

ภาคผนวก ข

โค้ดโปรแกรมควบคุมของไมโครคอนโทรลเลอร์ ARM 7

โค้ดควบคุมการทำงานแกน 1

```
#include <lpc2103.H>

#include "uart0.h"

#include "stdio.h"

#include "string.h"

#define S1 0x00010000

#define S2 0x00020000

void Delay_ms(unsigned int ms)
{
    int i,j;
    for(i=0;i<ms;i++)
        for(j=0;j<6666;j++);
}

void Delay_us(unsigned int us)
{
    int i,j;
    for(i=0;i<us;i++)
        for(j=0;j<(6666/1000);j++);
}

void main()
{
    PINSEL1 &= 0xFFFFFFFF;
    PINSEL1 |= 0x00000000;
    IODIR  |= 0x07000000;    // pin 0.24 0.25 0.26 output
    IOCLR  |= 0x07000000;
    init_serial0();
}
```

```

while(1)
{
    unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];
    unsigned int i,j=0;
    long J1 = 0 , J1Dif = 0 , SP = 0;
    while(1)
    {
        buff = getchar();
        if (buff == '[')
        {
            for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
            for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
        }
        J1 = atoi(str1);
        J1Dif = J1-J1Dif;
        SP = atoi(str7);
        if(J1Dif >= 0)
        {
            if((IOPIN &S1) != 0)
            {
                break;
            }
        }
    }
}

```

```

IOCLR |= 0x01000000;
}
IOSET |= 0x01000000;
for(i=0;i<J1Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}
}
IOCLR |= 0x01000000;
J1Dif = J1;
}
else if(J1Dif < 0)
{
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
IOSET |= 0x04000000;
J1Dif = J1Dif*(-1);

```

```

for(i=0;i<J1Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
}
IOCLR |= 0x04000000;
J1Dif = J1;
}
}
}
}

```

โค้ดควบคุมการทำงานแกน 2

```

#include <lpc2103.H>
#include "uart0.h"
#include "stdio.h"
#include "string.h"
#include "math.h"
#define S1 0x00010000
#define S2 0x00020000

```

```

void Delay_ms(unsigned int ms)
{
    int i,j;
    for(i=0;i<ms;i++)
        for(j=0;j<6666;j++);
}

void Delay_us(unsigned int us)
{
    int i,j;
    for(i=0;i<us;i++)
        for(j=0;j<(6666/1000);j++);
}

void main()
{
    PINSEL1 &= 0xFFFFFFFF;
    PINSEL1 |= 0x00000000;
    IODIR  |= 0x07000000;      // pin 0.24 0.25 0.26 output
    IOCLR  |= 0x07000000;
    init_serial0();
    while(1)
    {
        unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];
        unsigned int i,j=0;
        long J2 = 0 , J2Dif = 0 , SP = 0;
        while(1)
        {
            buff = getchar();

```

```

if (buff == '[')
{
for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
}

J2 = atoi(str2);
J2Dif = J2-J2Dif;
SP = atoi(str7)*2.1;
if(J2Dif >= 0)
{
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}
IOSET |= 0x01000000;
for(i=0;i<J2Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;

```

```

Delay_us(SP);
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}
}
IOCLR |= 0x01000000;
J2Dif = J2;
}
else if(J2Dif < 0)
{
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
IOSET |= 0x04000000;
J2Dif = J2Dif*(-1);
for(i=0;i<J2Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S2) != 0)
{

```

```

break;

IOCLR |= 0x04000000;

}

}

IOCLR |= 0x04000000;

J2Dif = J2;

}

}

}

}

```

โค้ดควบคุมการทำงานแกน 3

```

#include <lpc2103.H>

#include "uart0.h"

#include "stdio.h"

#include "string.h"

#define S1 0x00010000

#define S2 0x00020000

void Delay_ms(unsigned int ms)

{

int i,j;

for(i=0;i<ms;i++)

for(j=0;j<6666;j++);

}

void Delay_us(unsigned int us)

{

int i,j;

```

```

for(i=0;i<us;i++)

for(j=0;j<(6666/1000);j++);

}

void main()

{

PINSEL1 &= 0xFFFFFFFF;

PINSEL1 |= 0x00000000;

IODIR  |= 0x07000000;      // pin 0.24 0.25 0.26 output

IOCLR  |= 0x07000000;

init_serial0();

while(1)

{

unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];

unsigned int i,j=0;

long J3 = 0 , J3Dif = 0 , SP = 0;

while(1)

{

buff = getchar();

if (buff == '[')

{

for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;

```

```

for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
}

J3 = atoi(str3);
J3Dif = J3-J3Dif;
SP = atoi(str7)*5.1;
if(J3Dif >= 0)
{
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}

IOSET |= 0x01000000;
for(i=0;i<J3Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}
}

IOCLR |= 0x01000000;

```

```

J3Dif = J3;
}
else if(J3Dif < 0)
{
{
break;
IOCLR |= 0x04000000;
}
IOSET |= 0x04000000;
J3Dif = J3Dif*(-1);
for(i=0;i<J3Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
}
IOCLR |= 0x04000000;
J3Dif = J3;
}
}
}

```

โค้ดควบคุมการทำงานแกน 4

```
#include <lpc2103.H>

#include "uart0.h"

#include "stdio.h"

#include "string.h"

#define S1 0x00010000

#define S2 0x00020000

void Delay_ms(unsigned int ms)
{
    int i,j;
    for(i=0;i<ms;i++)
        for(j=0;j<6666;j++);
}

void Delay_us(unsigned int us)
{
    int i,j;
    for(i=0;i<us;i++)
        for(j=0;j<(6666/1000);j++);
}

void main()
{
    PINSEL1 &= 0xFFFFFFFF;
    PINSEL1 |= 0x00000000;
    IODIR  |= 0x07000000;    // pin 0.24 0.25 0.26 output
    IOCLR  |= 0x07000000;
    init_serial0();
}
```

```

while(1)
{
    unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];
    unsigned int i,j=0;
    long J4 = 0 , J4Dif = 0 , SP = 0;
    while(1)
    {
        buff = getchar();
        if (buff == '[')
        {
            for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
            for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
        }
        J4 = atoi(str4);
        J4Dif = J4-J4Dif;
        SP = atoi(str7)*5;
        if(J4Dif >= 0)
        {
        }
        IOSET |= 0x01000000;
        for(i=0;i<J4Dif;i++)

```

```

{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
printf("%d",i);
}

IOCLR |= 0x01000000;
J4Dif = J4;
printf("4");
}

else if(J4Dif < 0)
{
IOSET |= 0x04000000;
J4Dif = J4Dif*(-1);
for(i=0;i<J4Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
}

IOCLR |= 0x04000000;
J4Dif = J4;
}
}
}

```

โค้ดควบคุมการทำงานแกน 5

```
#include <lpc2103.H>

#include "uart0.h"

#include "stdio.h"

#include "string.h"

#define S1 0x00010000

#define S2 0x00020000

void Delay_ms(unsigned int ms)
{
    int i,j;
    for(i=0;i<ms;i++)
        for(j=0;j<6666;j++);
}

void Delay_us(unsigned int us)
{
    int i,j;
    for(i=0;i<us;i++)
        for(j=0;j<(6666/1000);j++);
}

void main()
{
    PINSEL1 &= 0xFFFFFFFF;
    PINSEL1 |= 0x00000000;
    IODIR  |= 0x07000000;    // pin 0.24 0.25 0.26 output
    IOCLR  |= 0x07000000;
    init_serial0();
}
```

```

while(1)
{
    unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];
    unsigned int i,j=0;
    long J5 = 0 , J5Dif = 0 , SP = 0;
    while(1)
    {
        buff = getchar();
        if (buff == '[')
        {
            for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;
            for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
            for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
        }
        J5 = atoi(str5);
        J5Dif = J5-J5Dif;
        SP = atoi(str7)*4.2;
        if(J5Dif >= 0)
        {
            if((IOPIN &S1) != 0)
            {
                break;
            }
        }
    }
}

```

```

IOCLR |= 0x01000000;
}
IOSET |= 0x01000000;
for(i=0;i<J5Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S1) != 0)
{
break;
IOCLR |= 0x01000000;
}
}
IOCLR |= 0x01000000;
J5Dif = J5;
}
else if(J5Dif < 0)
{
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
IOSET |= 0x04000000;
J5Dif = J5Dif*(-1);

```

```

for(i=0;i<J5Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
if((IOPIN &S2) != 0)
{
break;
IOCLR |= 0x04000000;
}
}
IOCLR |= 0x04000000;
J5Dif = J5;
}
}
}
}

```

โค้ดควบคุมการทำงานแกน 6

```

#include <lpc2103.H>
#include "uart0.h"
#include "stdio.h"
#include "string.h"
#define S1 0x00010000
#define S2 0x00020000
void Delay_ms(unsigned int ms)

```

```

{
int i,j;
for(i=0;i<ms;i++)
for(j=0;j<6666;j++);
}

void Delay_us(unsigned int us)
{
int i,j;
for(i=0;i<us;i++)
for(j=0;j<(6666/1000);j++);
}

void main()
{
PINSEL1 &= 0xFFFFFFFF;
PINSEL1 |= 0x00000000;
IODIR  |= 0x07000000;      // pin 0.24 0.25 0.26 output
IOCLR  |= 0x07000000;
init_serial0();
while(1)
{
unsigned char buff , str1[10] , str2[10] ,str3[10] , str4[10] , str5[10] , str6[10] , str7[10];
unsigned int i,j=0;
int J6 = 0 , J6Dif = 0 , SP = 0;
while(1)
{
buff = getchar();
if (buff == '[')

```

```

{
for (i=0;i<100;i++) str1[i]=0 , str2[i]=0 , str3[i]=0 , str4[i]=0 , str5[i]=0 , str6[i]=0 ,str7[i]=0;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str1[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str2[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str3[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str4[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str5[i] = buff;
for (buff = getchar() , i=0 ; buff !=',' ;buff = getchar() ,i++) str6[i] = buff;
for (buff = getchar() , i=0 ; buff !=']' ;buff = getchar() ,i++) str7[i] = buff;
}

J6 = atoi(str6);

J6Dif = J6-J6Dif;

SP = atoi(str7)*48;

if(J6Dif >= 0)

{

IOSET |= 0x01000000;

for(i=0;i<J6Dif;i++)

{

IOSET |= 0x02000000;

Delay_us(SP);

IOCLR |= 0x02000000;

Delay_us(SP);

}

IOCLR |= 0x01000000;

J6Dif = J6;

printf("%d",J6Dif);

}

```

```
else if(J6Dif < 0)
{
IOSET |= 0x04000000;
J6Dif = J6Dif*(-1);
for(i=0;i<J6Dif;i++)
{
IOSET |= 0x02000000;
Delay_us(SP);
IOCLR |= 0x02000000;
Delay_us(SP);
}
IOCLR |= 0x04000000;
J6Dif = J6;
printf("%d",J6Dif);
}
}
}
}
```