

## DAFTAR PUSTAKA

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## LAMPIRAN A



## LAMPIRAN B

### Program mikrokontrol atmega 8

```
include <avr/eeprom.h>
#include <stdlib.h>
#include ".././././CCompiler/mylib/keypad.h"
#include ".././././CCompiler/mylib/hd44780.h"
#include ".././././CCompiler/mylib/adc.h"
#include ".././././CCompiler/mylib/timer.h"
#define BUZZR PC_0
#define L_LCD PD_4
#define RLY_M PD_5
#define SENSR 2
#define cnt_flg 0
#define mtr_flg 1

/** used variables */
uint8_t flag = 0;
int tmr0, tmr1, _break = 3;
char buff[10];

/** Global Prototypes */
void IO_Init(void);
void ISR_Timer0(void);
void ISR_Timer1(void);
void LCD_BackLightOn(void);
void BUZZER_On(void);
void DISPLAY_WelcomeScreen(void);
void DISPLAY_CounterLimit(unsigned long);
void DISPLAY_SettingCounterLimit(void);
void Setting_CounterLimit(void);
```

```
/*  
*/
```

## Main Program

```
/*  
*/
```

```
int main(void) {  
    unsigned long _limits = eeprom_read_dword((uint32_t*)0x00);  
    unsigned long _count = 0;  
  
    KEYPAD_SetUp(PD_0, PD_1, PD_2, PD_3, PC_5, PC_4, PC_3,  
P_NC);  
    LCD_SetUp(PB_0, P_NC, PB_1, P_NC, P_NC, P_NC, P_NC, PB_2,  
PB_3, PB_4, PB_5);  
    LCD_Init(2, 16, LCD_FONT_5X8);  
    IO_Init();  
    ADC_Init();  
    TIMER_SetTime(0, 10000);  
    TIMER_SetTime(1, 1000000);  
    TIMER_AttachInterrupt(0, ISR_Timer0);  
    TIMER_AttachInterrupt(1, ISR_Timer1);  
  
    sei();  
  
    flag = 0;  
  
    DISPLAY_WelcomeScreen();  
    DISPLAY_CounterLimit(_limits);  
  
    while(1) {  
        char c = KEYPAD_GetKey();  
        if(c != ' ') {  
            if(c == '*') {  
                if(util_IsBitCleared(flag, mtr_flg)) {  
                    Setting_CounterLimit();  
                    _limits = eeprom_read_dword((uint32_t*)0x00);  
                    _count = 0;  
                    flag = 0;  
                    DISPLAY_CounterLimit(_limits);  
                }  
            }  
        }  
    }  
}
```

```

    }
}
else if(c == '#') {
    if(_count >= _limits) {
        LCD_SetCursor(1, 7);
        LCD_DisplayString("    ");
        _count = 0;
    }
    else {
        if(util_IsBitCleared(flag, cnt_flg)) {
            util_BitSet(flag, cnt_flg);
            BUZZER_On();
        }
        util_BitToggle(flag, mtr_flg);
        if(util_IsBitSet(flag, mtr_flg)) GPIO_PinWrite(RLY_M, 1);
        else GPIO_PinWrite(RLY_M, 0);
    }
}
LCD_BackLightOn();
KEYPAD_WaitRelease();
}

if(ADC_GetValue(SENSR) > 300) {
    if(++_count >= _limits) {
        flag = 0;
        BUZZER_On();
    }
    if(_count >= _limits-_break) GPIO_PinWrite(RLY_M, 0);

    while(ADC_GetValue(SENSR) > 300);
}

ultoa(_count, buff, 10);
LCD_SetCursor(1, 7);
LCD_DisplayString(buff);
};

return 0;
}

```

```
/******  
*****
```

## Functions and Routines

```
*****  
*****/
```

```
void IO_Init(void) {  
    GPIO_PinDirection(BUZZR, OUTPUT);  
    GPIO_PinDirection(L_LCD, OUTPUT);  
    GPIO_PinDirection(RLY_M, OUTPUT);  
    GPIO_PinDirection(SENSR, INPUT);  
  
    GPIO_PinWrite(BUZZR, LOW);  
    GPIO_PinWrite(L_LCD, LOW);  
    GPIO_PinWrite(RLY_M, LOW);  
}
```

```
void ISR_Timer0(void) {  
    if(++tmr0 > 200) {  
        TIMER_Stop(0);  
        GPIO_PinWrite(BUZZR, LOW);  
    }  
}
```

```
void ISR_Timer1(void) {  
    if(++tmr1 > 60) {  
        TIMER_Stop(1);  
        GPIO_PinWrite(L_LCD, LOW);  
    }  
}
```

```
void LCD_BackLightOn(void) {  
    GPIO_PinWrite(L_LCD, HIGH);  
    tmr1 = 0;  
    TIMER_Start(1);  
}
```

```
void BUZZER_On(void) {
```

```

GPIO_PinWrite(BUZZR, HIGH);
if(util_IsBitSet(flag, cnt_flg)) tmr0 = 170;
else tmr0 = 0;
TIMER_Start(0);
}

void DISPLAY_WelcomeScreen(void) {
LCD_BackLightOn();
LCD_SetCursor(0, 2);
LCD_DisplayString("Coill Winder");
LCD_SetCursor(1, 4);
LCD_DisplayString("Depotech");
for(int i=0; i<3; i++) {
LCD_CmdWrite(CMD_LCD_VISIBLE);
GPIO_PinWrite(BUZZR, HIGH);
delay_ms(500);
LCD_CmdWrite(CMD_LCD_BLANK);
GPIO_PinWrite(BUZZR, LOW);
delay_ms(50);
}
GPIO_PinWrite(BUZZR, LOW);
}

void DISPLAY_CounterLimit(unsigned long limit) {
LCD_CmdWrite(CMD_DISPLAY_ON_CURSOR_OFF);
ultoa(limit, buff, 10);

LCD_Clear();
LCD_DisplayString("Limit: ");
LCD_DisplayString(buff);
LCD_SetCursor(1, 0);
LCD_DisplayString("Count:");
}

void DISPLAY_SettingCounterLimit(void) {
LCD_CmdWrite(CMD_LCD_CLEAR);
LCD_SetCursor(0, 1);
LCD_DisplayString("Value is 10 to");
LCD_SetCursor(1, 3);
}

```



```

LCD_DisplayString("9.999.999");
delay_sec(1);

LCD_CmdWrite(CMD_LCD_CLEAR);
LCD_CmdWrite(CMD_DISPLAY_ON_CURSOR_BLINK);
LCD_SetCursor(0, 2);
LCD_DisplayString("Insert Limit:");
LCD_SetCursor(1, 4);
}

void Setting_CounterLimit(void) {
    unsigned long max;

displayMax:
    max = 0;
    char max_chr[] = "    ";
    int i = 0;

    DISPLAY_SettingCounterLimit();
    KEYPAD_WaitRelease();

    char c = KEYPAD_GetKey();
    KEYPAD_WaitRelease();
    while(c!='#') {
        if(c!='*') {
            if(c!=' ') {
                LCD_SetCursor(1, (4+i));
                LCD_DisplayChar(c);
                max_chr[i] = c;
                if(++i>7) goto displayMax;
            }
        }
        else if(c=='*') {
            if(--i<0) goto displayMax;
            LCD_SetCursor(1, (4+i));

            LCD_DisplayChar(' ');
            max_chr[i] = ' ';
            LCD_SetCursor(1, (4+i));
        }
    }
}

```

```
    }  
    c = KEYPAD_GetKey();  
    KEYPAD_WaitRelease();  
    }  
    LCD_Clear();  
    max = atol(max_chr);  
    if(max < 10) goto displayMax;  
  
    eeprom_write_dword((uint32_t*)0x00, max);  
}
```

## BIODATA PENULIS



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