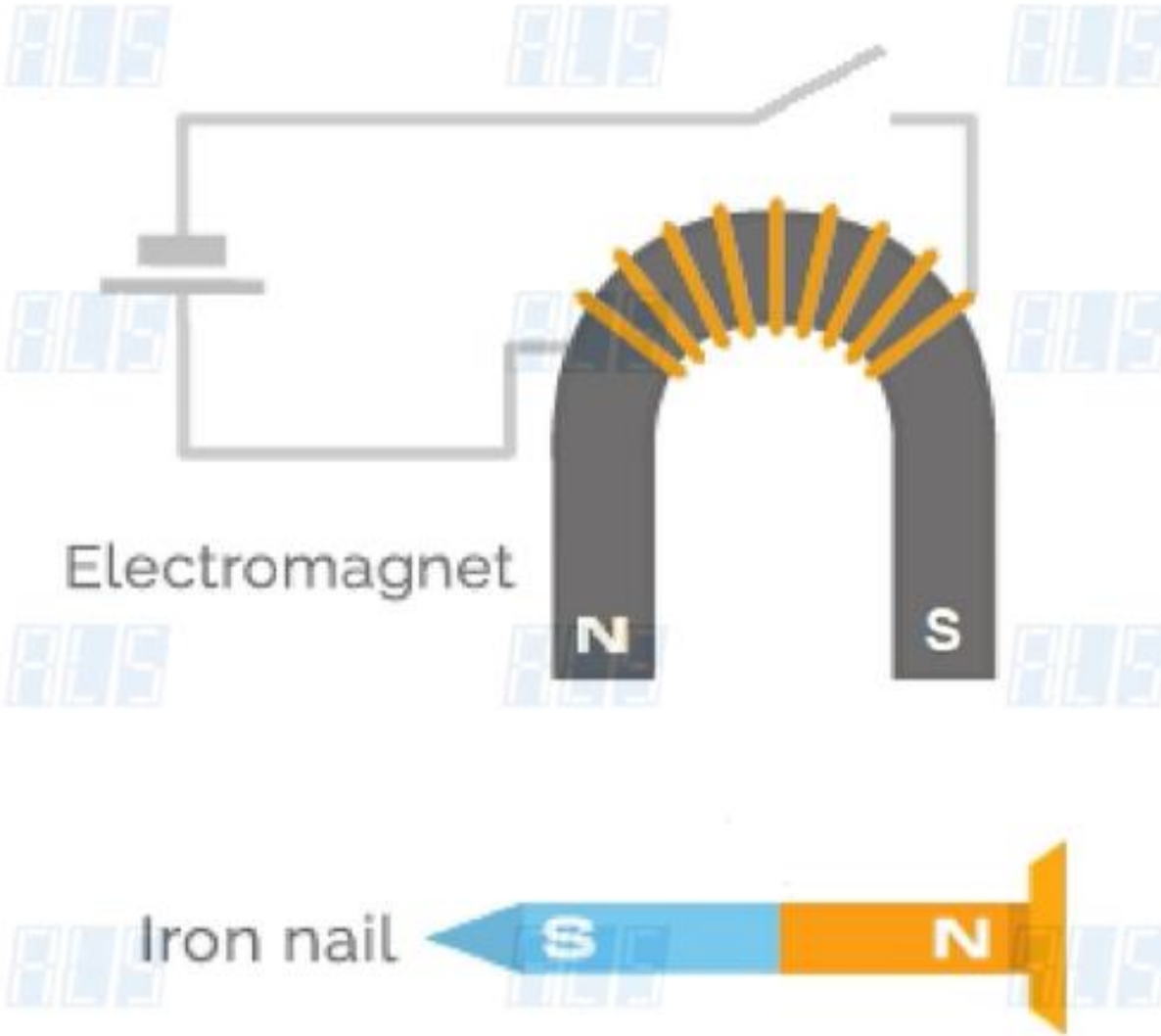
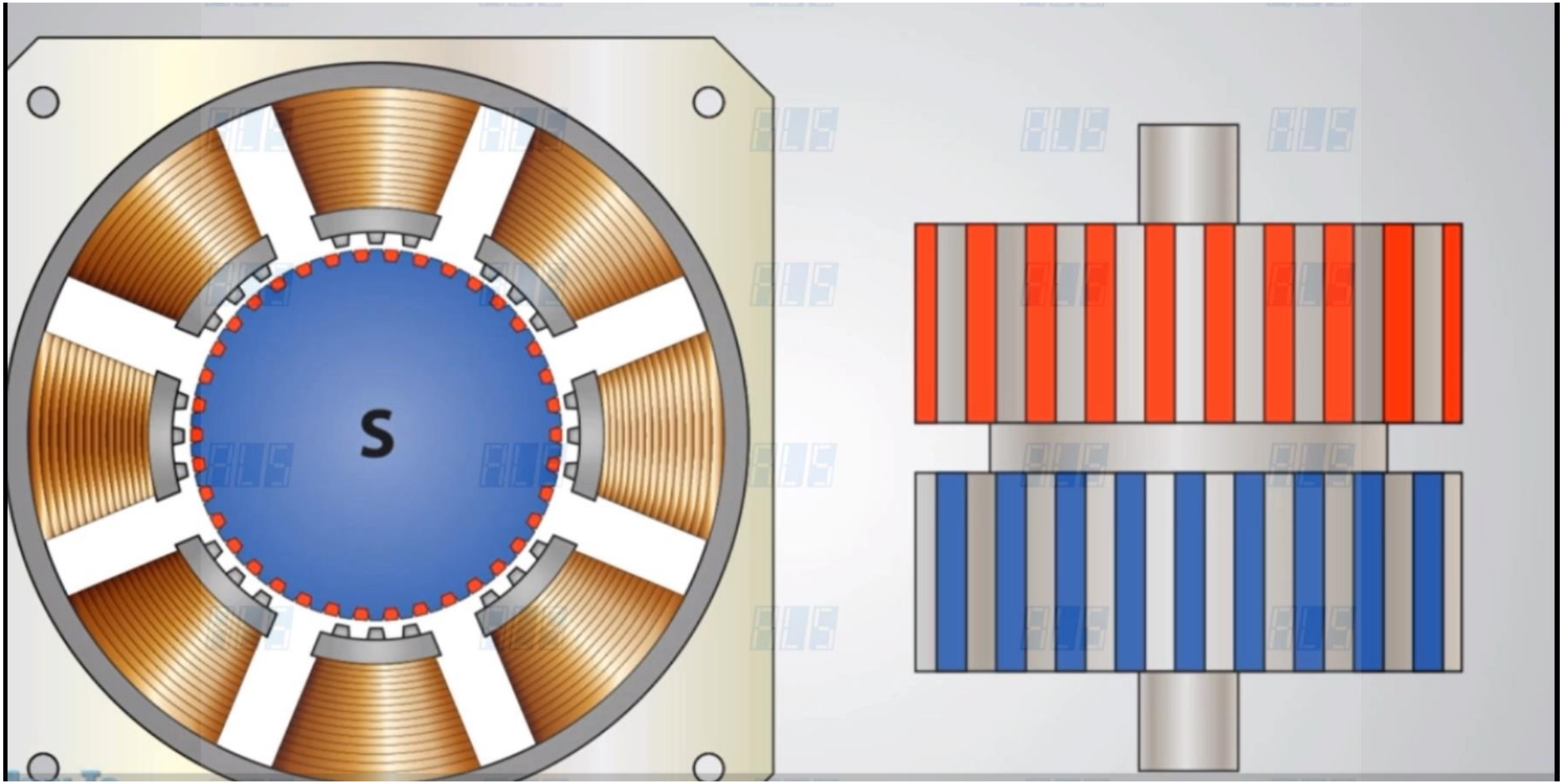
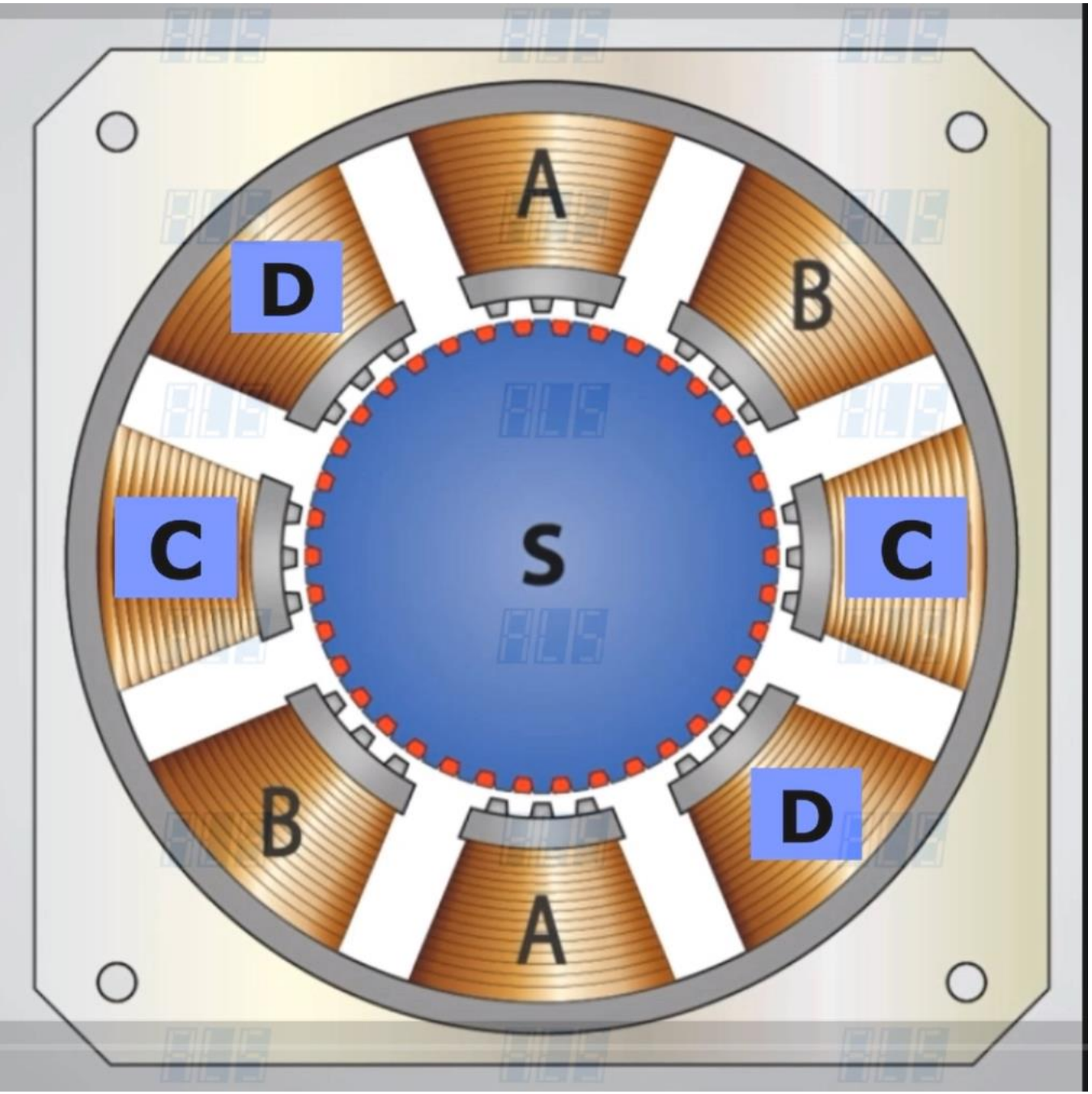
PROGRAM ON STEPPER MOTOR

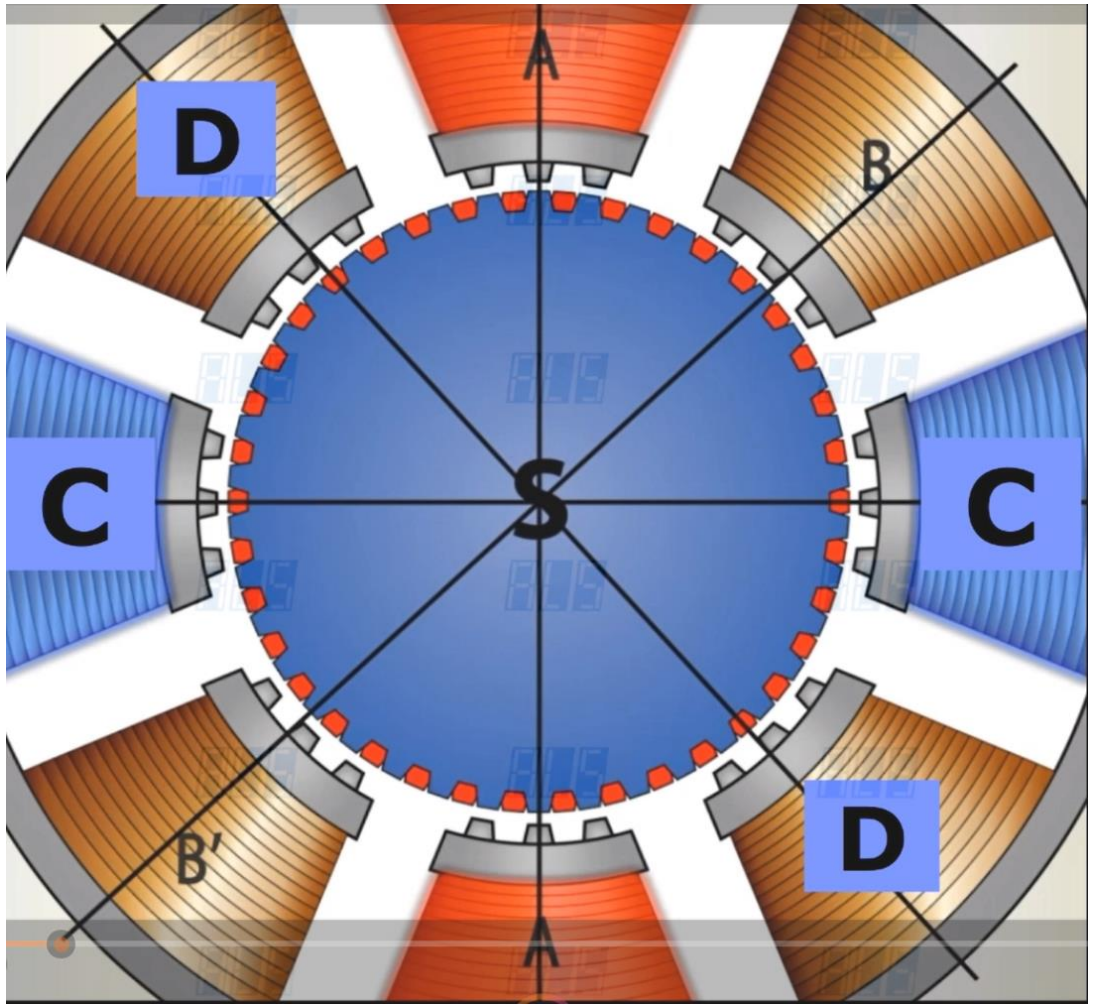
Objectives

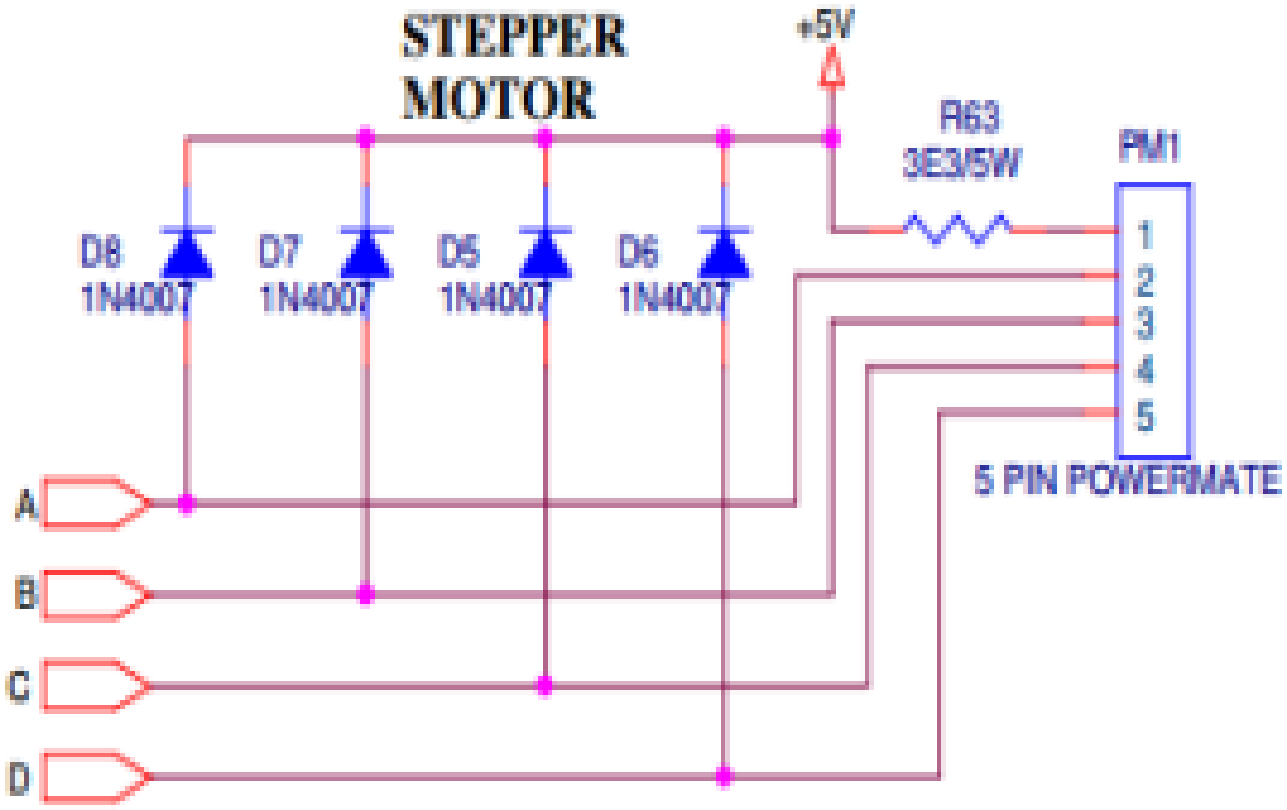
Interface and understand the working of stepper motor

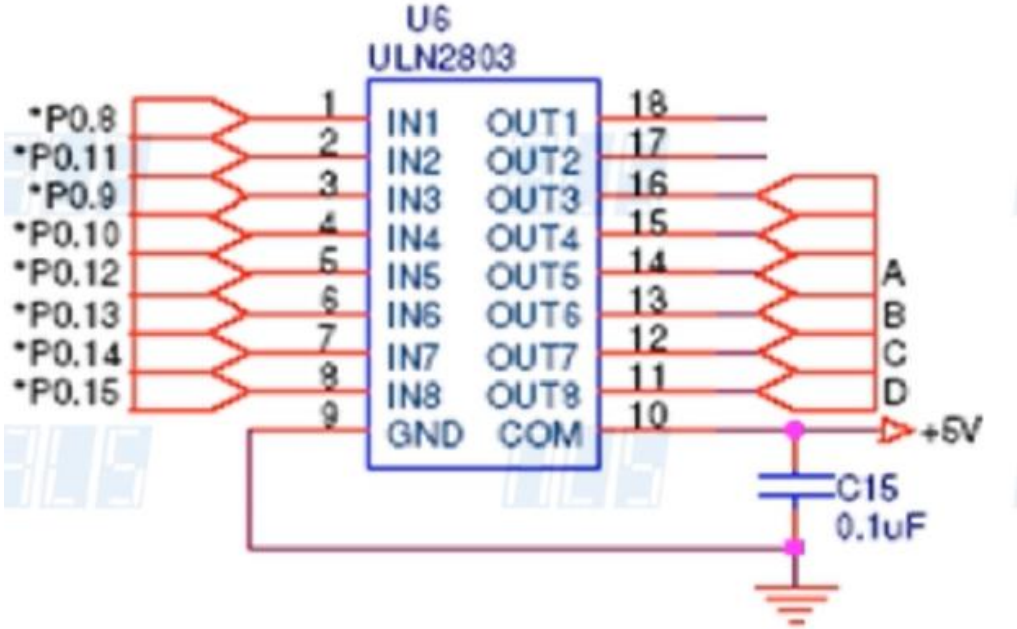

Electromagnet
N
S
Iron nail
S
N


S

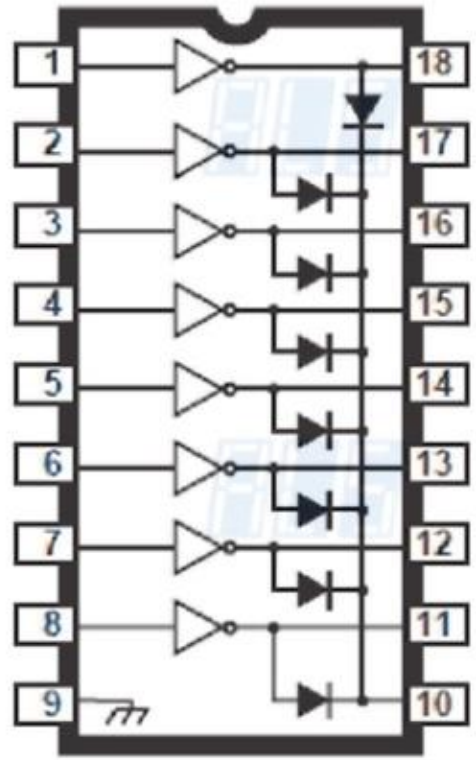

A
B
D
C
S
C
B
A
D


A
D
B
C
S
C
B′
A
D


STEPPER
MOTOR
+5V
R63
3E3/5W
PM1
D8
1N4007
D7
1N4007
D5
1N4007
D6
1N4007
1
2
3
4
5
5 PIN POWERMATE
A
B
C
D


U6
ULN2803
*P0.8
*P0.11
*P0.9
*P0.10
*P0.12
*P0.13
*P0.14
*P0.15
1
2
3
4
5
6
7
8
9
IN1
IN2
IN3
IN4
IN5
IN6
IN7
IN8
GND
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
COM
18
17
16
15
14
13
12
11
10
A
B
C
D
+5V
C15
0.1uF

P0.15	P0.14	P0.13	P0.12
0	0	0	1
0	0	1	0
0	1	0	0
1	0	0	0



D	C	B	A
1	1	1	0
1	1	0	1
1	0	1	1
0	1	1	1

Pin no	Description
1	+5v supply
2	Phase A
3	Phase B
4	Phase C
5	Phase D

Steps to be followed Project

Creation in Keil uvision4 IDE:

1. Create a project folder before creating NEW project.
2. Use separate folder for each project
3. Open Keil uVision4 IDE software by double clicking on “Keil Uvision4” icon.
4. Select “Project” then to “New Project” and save it with a name in the respective Project folder, which is already you created.
5. Select the device as “NXP (founded by Philips)” Select “LPC1768” then Press “OK” and then press “YES” button to add “system_LPC17xx.s” file.
6. Go to “File” select “New” to open an editor window. Create a source file and use the header file “LPC17xx.h” in the source file and save the file. Color syntax highlighting will be enabled once the file is saved with a Recognized extension such as “.C “.
7. Right click on “Source Group 1” and select the option “Add Files to Group 'Source Group 1' “add the. C source file(s) to the group.
8. Again right click on Source Group 1 and select the option “Add Files to Group 'Source Group 1' “add the file - C:Keil\ARM\startup\NXP\LPC17xx\system_LPC17xx.c

```
#include <LPC17xx.H>
void clock_wise(void);
void anti_clock_wise(void);
unsigned long int var1,var2;
unsigned int i=0,j=0,k=0;

int main(void)
{
      LPC_PINCON->PINSEL4 = 0x00000000;          //P2.0 to P2.3 GPIO
      LPC_GPIO2->FIODIR = 0x0000000F;                  //P2.0 to P2.3 output
      while(1)
      {
            for(j=0;j<30;j++)                          //50 times in Clock wise Rotation
                  clock_wise();

            for(k=0;k<50000;k++);                      //Delay to show  anti_clock Rotation

            for(j=0;j<30;j++)                                //50 times in  Anti Clock wise Rotation
                  anti_clock_wise();

            for(k=0;k<50000;k++) ;                     //Delay to show clock Rotation
      }
}
```

```
void clock_wise(void)
{
            var1 = 0x00000001;                                  //For Clockwise
    for(i=0;i<=3;i++)                                         //for A B C D Stepping
      {
         LPC_GPIO2->FIOCLR =  0X0000000F;
         LPC_GPIO2->FIOSET =  var1;
             var1 = var1<<1;                                          //For Clockwise
     for(k=0;k<15000;k++) ;                                    //for step speed variation
  }
}
```

```
void anti_clock_wise(void)
{
            var1 = 0x0000008;                                    //For Anticlockwise
    for(i=0;i<=3;i++)                                   //for A B C D Stepping
    {
          LPC_GPIO2->FIOCLR =  0X0000000F;
                  LPC_GPIO2->FIOSET =  var1;
                  var1 = var1>>1;                                        //For Anticlockwise
      for(k=0;k<15000;k++);                             //for step speed variation
    }
}
```

9. Any changes made to this file at current project will directly change the source system_LPC17xx.C file. As a result other project settings may get altered. So it is recommended to copy the file C:Keil\ARM\startup\NXP\LPC17xx\system_LPC17xx.c to the project folder and add to the source group.
10. Important: This file should be added during each project creation.
11. Select “Project” then select “Translate” to compile the File (s)
12. Select “Project” , select “Build Target” for building all source files such as “.C”,”.ASM”, “.h”, files, etc…This will create the hex file if there are no warnings & no errors

Some Settings to be done in KEILUV4 for Executing C programs :

- In Project Window Right click "TARGET1" and select "options for target 'TARGET1' select to option "Target" in that select
    1. XTAL 12.0MHz
    2. Select IROM1 (starting 0×0 size 0×8000).
    3. Select IRAM1 (starting 0×10000000 size 0×8000).
- Then go to option "Output"
    Select "Create Hex file".
- Then go to option "Linker"
    Select use memory layout from target dialog

Step4.Make following setting in Flash magic(Only once)

a. Communications:

Device:	LPC1768
Com Port:	COM1
Baud Rate:	9600
Interface:	None(ISP)
Oscillator:	12MHz

b. ERASE:

Select “Erase Blocks Used By Hex File”.

c. Hex file:

Browse and select the Hex file which you want to download.

d. Options:

Select “Verify After Programming”.