```
#include "lcd_dog_c_driver.h"


void delay_30uS()
{
    __delay_cycles(240);
}

void delay_40mS()
{
    __delay_cycles(320000);
}

void init_spi_lcd()
{
    // Enable SPI, Master, fck/64,
    SPCR = _BV(SPE) | _BV(MSTR) | _BV(CPOL) | _BV(CPHA) | _BV(SPR1) |
_BV(SPR0);

    char temp = SPSR;
    temp = SPDR;
}

int lcd_spi_transmit_CMD(char cmd)
{
    // clear rs for command
    LCD_PORT &= ~_BV(RS);
    // select slave
    LCD_PORT &= ~_BV(SS_bar);
    // send command
    SPDR = cmd;
    // wait for transmission complete
    while ( !(SPSR & _BV(SPIF)) ) {
    }
    // clear SPIF bit in SPSR
    char temp = SPDR;
    // unselect slave
    LCD_PORT |= _BV(SS_bar);

    return 0;
}

int lcd_spi_transmit_DATA(char data)
{
    // set rs for data
    LCD_PORT |= _BV(RS);
    // select slave
    LCD_PORT &= ~_BV(SS_bar);
    // clear SPIF bit in SPSR
    char temp = SPSR;
    temp = SPDR;
    // send data
    SPDR = data;
```

```
    // wait for transmission
    while ( !(SPSR & _BV(SPIF)) ) {
    }
    // clear SPIF bit in SPSR
    temp = SPDR;
    // unselect slave
    LCD_PORT |= _BV(SS_bar);

    return 0;
}

void init_lcd_dog(void)
{
    init_spi_lcd();
    // start up delay
    delay_40mS();
    // function set 1
    lcd_spi_transmit_CMD(0x39);
    delay_30uS();
    // function set 2
    lcd_spi_transmit_CMD(0x39);
    delay_30uS();
    // bias set
    lcd_spi_transmit_CMD(0x1E);
    delay_30uS();
    // power ctrl
    lcd_spi_transmit_CMD(0x50);
    delay_30uS();
    // follower ctrl
    lcd_spi_transmit_CMD(0x6C);
    delay_40mS();
    // contrast set
    lcd_spi_transmit_CMD(0x77);
    delay_30uS();
    // display on
    lcd_spi_transmit_CMD(0x0c);
    delay_30uS();
    // clear display
    lcd_spi_transmit_CMD(0x01);
    delay_30uS();
    //entry mode
    lcd_spi_transmit_CMD(0x06);
    delay_30uS();
}

void update_lcd_dog(void)
{
    init_spi_lcd();

    // init DDRAM addr-ctr
    lcd_spi_transmit_CMD(0x80) ;
    delay_30uS();
    // send data
    for (char i = 0; i < 16; i++) {
        lcd_spi_transmit_DATA(dsp_buff_1[i]);
        delay_30uS();
```

```
    }

    // init DDRAM addr-ctr
    lcd_spi_transmit_CMD(0x90) ;
    delay_30uS();
    // send data
    for (char i = 0; i < 16; i++) {
        lcd_spi_transmit_DATA(dsp_buff_2[i]);
        delay_30uS();
    }

    // init DDRAM addr-ctr
    lcd_spi_transmit_CMD(0xA0) ;
    delay_30uS();
    // send data
    for (char i = 0; i < 16; i++) {
        lcd_spi_transmit_DATA(dsp_buff_3[i]);
        delay_30uS();
    }
}
```