                                     8
                                          SystemCoreClockUpdate();
                                     9
                                    10
                                          LPC_PINCON ->PINSEL4 = 0x00000000;
                                          LPC_GPIO2 -> FIODIR =0x0000000F;
                                    11
                                    12
                                          while(1)
                                    13
                                    14 🗀
                                    15
                                             for(j=0;j<50;j++)
                                    16
                                    17
                                               anti_clock_wise();
                                    18
                                             for(k=0;k<65000;k++);
                                    19
                                    20
                                    21
                                        1
                                    22
                                    23
                                        void anti_clock_wise(void)
                                    24 □ {
                                           var1 = 0x000000008;
                                    25
                                           for(i=0;i<=3;i++)
                                    26
                                    27
                                                    LPC_GPIO2 -> FIOCLR = 0x0000000F;
                                    28
                                                        LPC_GPIO2 -> FIOSET = var1;
                                    29
                                                        var1 = var1>>1;
                                    30
                                                        for(k=0;k<100000;k++);
                                    31
                                    32
                                    33
🖭 Proj... 🥝 Books | {} Fun... | Ū→ Tem... |
Build Output
motor.c: 1 warning, 0 errors
linking...
Program Size: Code=1564 RO-data=236 RW-data=20 ZI-data=612
```

Fig-2 stepper motor anticlockwise

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

```
#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 = 0x000000000;
    LPC_GPIO2 -> FIODIR =0x00000000F;

    while(1)
```

```
{
          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 \rightarrow FIOCLR = 0x00000000F;
         LPC_GPIO2 -> FIOSET = var1;
          var1 = var1 >> 1;
          for(k=0;k<15000;k++);
   }
}
```

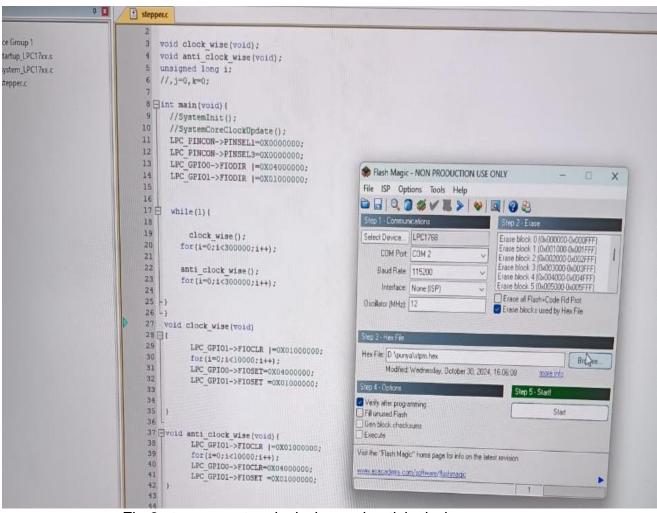


Fig-3 stepper motor clockwise and anticlockwise

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

```
Program:
```

```
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 = 0x00000000F;
          LPC_GPIO2 -> FIOSET = var1;
          var1 = var1 << 1;
          for(k=0;k<15000;k++);
   }
                           p.
                                    * stepper.c
                                           unsigned int i=1, j=0, k=0;
                                       6
Target 1
Source Group 1
                                       8 Hint main (void) (
  startup_LPC17xx.s
                                             SystemInit();
 system_LPC17xx.c
                                             SystemCoreClockUpdate();
                                       10
                                             LPC PINCON->PINSEL4=0X00000000;
 ⊞ (1) stepper.c
                                       11
                                             LPC GPIO2->FIODIR=0X0000000F;
                                       12
                                       13
                                       14
                                       15
                                             while(1)(
                                                if(!(LPC GPIO2->FIOPIN&0X00000800))
                                       16
                                                for()=0;j<50;j++)
                                       17
                                                 clock wise();
                                       18
                                                for (k=0; k<65000; k++);
                                       19
                                                //for(j=0;j<50;j++)
                                       20
                                                // anti clock wise();
                                       21
                                                //for(k=0;k<65000;k++);
                                        22
                                        23
                                        24
                                        25 void clock wise (void)
                                        26日(
                                                var1=0x000000001;
                                        27
                                              for(i=0;i<=3;i++){
                                        28
                                                  LPC GPIO2->FIOCLR=0X0000000F;
                                        29
                                                  LPC GPIO2->FIOSET=var1;
                                        30
                                                   var1=var1<<1;
                                        31
                                                 for (k=0; k<100000; k++);
                                        32
                                        33
                                        34
```

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.

```
#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 \rightarrow PINSEL4 = 0x000000000;
   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++);
```

```
Project
                                ₫ 90.c
□ Target 1
                                       #include <LPC17xx.H>
  2
                                       void clock_wise(void);
      startup_LPC17xx.s
                                    3
                                       unsigned long int varl, var2;
                                       unsigned int i = 0,j=0,k=0;
                                    4
     system_LPC17xx.c
                                    5
     ⊕ ∰ 90.c
                                    6
                                       int main (void)
                                    7 = {
                                    8
                                         SystemInit();
                                    9
                                         SystemCoreClockUpdate();
                                   10
                                         LPC PINCON ->PINSEL4 = 0x00000000;
                                   11
                                   12
                                         LPC GPIO2 -> FIODIR =0x0000000F;
                                   13
                                         while (1)
                                   14
                                   15 -
                                           if(!(LPC_GPIO2 ->FIOPIN &0x00000800))
                                   16
                                   17
                                           for(j=0;j<13;j++) // 50/4=13 for 90
                                   18
                                            clock wise();
                                   19
                                   20
                                           for (k=0; k<65000; k++);
                                   21
                                   22
                                   23
                                       void clock wise (void)
                                   25 □ {
                                   26
                                         var1 = 0x000000001;
                                         for(i=0;i<=3;i++)
                                   27
                                   28
                                           29
                                   30
                                   31
                                                      var1 = var1<<1;</pre>
                                   32
                                                      for (k=0; k<15000; k++);
                                   33
E Proj... 

Books {} Fun... □, Tem...
Build Output
compiling 90.c...
linking ...
Program Size: Code=1596 RO-data=236 RW-data=24 ZI-data=608
".\op.axf" - 0 Error(s), 0 Warning(s).
```

Fig 5-stepper motor 90 degree when switch pressed

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

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

unsigned long i;
int main(void)
{
    LPC_PINCON ->PINSEL1 = 0x000000000;
    LPC_PINCON ->PINSEL3 = 0x000000000;
    LPC_GPIO0 -> FIODIR |= 0x04000000;
    LPC_GPIO1 -> FIODIR |= 0x010000000;

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

```
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\_GPIOO->FIOCLR = 0x04000000;
    LPC\_GPIO1->FIOSET = 0x01000000;
}
                             roject
                         relay.c*
🖃 🛅 Target 1
                            1 #include<LPC17xx.H>
 🖹 🔠 Source Group 1
                            2 void clockwise(void);
                           3 void anticlockwise(void);
     startup_LPC17xx.s
     system_LPC17xx.c
                           5 unsigned long i;
     relay.c
                            6 int main (void)
                           7 ⊟ {
                            8
                               LPC PINCON ->PINSEL1 = 0x00000000;
                              LPC PINCON ->PINSEL3 = 0x00000000;
                           10
                              LPC GPI00 -> FIODIR |= 0x04000000;
                              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)
                              LPC GPI01 -> FIOCLR = 0x01000000;
                           24
                               for(i=0;i<10000;i++);
                               LPC GPIOO->FIOSET = 0x04000000;
                           25
                              LPC GPIO1->FIOSET = 0x01000000;
                           26
                           27 -}
                           28 void anticlockwise (void)
                           29 ⊟ {
                               LPC GPIO1 -> FIOCLR = 0x01000000;
                           30
                               for(i=0;i<10000;i++);
                           31
                               LPC_GPIOO->FIOCLR = 0x04000000;
                           33
                               LPC GPIO1->FIOSET = 0x01000000;
- . A- . lo-
               10
```

Fig 6-control direction of motor connected