

LAMPIRAN

Program Alat Pemindahan Barang

Rangkaian mikrokontroler ATmega16 diprogram dengan menggunakan software CodeVision AVR dengan kutipan program yang ditunjukkan sebagai berikut.

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

This program was produced by the

CodeWizardAVR V2.04.4a Advanced

Automatic Program Generator

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Project :

Version :

Date : 7/9/2017

Author : NeVaDa

Company :

Comments:

Chip type : ATmega16

Program type : Application

AVR Core Clock frequency: 8.000000 MHz

Memory model : Small

External RAM size : 0

Data Stack size : 256

*****/

```
#include <mega16.h>
```

```
#include <delay.h>
```

```
#define SA PINA.0
```

```
#define SB PINA.1
```

```
#define SC PINA.2
```

```
#define SD PINA.3
```

```
#define SS1 PINA.4
```

```
#define SS2 PINA.5
```

```
#define SH1 PINA.6
```

```
#define SH2 PINC.5
```

```
#define loadcell PINC.6
```

```
#define tombolH PINC.0
```

```
#define tombolA PINC.1
```

```
#define tombolB PINC.2
```

```
#define tombolC PINC.3
```

```
#define tombolD PINC.4
```

```
#define motorhookA PORTD.0
```

```
#define motorhookB PORTD.1
```

```
#define motorbrigeA PORTD.2
```

```
#define motorbridgeB PORTD.3
```

```
#define motorbeamA PORTD.4
```

```

#define motorbeamB    PORTD.5

// Alphanumeric LCD Module functions
#asm
    .equ __lcd_port=0x18 ;PORTB
#endasm
#include <lcd.h>

// Declare your global variables here

int n=0,cond=0;
void main(void)
{
// Declare your local variables here

// Input/Output Ports initialization

// Port A initialization

// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
// State7=P State6=P State5=P State4=P State3=P State2=P State1=P State0=P
PORTA=0xFF;
DDRA=0x00;

// Port B initialization

// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In
// State7=T State6=T State5=T State4=T State3=T State2=T State1=T State0=T
PORTB=0x00;
DDRB=0x00;

```

```
// Port C initialization

// Func7=In Func6=In Func5=In Func4=In Func3=In Func2=In Func1=In Func0=In

// State7=P State6=P State5=P State4=P State3=P State2=P State1=P State0=P

PORTC=0xFF;

DDRC=0x00;

// Port D initialization

// Func7=Out Func6=Out Func5=Out Func4=Out Func3=Out Func2=Out Func1=Out Func0=Out

// State7=0 State6=0 State5=0 State4=0 State3=0 State2=0 State1=0 State0=0

PORTD=0x00;

DDRD=0xFF;

// Timer/Counter 0 initialization

// Clock source: System Clock

// Clock value: Timer 0 Stopped

// Mode: Normal top=FFh

// OC0 output: Disconnected

TCCR0=0x00;

TCNT0=0x00;

OCR0=0x00;

// Timer/Counter 1 initialization

// Clock source: System Clock

// Clock value: Timer1 Stopped

// Mode: Normal top=FFFFh

// OC1A output: Discon.

// OC1B output: Discon.
```

```
// Noise Canceler: Off

// Input Capture on Falling Edge

// Timer1 Overflow Interrupt: Off

// Input Capture Interrupt: Off

// Compare A Match Interrupt: Off

// Compare B Match Interrupt: Off

TCCR1A=0x00;

TCCR1B=0x00;

TCNT1H=0x00;

TCNT1L=0x00;

ICR1H=0x00;

ICR1L=0x00;

OCR1AH=0x00;

OCR1AL=0x00;

OCR1BH=0x00;

OCR1BL=0x00;

// Timer/Counter 2 initialization

// Clock source: System Clock

// Clock value: Timer2 Stopped

// Mode: Normal top=FFh

// OC2 output: Disconnected

ASSR=0x00;

TCCR2=0x00;

TCNT2=0x00;

OCR2=0x00;
```

```

// External Interrupt(s) initialization

// INT0: Off

// INT1: Off

// INT2: Off

MCUCR=0x00;

MCUCSR=0x00;

// Timer(s)/Counter(s) Interrupt(s) initialization

TIMSK=0x00;

// Analog Comparator initialization

// Analog Comparator: Off

// Analog Comparator Input Capture by Timer/Counter 1: Off

ACSR=0x80;

SFIOR=0x00;

// LCD module initialization

lcd_init(16);

/*

hook:

ke atas   : motorhookA=1;motorhookB=0;

ke bawah  : motorhookA=0;motorhookB=1;

bridge:

ke kanan  : motorbrigeA=1;motorbridgeB=0;

ke kiri   : motorbrigeA=0;motorbridgeB=1;

```

beam:

ke depan : motorbeamA=1;motorbeamB=0;

ke belakang : motorbeamA=0;motorbeamB=1;

Letak:

D C

A B

H

*/

motorhookA=0;motorhookB=0;

motorbrigeA=0;motorbridgeB=0;

motorbeamA=0;motorbeamB=0;

lcd_gotoxy(0,0);

lcd_putsf("Hernanda F.");

lcd_gotoxy(0,1);

lcd_putsf("451302043");

delay_ms(5000);

lcd_clear();

while (1)

{

while(n==0)

{

lcd_gotoxy(0,0);

lcd_putsf("INPUT:"); //tampilkan tulisan INPUT di lcd

```

if(tombolH==0)
{
    lcd_putsf("H");cond=0;n=1;
}
else if(tombolA==0)
{
    lcd_putsf("A");cond=1;n=1;
}
else if(tombolB==0)
{
    lcd_putsf("B");cond=2;n=1;
}
else if(tombolC==0)
{
    lcd_putsf("C");cond=3;n=1;
}
else if(tombolD==0)
{
    lcd_putsf("D");cond=4;n=1;
}

}

motorhookA=1;motorhookB=0;           //hook gerak atas
delay_ms(2000);                       //delay gerakan hook
motorhookA=0;motorhookB=0;           //hook diam
if(loadcell==0)                       //jika load cell tidak mendeteksi beban
{

```



```

while(1)
{
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:NO LOAD "); //tampilkan status di lcd
}
}
else if(loadcell==1) //jika load cell mendeteksi beban
{
    if(cond==0) //kondisi H
    {
        lcd_gotoxy(0,1);
        lcd_putsf("STATUS:HOME "); //tampilkan status di lcd
    }
    else if(cond==1) //kondisi A
    {
        lcd_gotoxy(0,1);
        lcd_putsf("STATUS:GO TO A "); //tampilkan status di lcd
        //gerakan ke posisi A
        motorbrigeA=0;motorbridgeB=1; //bridge gerak ke kiri
        delay_ms(3000); //delay gerakan bridge
        motorbrigeA=0;motorbridgeB=0; //bridge diam
        delay_ms(1000);
        motorbeamA=1;motorbeamB=0; //beam gerak ke depan
        delay_ms(1000); //delay gerakan beam
        motorbeamA=0;motorbeamB=0; //beam diam
        delay_ms(1000);
        if(SA==0)

```

```

{
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:SA GOOD "); //tampilkan status di lcd
    //gerakan hook
    motorhookA=0;motorhookB=1; //hook gerak ke bawah
    delay_ms(2000); //delay gerakan hook
    motorhookA=0;motorhookB=0; //hook diam
    delay_ms(3000); //waktu unloading
    motorhookA=1;motorhookB=0; //hook gerak atas
    delay_ms(2000); //delay gerakan hook
    motorhookA=0;motorhookB=0; //hook diam
    delay_ms(1000);
    //gerakan ke posisi H
    while(SH1==1)
    { motorbrigeA=1;motorbridgeB=0;}
    motorbrigeA=0;motorbridgeB=0;
    delay_ms(1000);
    while(SH2==1)
    { motorbeamA=0;motorbeamB=1;}
    motorbeamA=0;motorbeamB=0;
    delay_ms(1000);
    motorhookA=0;motorhookB=1; //gerakan hook turun
    delay_ms(2000); //delay gerakan hook
    motorhookA=0;motorhookB=0; //hook berhenti
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:SUCCESSA"); //tampilkan status di lcd
}

```

```

else if(SA==1)
{
    while(tombolH==1)
    {
        lcd_gotoxy(0,1);
        lcd_putsf("STATUS:SA ERROR"); //tampilkan status di lcd
    }
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:GO HOME "); //tampilkan status di lcd
    //gerakan ke posisi H
    while(SH1==1)
    { motorbrigeA=1;motorbridgeB=0;}
    motorbrigeA=0;motorbridgeB=0;
    delay_ms(1000);
    while(SH2==1)
    { motorbeamA=0;motorbeamB=1;}
    motorbeamA=0;motorbeamB=0;
    delay_ms(1000);
    motorhookA=0;motorhookB=1; //gerakan hook turun
    delay_ms(2000); //delay gerakan hook
    motorhookA=0;motorhookB=0; //hook berhenti
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:FAILED A"); //tampilkan status di lcd
    }
}
else if(cond==2) //kondisi B
{

```

```

lcd_gotoxy(0,1);

lcd_putsf("STATUS:GO TO B "); //tampilkan status di lcd

//gerakan ke posisi B

motorbeamA=1;motorbeamB=0; //beam gerak ke depan

delay_ms(1000); //delay gerakan beam

motorbeamA=0;motorbeamB=0; //beam diam

if(SB==0)

{

//gerakan hook

motorhookA=0;motorhookB=1; //hook gerak ke bawah

delay_ms(2000); //delay gerakan hook

motorhookA=0;motorhookB=0; //hook diam

delay_ms(3000); //waktu unloading

motorhookA=1;motorhookB=0; //hook gerak atas

delay_ms(2000); //delay gerakan hook

motorhookA=0;motorhookB=0; //hook diam

delay_ms(1000);

//gerakan ke posisi H

while(SH1==1)

{ motorbrigeA=1;motorbridgeB=0;}

motorbrigeA=0;motorbridgeB=0;

delay_ms(1000);

while(SH2==1)

{ motorbeamA=0;motorbeamB=1;}

motorbeamA=0;motorbeamB=0;

delay_ms(1000);

motorhookA=0;motorhookB=1; //gerakan hook turun

```

```

delay_ms(2000);           //delay gerakan hook

motorhookA=0;motorhookB=0; //hook berhenti

lcd_gotoxy(0,1);

lcd_putsf("STATUS:SUCCESSB"); //tampilkan status di lcd
}
else if(SB==1)
{
while(tombolH==1)
{
lcd_gotoxy(0,1);

lcd_putsf("STATUS:ERROR SB"); //tampilkan status di lcd
}

lcd_gotoxy(0,1);

lcd_putsf("STATUS:GO HOME "); //tampilkan status di lcd

//gerakan ke posisi H

while(SH1==1)

{ motorbrigeA=1;motorbridgeB=0;}

motorbrigeA=0;motorbridgeB=0;

delay_ms(1000);

while(SH2==1)

{ motorbeamA=0;motorbeamB=1;}

motorbeamA=0;motorbeamB=0;

delay_ms(1000);

motorhookA=0;motorhookB=1; //gerakan hook turun

delay_ms(2000);           //delay gerakan hook

motorhookA=0;motorhookB=0; //hook berhenti

lcd_gotoxy(0,1);

```

```

        lcd_putsf("STATUS:FAILED B"); //tampilkan status di lcd
    }
}
else if(cond==3) //kondisi C
{
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:GO TO C "); //tampilkan status di lcd
    //gerakan ke posisi C
    motorbeamA=1;motorbeamB=0; //beam gerak ke depan
    delay_ms(3000); //delay gerakan beam
    motorbeamA=0;motorbeamB=0; //beam diam
    if(SC==0)
    {
        //gerakan hook
        motorhookA=0;motorhookB=1; //hook gerak ke bawah
        delay_ms(2000); //delay gerakan hook
        motorhookA=0;motorhookB=0; //hook diam
        delay_ms(3000); //waktu unloading
        motorhookA=1;motorhookB=0; //hook gerak atas
        delay_ms(2000); //delay gerakan hook
        motorhookA=0;motorhookB=0; //hook diam
        delay_ms(1000);
        //gerakan ke posisi H
        while(SH1==1)
        { motorbrigeA=1;motorbridgeB=0;}
        motorbrigeA=0;motorbridgeB=0;
        delay_ms(1000);
    }
}

```

```

while(SH2==1)

{ motorbeamA=0;motorbeamB=1;}

motorbeamA=0;motorbeamB=0;

delay_ms(1000);

motorhookA=0;motorhookB=1;    //gerakan hook turun
delay_ms(2000);                //delay gerakan hook
motorhookA=0;motorhookB=0;    //hook berhenti

lcd_gotoxy(0,1);

lcd_putsf("STATUS:SUCCESSC"); //tampilkan status di lcd
}

else if(SC==1)

{

while(tombolH==1)

{

lcd_gotoxy(0,1);

lcd_putsf("STATUS:ERROR SC"); //tampilkan status di lcd

}

lcd_gotoxy(0,1);

lcd_putsf("STATUS:GO HOME "); //tampilkan status di lcd

//gerakan ke posisi H

while(SH1==1)

{ motorbrigeA=1;motorbridgeB=0;}

motorbrigeA=0;motorbridgeB=0;

delay_ms(1000);

while(SH2==1)

{ motorbeamA=0;motorbeamB=1;}

motorbeamA=0;motorbeamB=0;

```

```

    delay_ms(1000);

    motorhookA=0;motorhookB=1;    //gerakan hook turun
    delay_ms(2000);                //delay gerakan hook
    motorhookA=0;motorhookB=0;    //hook berhenti
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:FAILED C"); //tampilkan status di lcd
}
}
else if(cond==4)                  //kondisi D
{
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:GO TO D "); //tampilkan status di lcd
    //gerakan ke posisi D
    motorbrigeA=0;motorbridgeB=1; //bridge gerak ke kiri
    delay_ms(3000);                //delay gerakan bridge
    motorbrigeA=0;motorbridgeB=0; //bridge diam
    delay_ms(1000);
    motorbeamA=1;motorbeamB=0;    //beam gerak ke depan
    delay_ms(3000);                //delay gerakan beam
    motorbeamA=0;motorbeamB=0;    //beam diam
    if(SD==0)
    {
        //gerakan hook
        motorhookA=0;motorhookB=1; //hook gerak ke bawah
        delay_ms(2000);            //delay gerakan hook
        motorhookA=0;motorhookB=0; //hook diam
        delay_ms(3000);            //waktu unloading
    }
}

```



```

motorhookA=1;motorhookB=0; //hook gerak atas
delay_ms(2000); //delay gerakan hook
motorhookA=0;motorhookB=0; //hook diam
delay_ms(1000);
//gerakan ke posisi H
while(SH1==1)
{
  motorbrigeA=1;motorbridgeB=0;}
  motorbrigeA=0;motorbridgeB=0;
  delay_ms(1000);
  while(SH2==1)
  {
    motorbeamA=0;motorbeamB=1;}
    motorbeamA=0;motorbeamB=0;
    delay_ms(1000);
    motorhookA=0;motorhookB=1; //gerakan hook turun
    delay_ms(2000); //delay gerakan hook
    motorhookA=0;motorhookB=0; //hook berhenti
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:SUCCESSD"); //tampilkan status di lcd
  }
else if(SD==1)
{
  while(tombolH==1)
  {
    lcd_gotoxy(0,1);
    lcd_putsf("STATUS:ERROR SD"); //tampilkan status di lcd
  }
  lcd_gotoxy(0,1);

```

```

    lcd_putsf("STATUS:GO HOME "); //tampilkan status di lcd

    //gerakan ke posisi H

    while(SH1==1)

    { motorbrigeA=1;motorbridgeB=0;}

    motorbrigeA=0;motorbridgeB=0;

    delay_ms(1000);

    while(SH2==1)

    { motorbeamA=0;motorbeamB=1;}

    motorbeamA=0;motorbeamB=0;

    delay_ms(1000);

    motorhookA=0;motorhookB=1; //gerakan hook turun

    delay_ms(2000); //delay gerakan hook

    motorhookA=0;motorhookB=0; //hook berhenti

    lcd_gotoxy(0,1);

    lcd_putsf("STATUS:FAILED D"); //tampilkan status di lcd

    }

}

n=0;

}

};

}

```