

ภาคผนวก

ภาคผนวก ก

โปรแกรมการสั่งงานระบบควบคุมและ โปรแกรมรูปแบบแสงบนเวทีแบบไร้สาย

โปรแกรมการสั่งงานระบบควบคุมและโปรแกรมรูปแบบแสงบนเวทีแบบไร้สาย (ภาคส่ง) Main

```

#include <18f458.h>
#define HS,NOLVP,NOWDT,NOPROTECT
#define delay(clock=20M)
#define rs232(baud=9600,xmit=PIN_C6,rcv=PIN_C7)

#define fast_io(A)
#define fast_io(B)
#define fast_io(C)
#define fast_io(D)
#define fast_io(E)

#define SW_LEFT PIN_A0
#define SW_RIGHT PIN_A1
#define SW_UP PIN_A2
#define SW_DOWN PIN_A3
#define SW_STOP PIN_A4

#define Auto_1 PIN_B0
#define Auto_2 PIN_B1
#define Auto_3 PIN_B2
#define Auto_4 PIN_B3
#define Auto_5 PIN_B4

#define Moter_1 PIN_B5
#define Moter_2 PIN_B6
#define Mode_Manual PIN_B7

#define Bule PIN_E0
#define Green PIN_E1
#define Rad PIN_E2

void Motor_1();
void Motor_2();
void Manual_ALL();
void Manual_Motor_1();
void Manual_Motor_2();

void main(){
    setup_adc(adc_off);
    set_tris_A(0xFF);
    set_tris_B(0xFF);
    set_tris_C(0B10000000);
    set_tris_D(0x00);
    set_tris_E(0xFF);

    output_D(0x00);

    while(1){

        if(input(SW_STOP)==0){ // 0-Motor-Stop
            delay_ms(100);
            Printf("\fZ");
        }

        //----- Mode_Auto -----
        if(input(Auto_1)==0){ // 1-Motor-ALL
            output_D(0B00000001);
            delay_ms(100);
            Printf("\f1");
        }
        if(input(Auto_2)==0){ // 2-Motor-ALL
            delay_ms(100);
            output_D(0B00000010);
            Printf("\f2");
        }
        if(input(Auto_3)==0){ // 3-Motor-ALL

```

```

    delay_ms(100);
    output_D(0B00000100);
    Printf("\f3");
}if(input(Auto_4)==0){ // 4-Motor-ALL
    delay_ms(100);
    output_D(0B00001000);
    Printf("\f4");
}if(input(Auto_5)==0){ // 5-Motor-ALL
    delay_ms(100);
    output_D(0B00010000);
    Printf("\f5");
}
//----- Mode_Select Motor -----
if(input(Moter_1)==0){ // Motor_1
    delay_ms(100);
    Motor_1();
}if(input(Moter_2)==0){ // Motor_2
    delay_ms(100);
    Motor_2();
}
//----- Mode_Manual -----
if(input(Mode_Manual)==0){ //
Mode_Manual
    delay_ms(100);
    Manual_ALL();
}
}
//-----Start Mode Auto Select -----//

//----- Functions Select Motor-1 -----
void Motor_1(){
    while(input(Moter_1)==0){

```

```

        if(input(SW_STOP)==0){ // 0-Motor-Stop
            delay_ms(100);
            Printf("\fZ");
        }
        if(input(Mode_Manual)==0){ //
Mode_Manual
            delay_ms(100);
            Manual_ALL();
        }

        if(input(Auto_1)==0){ // A1-Motor-1
            delay_ms(100);
            output_D(0B00000001);
            Printf("\fA");
        }if(input(Auto_2)==0){ // B2-Motor-1
            delay_ms(100);
            output_D(0B00000010);
            Printf("\fB");
        }if(input(Auto_3)==0){ // C3-Motor-1
            delay_ms(100);
            output_D(0B00000100);
            Printf("\fC");
        }if(input(Auto_4)==0){ // D4-Motor-1
            delay_ms(100);
            output_D(0B00001000);
            Printf("\fD");
        }if(input(Auto_5)==0){ // E5-Motor-1
            delay_ms(100);
            output_D(0B00010000);
            Printf("\fE");
        }
    }
}
//----- END Functions Select Motor-1 -----

```

```

//----- Functions Select Motor-2 -----
void Motor_2(){
    while(input(Moter_2)==0){
        if(input(SW_STOP)==0){    // 0-Motor-Stop
            delay_ms(100);
            Printf("\fZ");
        }
        if(input(Mode_Manual)==0){    //
Mode_Manual
            delay_ms(100);
            Manual_ALL();
        }

        if(input(Auto_1)==0){    // F1-Motor-2
            delay_ms(100);
            output_D(0B00000001);
            Printf("\fF");
        }
        if(input(Auto_2)==0){    // G2-Motor-2
            delay_ms(100);
            output_D(0B00000010);
            Printf("\fG");
        }
        if(input(Auto_3)==0){    // H3-Motor-2
            delay_ms(100);
            output_D(0B00000100);
            Printf("\fH");
        }
        if(input(Auto_4)==0){    // I4-Motor-2
            delay_ms(100);
            output_D(0B00001000);
            Printf("\fI");
        }
        if(input(Auto_5)==0){    // J5-Motor-2
            delay_ms(100);
            output_D(0B00010000);
            Printf("\fJ");
        }
    }
}

}

//----- END Functions Select Motor-2 -----
-----

//----- END Mode Auto Select -----//
//-----//

//----- Start Mode Manual -----//

//----- Functions Mode_Manual ALL -----
void Manual_ALL(){
    while(input(Mode_Manual)==0){
        if(input(Bule)==0){    // Led Bule
            delay_ms(100);
            Printf("\fT");
        }
        if(input(Green)==0){    // Led Green
            delay_ms(100);
            Printf("\fU");
        }
        if(input(Rad)==0){    // Led Rad
            delay_ms(100);
            Printf("\fV");
        }

        else if(input(Moter_1)==0){    // Manual
Motor_1
            Manual_Motor_1();
        }
    }
}

```

```

    }else if(input(Moter_2)==0){    // Manual
Motor_2
    Manual_Motor_2();
    }

    else if(input(SW_LEFT)==0){    // 6-LEFT
        Printf("\f6");
        delay_ms(100);
    }else if(input(SW_RIGHT)==0){    // 7-
RIGHT
        Printf("\f7");
        delay_ms(100);
    }else if(input(SW_UP)==0){    // 8-UP
        Printf("\f8");
        delay_ms(100);
    }else if(input(SW_DOWN)==0){    // 9-
DOWN
        Printf("\f9");
        delay_ms(100);
    }else{
        Printf("\f0");    // 0-Central
    }
}

//----- END Functions Mode_Manual -----
-----

//----- Functions Mode_Manual Motor_1 --
-----

void Manual_Motor_1(){
    while(input(Moter_1)==0){
        if(input(Mode_Manual)==1){    //
Mode_Manual
            delay_ms(100);
            return;
        }
        if(input(Bule)==0){    // Led Bule
            delay_ms(100);
            Printf("\fT");
        }
        if(input(Green)==0){    // Led Green
            delay_ms(100);
            Printf("\fU");
        }
        if(input(Rad)==0){    // Led Rad
            delay_ms(100);
            Printf("\fV");
        }
        else if(input(SW_LEFT)==0){    // K-
LEFT-1
            Printf("\fK");
            delay_ms(100);
        }else if(input(SW_RIGHT)==0){    // L-
RIGHT-1
            Printf("\fL");
            delay_ms(100);
        }else if(input(SW_UP)==0){    // M-UP-1
            Printf("\fM");
            delay_ms(100);
        }else if(input(SW_DOWN)==0){    // N-
DOWN-1
            Printf("\fN");
            delay_ms(100);
        }else{
            Printf("\f0");    // 0-Central-1
        }
    }
}

```

```

}
//----- END Functions Mode_Manual Motor_1 ---
-----
//----- Functions Mode_Manual Motor_2 -----
-
void Manual_Motor_2(){
    while(input(Moter_2)==0){
        if(input(Mode_Manual)==1){          //
Mode_Manual
            delay_ms(100);
            return;
        }
        if(input(Bule)==0){          // Led Bule
            delay_ms(100);
            Printf("\fT");
        }
        if(input(Green)==0){          // Led Green
            delay_ms(100);
            Printf("\fU");
        }
        if(input(Rad)==0){          // Led Rad
            delay_ms(100);
            Printf("\fV");
        }

        else if(input(SW_LEFT)==0){          // P-LEFT-
2
            Printf("\fP");
            delay_ms(100);
        }else if(input(SW_RIGHT)==0){          // Q-
RIGHT-2
            Printf("\fQ");
            delay_ms(100);
        }else if(input(SW_UP)==0){          // R-UP-2
            Printf("\fR");
            delay_ms(100);
        }else if(input(SW_DOWN)==0){          // S-
DOWN-2
            Printf("\fS");
            delay_ms(100);
        }else{
            Printf("\f0");          // 0-Central-2
        }
    }
}
//----- END Functions Mode_Manual Motor_2 ---
-----
//----- END Mode Manual -----
//
//-----
//

```



```

set_tris_C(0B10000000);
set_tris_B(0x00);
set_tris_D(0x00);
enable_interrupts(GLOBAL); // Interrupts
enable_interrupts(INT_RDA);

output_C(0B10000000);
output_D(0x00);

while(1){
    //----- Mode_Auto -----
    if(ch=='1'){
        Format_1();
    }if(ch=='2'){
        Format_2();
    }if(ch=='3'){
        Format_3();
    }if(ch=='4'){
        Format_4();
    }if(ch=='5'){
        Format_5();
    }
    //----- Mode_Select Motor -----
    if(ch=='A'){
        Format_1();
    }if(ch=='B'){
        Format_2();
    }if(ch=='C'){
        Format_3();
    }if(ch=='D'){
        Format_4();
    }if(ch=='E'){
        Format_5();
    }

    //----- Mode_Manual ALL-----
    if(ch=='6'){
        Motor_ALL_LEFT();
    }if(ch=='7'){
        Motor_ALL_RIGHT();
    }if(ch=='8'){
        Motor_ALL_UP();
    }if(ch=='9'){
        Motor_ALL_DOWN();
    }
    //-----
    if(ch=='K'){ // Mode_Manual Motor 1
        Motor_LEFT();
    }if(ch=='L'){
        Motor_RIGHT();
    }if(ch=='M'){
        Motor_UP();
    }if(ch=='N'){
        Motor_DOWN();
    }
    //-----
    if(ch=='T'){ // Led Bule
        Bule();
    }if(ch=='U'){ // Led Green
        Green();
    }if(ch=='V'){ // Led Red
        Rad();
    }
    //-----
    if(ch=='0'){ // Motor Stop Mode_Manual
        Motor_Stop();
    }
}

```

```

    }
}

//-----
//----- Start Functions Degree -----
--

//----- Functions 1/180* -----
--

void Motor_top_next_1(){
    for(j=0;j<145;j++){    // Motor top >>
+135*
        delay_ms(6);
        output_B(data_2[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_top_back_1(){
    for(j=0;j<145;j++){    // Motor top << -
135*
        delay_ms(6);
        output_B(data_2[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

void Motor_below_next_1(){

```

```

    for(j=0;j<185;j++){    // Motor below >>
+185*
        delay_ms(6);
        output_B(data_1[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_below_back_1(){
    for(j=0;j<185;j++){    // Motor below << -
185*
        delay_ms(6);
        output_B(data_1[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions 1/180* -----
----

//----- Functions 2/90* -----
-

void Motor_top_next_2(){
    for(j=0;j<97;j++){    // Motor top >>
+90*
        delay_ms(6);
        output_B(data_2[i]);
        i++;
        if(i==8){

```

```

        i=0;
    }
}

void Motor_top_back_2(){
    for(j=0;j<97;j++){    // Motor top << -
90*
        delay_ms(6);
        output_B(data_2[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

void Motor_below_next_2(){
    for(j=0;j<124;j++){    // Motor below >>
+124*
        delay_ms(6);
        output_B(data_1[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_below_back_2(){
    for(j=0;j<124;j++){    // Motor below << -
124*
        delay_ms(6);
        output_B(data_1[i]);
        i--;
        if(i==255){

```

```

        i=7;
    }
}

//----- END Functions 2/90* -----
-----

//----- END Functions Degree -----
-----

//-----
-----

//-----
-----

//----- Start Functions Format -----
---

//----- Functions Format_1 /360*/360*----
-----

void Format_1(){
    output_C(0B10000001);
    output_D(0B00000001);
        Motor_below_next_1();
        Motor_below_next_1();
        delay_ms(120);
    output_D(0B00000010);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
    output_D(0B00000100);
        Motor_below_back_1();
        Motor_below_back_1();
        delay_ms(120);
    output_D(0B00000001);
        Motor_top_back_1();

```

```

    Motor_top_back_1();
    delay_ms(120);
}
//----- Functions Format_2 /180*/180*-----
-----
void Format_2(){
    output_C(0B10000010);
    output_D(0B00000001);
    Motor_below_next_1();
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_back_1();
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    //-----
    output_D(0B00000010);
    delay_ms(120);
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    //-----
    output_D(0B00000100);
    delay_ms(120);
    Motor_below_back_1();

```

```

    delay_ms(120);
    Motor_top_back_1();
    delay_ms(120);
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    delay_ms(120);
}
//----- Functions Format_3 /90*/90*-----
-----
void Format_3(){
    output_C(0B10000100);
    output_D(0B00000001);
    Motor_below_next_1();
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_back_1();
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    //-----
    output_D(0B00000010);
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_2();
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);

```

```

    Motor_top_next_2();
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_2();
    //-----
output_D(0B00000100);
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_back_2();
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_back_2();
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_back_2();
    delay_ms(120);
}
//----- Functions Format_4 /360*/180*-----
-----

void Format_4(){
    output_C(0B10001000);
    output_D(0B00000100);
        Motor_below_next_1();
        Motor_below_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_below_back_1();

        Motor_below_back_1();
        delay_ms(120);
        Motor_top_back_1();
        delay_ms(120);
        Motor_top_back_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        delay_ms(120);
        output_D(0B00000001);
        delay_ms(120);
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        delay_ms(120);
}

```

```

    Motor_below_back_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
}

//----- Functions Format_5 /360*/90* -----
-----

void Format_5(){
    output_C(0B10010000);
    output_D(0B00000001);
        Motor_below_next_1();
        Motor_below_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_below_back_1();
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        //-----
    output_D(0B00000010);
        delay_ms(120);
        Motor_below_next_2();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        delay_ms(120);
        output_D(0B00000100);
        Motor_below back 2();
}

```

```

    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
    output_D(0B00000010);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
}
//----- END Functions Format -----
//-----

//-----
//----- Functions Mode_Manual ALL -----
--
void Motor_ALL_LEFT(){
    if(ch=='6'){
        output_B(data_1[i]);
        delay_ms(25);
        i++;
        if(i==8){
            i=0;
        }
    }
}
}

```

```

void Motor_ALL_RIGHT(){
    if(ch=='7'){
        output_B(data_1[i]);
        delay_ms(25);
        i--;
        if(i==255){
            i=7;
        }
    }
}

void Motor_ALL_UP(){
    if(ch=='8'){
        output_B(data_2[i]);
        delay_ms(25);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_ALL_DOWN(){
    if(ch=='9'){
        output_B(data_2[i]);
        delay_ms(25);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions Mode_Manual ALL-----
-----

```

```
//----- Functions Mode_Manual Moter-1 -----
```

```
---
```

```
void Motor_LEFT(){
```

```
    if(ch=='K'){
```

```
        output_B(data_1[i]);
```

```
        delay_ms(25);
```

```
        i++;
```

```
        if(i==8){
```

```
            i=0;
```

```
        }
```

```
    }
```

```
}
```

```
void Motor_RIGHT(){
```

```
    if(ch=='L'){
```

```
        output_B(data_1[i]);
```

```
        delay_ms(25);
```

```
        i--;
```

```
        if(i==255){
```

```
            i=7;
```

```
        }
```

```
    }
```

```
}
```

```
void Motor_UP(){
```

```
    if(ch=='M'){
```

```
        output_B(data_2[i]);
```

```
        delay_ms(25);
```

```
        i++;
```

```
        if(i==8){
```

```
            i=0;
```

```
        }
```

```
    }
```

```
}
```

```
void Motor_DOWN(){
```

```
    if(ch=='N'){
```

```
        output_B(data_2[i]);
```

```
        delay_ms(25);
```

```
        i--;
```

```
        if(i==255){
```

```
            i=7;
```

```
        }
```

```
    }
```

```
}
```

```
//----- END Functions Mode_Manual Moter-1 -
```

```
-----
```

```
//----- Interrupts Stop Moter -----
```

```
--
```

```
void Stop(){ // Interrupts Stop Moter
```

```
    enable_interrupts(GLOBAL);
```

```
    enable_interrupts(INT_RDA);
```

```
    while(ch=='Z'){
```

```
        output_D(0x00);
```

```
        output_B(0x11);
```

```
    }
```

```
}
```

```
//----- Mode_Manual -----
```

```
void Motor_Stop(){ // Stop Moter Mode_Manual
```

```
    output_C(0B10111111);
```

```
    output_B(0x11);
```

```
}
```

```
void Bule(){ // Led Bule
```

```
    output_D(0B00000001);
```

```
}
```

```
void Green(){ // Led Green
```

```
    output_D(0B00000010);
```



```
}                                output_D(0B00000100);  
void Rad(){                      // Led Red
```

โปรแกรมการสั่งงานระบบควบคุมและโปรแกรมรูปแบบแสงบนเวทีแบบไร้สาย (ตัวรับ) Slave ตัวที่ 2

```

#include <18f458.h>
#define HS,NOLVP,NOWDT,NOPROTECT
#define delay(clock=20M)
#define use
rs232(baud=9600,xmit=PIN_C6,rcv=PIN_C7)
#define use fast_io(C)
#define use fast_io(B)
#define use fast_io(D)

char ch;
int i=0,j=0;

char data_1[8]={0x11,0x13,0x12,0x16,
               0x14,0x1c,0x18,0x19};
char data_2[8]={0x10,0x30,0x20,0x60,
               0x40,0xc0,0x80,0x90};

void Motor_top_next_1();
void Motor_top_back_1();
void Motor_below_next_1();
void Motor_below_back_1();

void Motor_top_next_2();
void Motor_top_back_2();
void Motor_below_next_2();
void Motor_below_back_2();

void Format_1();
void Format_2();
void Format_3();
void Format_4();

void Format_5();

void Motor_ALL_LEFT();
void Motor_ALL_RIGHT();
void Motor_ALL_UP();
void Motor_ALL_DOWN();

void Motor_LEFT();
void Motor_RIGHT();
void Motor_UP();
void Motor_DOWN();

void Stop();
void Motor_Stop();

void Bule();
void Green();
void Rad();

#define INT_RDA

void IntrDA_isr(){
    ch=getc();

    if(ch=='Z'){ // Interrupts Stop Moter
        Stop();
    }
}

void main(){

```

```

set_tris_C(0B10000000);
set_tris_B(0x00);
set_tris_D(0x00);
enable_interrupts(GLOBAL);
enable_interrupts(INT_RDA);

```

```

output_C(0B10000000);
output_D(0x00);

```

```

while(1){
    //----- Mode_Auto -----
    if(ch=='1'){
        Format_1();
    }if(ch=='2'){
        Format_2();
    }if(ch=='3'){
        Format_3();
    }if(ch=='4'){
        Format_4();
    }if(ch=='5'){
        Format_5();
    }
    //----- Mode_Select Motor -----
    if(ch=='F'){
        Format_1();
    }if(ch=='G'){
        Format_2();
    }if(ch=='H'){
        Format_3();
    }if(ch=='I'){
        Format_4();
    }if(ch=='J'){
        Format_5();
    }
}

```

```

//----- Mode_Manual -----

```

```

if(ch=='6'){
    Motor_ALL_LEFT();
}if(ch=='7'){
    Motor_ALL_RIGHT();
}if(ch=='8'){
    Motor_ALL_UP();
}if(ch=='9'){
    Motor_ALL_DOWN();
}

```

```

//-----

```

```

if(ch=='P'){ // Mode_Manual Motor 2
    Motor_LEFT();
}if(ch=='Q'){
    Motor_RIGHT();
}if(ch=='R'){
    Motor_UP();
}if(ch=='S'){
    Motor_DOWN();
}

```

```

//-----

```

```

if(ch=='T'){ // Led Bule
    Bule();
}if(ch=='U'){ // Led Green
    Green();
}if(ch=='V'){ // Led Red
    Rad();
}

```

```

//-----

```

```

if(ch=='0'){ // Motor Stop
    Motor_Stop();
}
}

```

```

//-----
--
//----- Start Functions Degree -----

//----- Functions 1/180* -----
void Motor_top_next_1(){
    for(j=0;j<145;j++){ // Motor top >>
+135*
        delay_ms(6);
        output_B(data_2[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_top_back_1(){
    for(j=0;j<145;j++){ // Motor top << -
135*
        delay_ms(6);
        output_B(data_2[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

void Motor_below_next_1(){
    for(j=0;j<185;j++){ // Motor below >>
+185*
        delay_ms(6);
        output_B(data_1[i]);
        i++;

        if(i==8){
            i=0;
        }
    }
}

void Motor_below_back_1(){
    for(j=0;j<185;j++){ // Motor below << -
185*
        delay_ms(6);
        output_B(data_1[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions 1/180* -----
-----

//----- Functions 2/90* -----
void Motor_top_next_2(){
    for(j=0;j<97;j++){ // Motor top >>
+90*
        delay_ms(6);
        output_B(data_2[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_top_back_2(){
    for(j=0;j<97;j++){ // Motor top << -
90*

```

```

    delay_ms(6);
    output_B(data_2[i]);
    i--;
    if(i==255){
        i=7;
    }
}

void Motor_below_next_2(){
    for(j=0;j<124;j++){ // Motor below >>
+124*
        delay_ms(6);
        output_B(data_1[i]);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_below_back_2(){
    for(j=0;j<124;j++){ // Motor below << -
124*
        delay_ms(6);
        output_B(data_1[i]);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions 2/90* -----
-----

```

```

//----- END Functions Degree -----
-----
//-----
-----
//----- Start Functions Format -----
-----

//----- Functions Format_1 /360*/360*-----
-----

void Format_1(){
    output_C(0B10000001);
    output_D(0B00000001);
    Motor_below_next_1();
    Motor_below_next_1();
    delay_ms(120);
    output_D(0B00000010);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    output_D(0B00000100);
    Motor_below_back_1();
    Motor_below_back_1();
    delay_ms(120);
    output_D(0B00000001);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
}

//----- Functions Format_2 /180*/180*-----
-----

void Format_2(){
    output_C(0B10000010);

```

```

output_D(0B00000001);
    Motor_below_next_1();
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_back_1();
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    //-----
output_D(0B00000010);
    delay_ms(120);
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    //-----
output_D(0B00000100);
    delay_ms(120);
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    delay_ms(120);
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    delay_ms(120);
}

```

```

//----- Functions Format_3 /90*/90*-----
void Format_3(){
    output_C(0B10000100);
    output_D(0B00000001);
        Motor_below_next_1();
        Motor_below_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_below_back_1();
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        //-----
output_D(0B00000010);
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_2();
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_2();
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_2();
    //-----
output_D(0B00000100);
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
}

```

```

    Motor_top_back_2();
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_back_2();
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_back_2();
    delay_ms(120);
}
//----- Functions Format_4 /360*/180*-----
---
void Format_4(){
    output_C(0B10001000);
    output_D(0B00000100);
        Motor_below_next_1();
        Motor_below_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_below_back_1();
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        //-----
    output_D(0B00000010);
        delay_ms(120);
        Motor_below_next_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();

```

```

    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    //-----
    output_D(0B00000001);
        delay_ms(120);
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        delay_ms(120);
        Motor_below_back_1();
        delay_ms(120);
        Motor_top_next_1();
        Motor_top_next_1();
        delay_ms(120);
        Motor_top_back_1();
        Motor_top_back_1();
        delay_ms(120);
    }
//----- Functions Format_5 /360*/90* -----
-----
void Format_5(){

```

```

output_C(0B10010000);
output_D(0B00000001);
    Motor_below_next_1();
    Motor_below_next_1();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_below_back_1();
    Motor_below_back_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    //-----
output_D(0B00000010);
    delay_ms(120);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
output_D(0B00000100);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
output_D(0B00000001);
    Motor_below_next_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
    //-----
output_D(0B00000010);
    delay_ms(120);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
output_D(0B00000100);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();
    Motor_top_back_1();
    delay_ms(120);
output_D(0B00000010);
    Motor_below_back_2();
    delay_ms(120);
    Motor_top_next_1();
    Motor_top_next_1();
    delay_ms(120);
    Motor_top_back_1();

```



```

    Motor_top_back_1();
    delay_ms(120);
}
//----- END Functions Format -----
//-----

//-----
//----- Functions Mode_Manual ALL-----
-----

void Motor_ALL_LEFT(){
    if(ch=='6'){
        output_B(data_1[i]);
        delay_ms(25);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_ALL_RIGHT(){
    if(ch=='7'){
        output_B(data_1[i]);
        delay_ms(25);
        i--;
        if(i==255){
            i=7;
        }
    }
}

void Motor_ALL_UP(){
    if(ch=='8'){
        output_B(data_2[i]);
        delay_ms(25);
        i++;

```

```

        if(i==8){
            i=0;
        }
    }
}

void Motor_ALL_DOWN(){
    if(ch=='9'){
        output_B(data_2[i]);
        delay_ms(25);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions Mode_Manual ALL ----
-----

//----- Functions Mode_Manual Moter-2 -----
-----

void Motor_LEFT(){
    if(ch=='P'){
        output_B(data_1[i]);
        delay_ms(25);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_RIGHT(){
    if(ch=='Q'){
        output_B(data_1[i]);
        delay_ms(25);

```

```

    i--;
    if(i==255){
        i=7;
    }
}

void Motor_UP(){
    if(ch=='R'){
        output_B(data_2[i]);
        delay_ms(25);
        i++;
        if(i==8){
            i=0;
        }
    }
}

void Motor_DOWN(){
    if(ch=='S'){
        output_B(data_2[i]);
        delay_ms(25);
        i--;
        if(i==255){
            i=7;
        }
    }
}

//----- END Functions Mode_Manual Moter-2
-----

//----- Interrupts Stop Moter -----
-----

void Stop(){ // Interrupts Stop Moter
    enable_interrupts(GLOBAL);
    enable_interrupts(INT_RDA);
    while(ch=='Z'){
        output_D(0x00);
        output_B(0x11);
    }
}

//----- Mode_Manual -----
void Motor_Stop(){ // Stop Moter
    output_C(0B10111111);
    output_B(0x11);
}

void Bule(){ // Led Bule
    output_D(0B00000001);
}

void Green(){ // Led Green
    output_D(0B00000010);
}

void Rad(){ // Led Red
    output_D(0B00000100);
}

```