

DAFTAR LAMPIRAN

Lampiran 1 program arduino

```
#include <WiFi.h>
#include <HTTPClient.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <SPI.h>
#include <MFRC522.h>
#include <EEPROM.h>
#include <ESP32Servo.h>
#include <HX711.h>
// === WiFi & Google Sheet ===
const char* ssid = "Realme_10";
const char* password = "12345678";
const String scriptURL =
    "https://script.google.com/macros/s/AKfycbwQpr1tfYzFzqI4LHEraMI
    gWceUT7B4Lj1jVjHdE7_krbKon0EhwJBm7ixPIsrfOY/exec";

// === LCD & RFID ===
LiquidCrystal_I2C lcd(0x27, 20, 4);
#define SS_PIN 17
#define RST_PIN 5
MFRC522 mfrc522(SS_PIN, RST_PIN);

// === Servo ===
Servo pintuBeras, servoBoxUang;
const int pinServo = 4;
const int pinServoBox = 12;

// === Load Cell ===
#define DT 33
#define SCK 32
HX711 scale;
float kalibrasi_default = -102503.0;
float beratTarget = 0, beratSekarang = 0;

// === EEPROM RFID ===
const int maxCards = 10, recordSize = 8;
bool rfidDetected = false;
String rfidUID = "";
```

```

//=== Menu & Uang Tunai ===
int menuState = 0, kgTerpilih = 0;
String inputNominal = "";
int totalUangTunai = 0;

// === Keypad PCF8574 ===
#define PCF8574_ADDR 0x20
char customKeypad[4][4] = {
    {'D','#','0','*'}, {'C','9','8','7'},
    {'B','6','5','4'}, {'A','3','2','1'}
};

// === Sensor Warna ===
#define S0 27
#define S1 26
#define S2 25
#define S3 14
#define OUT 13

int r,g,b,lastR,lastG,lastB;
unsigned long lastDeteksi = 0;
const unsigned long jeda = 2500;
struct WarnaKal { int r,g,b,nominal; };
WarnaKal uangKal[] = {

    {259, 261, 229, 20000}, {260, 261, 229, 20000}, {259, 261, 229, 20000},
    {259, 260, 229, 20000}, {290, 294, 253, 20000}, {290, 294, 252, 20000},
    {291, 294, 253, 20000}, {266, 274, 236, 20000}, {266, 274, 236, 20000},
    {265, 274, 235, 20000}, {265, 274, 235, 20000}, {264, 274, 236, 20000},

    {260, 293, 255, 5000}, {259, 292, 256, 5000}, {259, 292, 255, 5000},
    {267, 298, 253, 5000}, {267, 298, 253, 5000}, {266, 298, 252, 5000},
    {226, 258, 221, 5000}, {226, 259, 222, 5000}, {226, 260, 222, 5000},
    {232, 270, 226, 5000}, {231, 270, 227, 5000}, {231, 269, 227, 5000},

    {296, 319, 249, 10000}, {296, 319, 249, 10000}, {296, 319, 250, 10000},
    {290, 323, 259, 10000}, {290, 323, 260, 10000}, {289, 322, 259, 10000},
    {232, 251, 199, 10000}, {233, 251, 198, 10000}, {233, 249, 199, 10000},
    {229, 246, 195, 10000}, {229, 247, 196, 10000}, {229, 247, 196, 10000},

    {266, 291, 234, 100000}, {266, 291, 235, 100000}, {264, 291, 233, 100000},
    {263, 294, 237, 100000}, {264, 292, 237, 100000}, {263, 294, 236, 100000},
    {265, 290, 232, 100000}, {261, 293, 232, 100000}, {261, 295, 230, 100000},
    {262, 291, 238, 100000}, {269, 299, 234, 100000}, {266, 297, 231, 100000},

    {274, 260, 205, 50000}, {274, 260, 204, 50000}, {273, 258, 205, 50000},

```

```

{273, 260, 205, 50000}, {294, 276, 219, 50000}, {293, 277, 220, 50000},
{294, 277, 219, 50000}, {258, 260, 208, 50000}, {258, 260, 208, 50000},
{257, 260, 206, 50000}, {264, 263, 210, 50000}, {265, 262, 211, 50000},
};

void sendDataToSheet(String metode, float berat, int nominal, String uid) {
  if (WiFi.status()==WL_CONNECTED) {
    HTTPClient http;
    String url = scriptURL +
      "?metode=" + metode +
      "&berat=" + String(berat,2) +
      "&nominal=" + String(nominal) +
      "&uid=" + uid;
    http.begin(url);
    int code = http.GET();
    http.end();
  }
}

void setupSensorWarna() {
  pinMode(S0,OUTPUT);pinMode(S1,OUTPUT);
  pinMode(S2,OUTPUT);pinMode(S3,OUTPUT);
  pinMode(OUT,INPUT);
  digitalWrite(S0,HIGH);digitalWrite(S1,LOW);
}

int bacaFrekuensi(bool s2, bool s3){
  digitalWrite(S2,s2);digitalWrite(S3,s3);
  delay(100);
  return pulseIn(OUT,LOW);
}

void bacaWarna(){
  r=bacaFrekuensi(LOW,LOW);
  g=bacaFrekuensi(HIGH,HIGH);
  b=bacaFrekuensi(LOW,HIGH);
}

int identifikasiUang(int rVal,int gVal,int bVal){
  for(int i=0;i<sizeof(uangKal)/sizeof(uangKal[0]);i++){
    int sel=abs(rVal-uangKal[i].r)+abs(gVal-uangKal[i].g)+abs(bVal-
      uangKal[i].b);
    if(sel<150) return uangKal[i].nominal;
  }
}
return 0;

```

```

}
void bukaBoxUang(){
    servoBoxUang.write(90);
    delay(3000);
    servoBoxUang.write(0);
}

int ambilSaldoEEPROM(String uid) {
    for(int i=0;i<maxCards;i++){
        int addr=i*recordSize; String stored="";
        for(int j=0;j<4;j++){
            byte b=EEPROM.read(addr+j);
            if(b<16) stored+="0";
            stored+=String(b,HEX);
        }
        stored.toUpperCase();
        if(uid==stored){
            int saldo=0;
            saldo|=EEPROM.read(addr+4)<<24;
            saldo|=EEPROM.read(addr+5)<<16;
            saldo|=EEPROM.read(addr+6)<<8;
            saldo|=EEPROM.read(addr+7);
            return saldo;
        }
    }
    return 0;
}

void simpanSaldoEEPROM(String uid, int saldo){
    int idx=-1;
    for(int i=0;i<maxCards;i++){
        int addr=i*recordSize; String stored="";
        for(int j=0;j<4;j++){
            byte b=EEPROM.read(addr+j);
            if(b<16) stored+="0";
            stored+=String(b,HEX);
        }
        stored.toUpperCase();
        if(uid==stored){ idx=i; break; }
    }
    if(idx==-1){
        for(int i=0;i<maxCards;i++){
            if(EEPROM.read(i*recordSize)==0xFF) { idx=i; break; }
        }
    }
}

```

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if(idx!=-1){
    int addr=idx*recordSize;
    for(int j=0;j<4;j++){
        String bs=uid.substring(j*2, j*2+2);
        EEPROM.write(addr+j, strtol(bs.c_str(),0,16));
    }
    EEPROM.write(addr+4, (saldo>>24)&0xFF);
    EEPROM.write(addr+5, (saldo>>16)&0xFF);
    EEPROM.write(addr+6, (saldo>>8)&0xFF);
    EEPROM.write(addr+7, saldo&0xFF);
    EEPROM.commit();
}
}

// === Format angka ke ribuan (Rp 20.000) ===
String formatRupiah(int angka) {
    String hasil = "";
    String num = String(angka);
    int len = num.length();
    int counter = 0;
    for(int i=len-1; i>=0; i--){
        hasil = num[i] + hasil;
        counter++;
        if(counter%3==0 && i!=0){
            hasil = '.' + hasil;
        }
    }
    return "Rp " + hasil;
}

void tampilkanMenuAwal(){
    lcd.clear();
    lcd.setCursor(0,0);lcd.print("A: Non Tunai");
    lcd.setCursor(0,1);lcd.print("B: Tunai");
    lcd.setCursor(0,2);lcd.print("C: Cek Saldo");
    lcd.setCursor(0,3);lcd.print("D: Isi Saldo");
    menuState=0;rfidDetected=false;
    inputNominal="";totalUangTunai=0;
}

void prosesTimbang(){
    beratTarget=kgTerpilih*1.0;
    lcd.clear();lcd.setCursor(0,0);lcd.print("Menimbang...");
    scale.tare(); pintuBeras.write(180);
    while(true){

```

```

beratSekarang=scale.get_units(5);
  lcd.setCursor(0,1);
  lcd.printf("Berat: %.2f kg ", beratSekarang);
  if(beratSekarang>=beratTarget){
    pintuBeras.write(0);
    lcd.setCursor(0,2);lcd.print("Tercapai");
    lcd.setCursor(0,3);
    lcd.printf("Final: %.2f kg", beratSekarang);
    break;
  }
}
delay(3000);
tampilkanMenuAwal();
}

void bacaRFID(){
  if(!mfrc522.PICC_IsNewCardPresent() || !mfrc522.PICC_ReadCardSerial())
    return;
  rfidUID="";
  for(byte i=0;i<mfrc522.uid.size;i++){
    if(mfrc522.uid.uidByte[i]<0x10) rfidUID+="0";
    rfidUID+=String(mfrc522.uid.uidByte[i],HEX);
  }
  rfidUID.toUpperCase(); rfidDetected=true;
  mfrc522.PICC_HaltA();
  if(menuState==5){
    int harga=kgTerpilih*20000;
    int saldo=ambilSaldoEEPROM(rfidUID);
    if(saldo>=harga){
      simpanSaldoEEPROM(rfidUID, saldo-harga);
      sendDataToSheet("non-tunai", kgTerpilih, harga, rfidUID);
      prosesTimbang();
    } else {
      lcd.clear();
      lcd.setCursor(0,0); lcd.print("Saldo Tidak Cukup");
      lcd.setCursor(0,1); lcd.printf("Perlu: %s", formatRupiah(harga).c_str());
      delay(3000); tampilkanMenuAwal();
    }
  }
  } else if(menuState==3){
    int saldo=ambilSaldoEEPROM(rfidUID);
    lcd.clear();
    lcd.setCursor(0,0); lcd.print("Saldo Anda:");
    lcd.setCursor(0,1); lcd.printf("%s", formatRupiah(saldo).c_str());
    delay(3000); tampilkanMenuAwal();
  }
}

```

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}
}
char bacaKeypad() {
  for(int row=0; row<4; row++){
    byte data = 0xF0 | ~(1<<row);
    Wire.beginTransmission(PCF8574_ADDR);
    Wire.write(data);
    Wire.endTransmission();
    delayMicroseconds(50);
    Wire.requestFrom(PCF8574_ADDR,1);
    if(Wire.available()){
      byte kol=Wire.read();
      for(int col=0; col<4; col++){
        if(!(kol&(1<<(4+col)))) return customKeypad[row][col];
      }
    }
  }
  return 0;
}

void setup(){
  Serial.begin(115200);
  WiFi.begin(ssid,password);
  while(WiFi.status()!=WL_CONNECTED){ delay(500); }
  Wire.begin(21,22);
  lcd.init(); lcd.backlight();
  pintuBeras.attach(pinServo);
  servoBoxUang.attach(pinServoBox);
  pintuBeras.write(0); servoBoxUang.write(0);
  SPI.begin(18,19,23,SS_PIN);
  mfr522.PCD_Init();
  EEPROM.begin(512);
  scale.begin(DT,SCK);
  scale.set_scale(kalibrasi_default);
  scale.tare();
  setupSensorWarna();
  tampilkanMenuAwal();
}

Void loop(){
  if((menuState==3 || menuState==4 || menuState==5) && !rfidDetected)
    bacaRFID();
  if(menuState==7){
    if(millis()-lastDeteksi>jeda){
      bacaWarna();
      if(abs(r-lastR)>10||abs(g-lastG)>10||abs(b-lastB)>10){
        int nom = identifikasiUang(r,g,b);

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        if(nom>0){
            totalUangTunai+=nom;
            lcd.setCursor(0,1);
            lcd.printf("Diterima: %s", formatRupiah(nom).c_str());
            lcd.setCursor(0,2);
            lcd.printf("Total: %s ", formatRupiah(totalUangTunai).c_str());
            bukaBoxUang();
            if(totalUangTunai >= kgTerpilih*20000) {
                sendDataToSheet("tunai", kgTerpilih, totalUangTunai, "-");
                prosesTimbang();
            }
            else {
                lcd.setCursor(0,1); lcd.print("Uang tidak valid");
                lcd.setCursor(0,2); lcd.print("Silakan ulangi");
                delay(2000);
            }
            lastDeteksi = millis();
        }
        lastR=r; lastG=g; lastB=b;
    }
}
char key = bacaKeypad();
if(key){
    delay(200);
    switch(key){
        case 'A':
            menuState=1;
            lcd.clear(); lcd.print("Non Tunai - Pilih");
            lcd.setCursor(0,1); lcd.print("1:1kg ... 5:5kg");
            break;
        case 'B':
            menuState=2;
            lcd.clear(); lcd.print("Tunai - Pilih Kg");
            lcd.setCursor(0,1); lcd.print("1:1kg ... 5:5kg");
            break;
        case 'C':
            menuState=3; rfidDetected=false;
            lcd.clear(); lcd.print("Cek Saldo"); lcd.setCursor(0,1);
            lcd.print("Tempelkan Kartu");
            break;
        case 'D':
            menuState=4; rfidDetected=false; inputNominal="";
            lcd.clear(); lcd.print("Isi Saldo"); lcd.setCursor(0,1); lcd.print("Tempelkan
            Kartu");

```



```

break;
case '*':
    if(menuState==2 && kgTerpilih){
        lcd.clear();lcd.print("Masukkan uang...");
        totalUangTunai=0;
        lastDeteksi=0;
        menuState=7;
    }
    else if(menuState==4 && rfidDetected && inputNominal!=""){
        int nom = inputNominal.toInt();
        int saldo = ambilSaldoEEPROM(rfidUID);
        simpanSaldoEEPROM(rfidUID, saldo + nom);
        lcd.clear(); lcd.setCursor(0,0); lcd.print("Topup Berhasil");
        lcd.setCursor(0,1); lcd.printf("Saldo: %s", formatRupiah(saldo +
nom).c_str());
        delay(3000); tampilkanMenuAwal();
    }
    break;
case '#':
    tampilkanMenuAwal();
    break;
default:
    if(menuState==1||menuState==2){
        if(key>='1'&&key<='5'){
            kgTerpilih=key-'0';
            lcd.clear(); lcd.printf("Dipilih: %d kg", kgTerpilih);
            if(menuState==1){
                lcd.setCursor(0,1); lcd.print("Tempelkan Kartu");
                menuState=5; rfidDetected=false;
            }
        }
    }
    else if(menuState==4 && rfidDetected && key >= '0' && key <= '9'){
        if(inputNominal.length() < 7){
            inputNominal += key;
            lcd.setCursor(0,1);
            lcd.print("      ");
            lcd.setCursor(0,1);
            lcd.printf("Isi: Rp%s    ", inputNominal.c_str());
        }
    }
    Break;
}
}
}

```

Lampiran 2 Dokumentasi Pembuatan Kerangka Alat



Lampiran 3 Foto keseluruhan alat

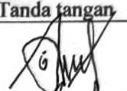
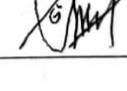


Lampiran 4 Form Pembimbing 1

**FORM BIMBINGAN
TUGAS AKHIR**

NAMA : HANIF MUZAKI
 NIM : 22010011
 JUDUL TUGAS AKHIR : Rancang Bangun Vending machine Beras
 Otomatis Berbasis mikrokontroler ESP 32.

Pembimbing 1

No	Hari / tanggal	Uraian	Tanda tangan
	20/3/2025	terbaca riset pendahuluan untuk menunjukkan novelty	
	24/3/2025	ACC	
	30/4/2025	perubahan desain yang menunjukkan komponen	
	13/5/2025	- Hapus yg tidak perlu, simpul & komponen yg diganti - lanjutkan bab 3	
	12/6/2025	Perbaiki isi program data dan flowchart	
	12/7/2025	perbaiki flowchart	
	17/7/2025	lanjutkan program dan analisis	
	18/7/2025	terbaca analisis program	
	25/7/2025	ACC siap sidang	

Lampiran 5 Form Pembimbing 2

**FORM BIMBINGAN
TUGAS AKHIR**

NAMA : HANIF MUZAKI
 NIM : 22010011
 JUDUL TUGAS AKHIR : Rancangan Bangun Vending machine Deras.
 Otomatis Berbasis mikrokontroler ESP 32.

Pembimbing 2		Uraian	Tanda tangan
No	Hari / tanggal		
1.	24/3-2025	Perubahan kata di Sub-bab Tujuan.	
2.	30/4-2025	Desain	
3.	9/5-2025	Perubahan kata di bab I (Sebelum). Kemudian Lanjutkan BAB III	
4.	14/7-2025	Acc Lanjutkan BAB IV	
5.	28/7-2025	- Pengujian - Hitung daya motoran.	
6.	28/7-2025	- Hitung daya keseluruhan.	
7.	30/7-2025		
		Accept	

Lampiran 6 Penilaian Bimbingan

PENILAIAN BIMBINGAN TUGAS AKHIR INDIVIDU

Judul : RANCANG BANGUN *VENDING MACHINE* BERAS
OTOMATIS BERBASIS MIKROKONTROLER ESP32

Nama : Hanif Muzaki

NIM : 22010011

Kelas : 6A / D3 Teknik Elektronika

I. Nilai Bimbingan Tugas Akhir (Pembimbing I)

No	Unsur Yang Dinilai	Nilai
1	Kedisiplinan dalam bimbingan	80
2	Kreativitas pemecahan dalam bimbingan	80
3	Penguasaan materi tugas akhir	80
4	Kelengkapan dan referensi tugas akhir	80
Total Nilai = (Jumlah Nilai / 4)		80

II. Nilai Bimbingan Tugas Akhir (Pembimbing II)

No	Unsur Yang Dinilai	Nilai
1	Kedisiplinan dalam bimbingan	80
2	Kreativitas pemecahan dalam bimbingan	80
3	Penguasaan materi tugas akhir	80
4	Kelengkapan dan referensi tugas akhir	80
Total Nilai = (Jumlah Nilai / 4)		80

$$\begin{aligned} \text{Nilai Bimbingan} &= \frac{\text{TotalNilaiPembimbing1} + \text{TotalNilaiPembimbing2}}{2} \\ &= 80 \end{aligned}$$

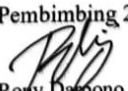
Tegal, 30 Juli 2025

Mengetahui,

Pembimbing 2

Pembimbing 1

Oironi, S.Pd, M.T
NIPY. 09.015.281


Rony Darsono, M.T
NIPY. 09.015.282

Lampiran 7 *Datasheet* Komponen

1.) *Datasheet* ESP32

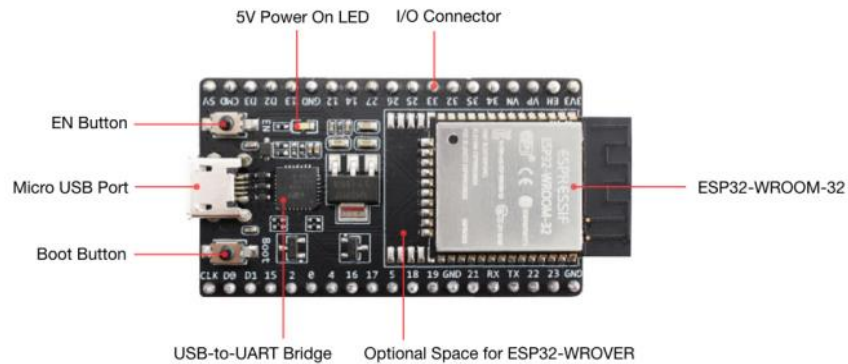
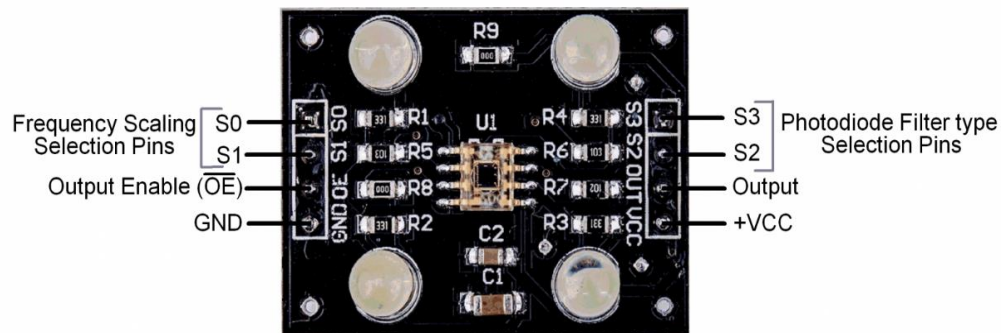


Fig. 1: ESP32-DevKitC V4 with ESP32-WROOM-32 module soldered

Key Component	Description
ESP32-WROOM-32	A module with ESP32 at its core. For more information, see ESP32-WROOM-32 Datasheet .
EN	Reset button.
Boot	Download button. Holding down Boot and then pressing EN initiates Firmware Download mode for downloading firmware through the serial port.
USB-to-UART Bridge	Single USB-UART bridge chip provides transfer rates of up to 3 Mbps.
Micro USB Port	USB interface. Power supply for the board as well as the communication interface between a computer and the ESP32-WROOM-32 module.
5V Power On LED	Turns on when the USB or an external 5V power supply is connected to the board. For details see the schematics in Related Documents .
I/O	Most of the pins on the ESP module are broken out to the pin headers on the board. You can program ESP32 to enable multiple functions such as PWM, ADC, DAC, I2C, I2S, SPI, etc.

No.	Name	Type ¹	Function
1	3V3	P	3.3 V power supply
2	EN	I	CHIP_PU, Reset
3	VP	I	GPIO36, ADC1_CH0, S_VP
4	VN	I	GPIO39, ADC1_CH3, S_VN
5	IO34	I	GPIO34, ADC1_CH6, VDET_1
6	IO35	I	GPIO35, ADC1_CH7, VDET_2
7	IO32	I/O	GPIO32, ADC1_CH4, TOUCH_CH9, XTAL_32K_P
8	IO33	I/O	GPIO33, ADC1_CH5, TOUCH_CH8, XTAL_32K_N
9	IO25	I/O	GPIO25, ADC2_CH8, DAC_1
10	IO26	I/O	GPIO26, ADC2_CH9, DAC_2
11	IO27	I/O	GPIO27, ADC2_CH7, TOUCH_CH7
12	IO14	I/O	GPIO14, ADC2_CH6, TOUCH_CH6, MTMS
13	IO12	I/O	GPIO12, ADC2_CH5, TOUCH_CH5, MTDI
14	GND	G	Ground
15	IO13	I/O	GPIO13, ADC2_CH4, TOUCH_CH4, MTCK
16	D2	I/O	GPIO9, D2 ²
17	D3	I/O	GPIO10, D3 ²
18	CMD	I/O	GPIO11, CMD ²
19	5V	P	5 V power supply

2.) Datasheet Sensor Warna TCS3200



Spesifikasi dan Fitur :

=====

- 1 , using imported chip TCS3200 PCB board with gold plating
- 2, TCS3200 TCS230 is an upgraded version , the better
- 3 , power supply 3-5v
- 4, anti- light interference
- 5, white LED, can control lights , off.
- 6 , can detect non-luminous object color
- 7, PCB size : (L) 33mm * (W) 25mm

3.) *Datasheet* RFID MFRC522



- Pin 1 : VCC**
- Pin 2 : RST**
- Pin 3 : GND**
- Pin 4 : IRQ**
- Pin 5 : MISO/SCL/TX**
- Pin 6 : MOSI**
- Pin 7 : SCK**
- Pin 8 : SS/SDA/RX**

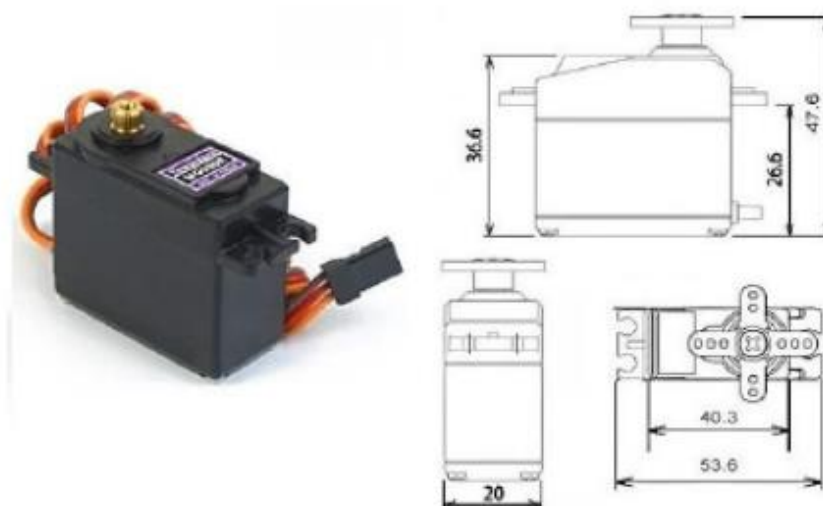
Spesifikasi:

=====

- Arus dan tegangan operasional : 13-26mA/DC 3.3V
- Tipe kartu Tag yang didukung : mifare1 S50, MIFARE DESFire, mifare Pro, mifare1 S70 MIFARE Ultralight,
- Idle current : 10-13mA/DC 3.3V
- Peak current: 30mA
- Sleep current: 80uA
- Menggunakan Antarmuka SPI
- Kecepatan transfer rate data : maximum 10Mbit/s
- Frekuensi kerja : 13.56MHz
- Ukuran dari RFID Reader : 40 x 60mm
- Suhu tempat penyimpanan : -40 – 85 degrees Celsius
- Suhu kerja : -20 – 80 degrees Celsius
- Relative humidity: relative humidity 5% -95%

4.) Datasheet Motor Servo MG996R

MG996R High Torque Metal Gear Dual Ball Bearing Servo



This High-Torque MG996R Digital Servo features metal gearing resulting in extra high 10kg stalling torque in a tiny package. The MG996R is essentially an upgraded version of the famous MG995 servo, and features upgraded shock-proofing and a redesigned PCB and IC control system that make it much more accurate than its predecessor. The gearing and motor have also been upgraded to improve dead bandwith and centering. The unit comes complete with 30cm wire and 3 pin 'S' type female header connector that fits most receivers, including Futaba, JR, GWS, Cirrus, Blue Bird, Blue Arrow, Corona, Berg, Spektrum and Hitec.

This high-torque standard servo can rotate approximately 120 degrees (60 in each direction). You can use any servo code, hardware or library to control these servos, so it's great for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. The MG996R Metal Gear Servo also comes with a selection of arms and hardware to get you set up nice and fast!

Specifications

- Weight: 55 g
- Dimension: 40.7 x 19.7 x 42.9 mm approx.
- Stall torque: 9.4 kgf-cm (4.8 V), 11 kgf-cm (6 V)
- Operating speed: 0.17 s/60° (4.8 V), 0.14 s/60° (6 V)

5.) *Datasheet* Motor Servo SG90



SPESIFIKASI :

Product Model : SG90

Weight: 13g

Dimension: 22.6mm x 12.1mm x 22.3mm

Stall torque: 1.8kg/cm(4.8v)

Stall Current: 1.5A

Gear type: POM gear set

Operating speed: 0.1sec/60degree(4.8v)

Operating voltage: 4.8v

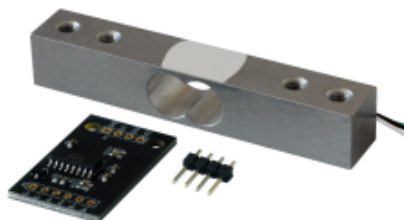
Temperature range: 0_ 55

Dead band width: 1us

Power Supply: Through External Adapter

Servo wire length: 25 cm

6.) Datasheet Load Cell HX711



MAIN FEATURES	
Model	HX711-20
Special feature	Integrated 24 bit A/D-converter
Measuring range	Up to 20 kg
Load cell accuracy	$\pm 0,02\%$ F.S
Items delivered	Load cell, amplifier board, pin header (4 pins)

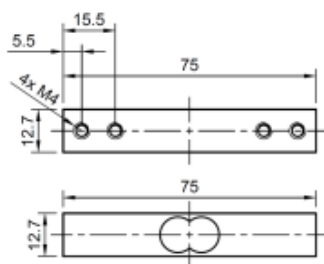
With this load cell and amplifier board, you can build your own scale in conjunction with a microcontroller or single-board computer.

The amplifier board contains an HX711 24 bit A/D converter to convert the analogue signal of the load cell into a weight with high accuracy.

Due to its high popularity, there are many application examples online for this converter.

FURTHER SPECIFICATIONS	
Supply voltage	2.6 ~ 5.25 V
Current consumption	< 1.5 mA
Interface	Serial; 2-wire
Dimensions PCB	34.2 x 20 x 3 mm
Dimensions load cell	75 x 15 x 14.2 mm
Cable length	25 cm
Weight	33.5 g

FURTHER DETAILS	
Article No.	SEN-HX711-20
EAN	4250236822297
Customs Tariff No.	84239010



7.) Datasheet Step Down LM2596



Fitur & Spesifikasi:

=====

- Efisiensi : Up to 92% (makin besar tegangan output, efisiensinya makin besar juga)
- Frekuensi switching: 150KHz
- Rectifier: Non-Synchronous Rectification
- Module Properties: Non-isolated step-down module (buck)
- Short circuit protection: current limiting, since the recovery
- Operating temperature: Industrial grade (-40 to +85) (output power 24W or less)
- Full load temperature rise: 40
- Load regulation: 0.5%
- Voltage regulation: 2.5%
- Tegangan Input : 4-35V
- Tegangan Output: 1.23-30V(Adjustable)
- Arus Output : Rated current is 2A,maximum 3A(Additional heatsink is required)
- Dimensi : 43x21x14MM

Lampiran 8 Form Revisi Ketua penguji

FORMULIR REVISI

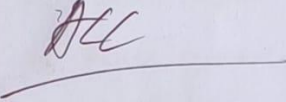
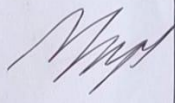
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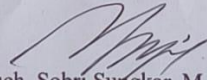
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KETUA PENGUJI

No	Hari/Tanggal	Uraian	Tanda Tangan
1	1/9 - 2026	Revisi Alat Pendambahan Sistem Admin 	

Ketua Penguji


Much. Sobri Sungkar, M.Kom

Lampiran 9 Form Revisi Penguji 1

FORMULIR REVISI

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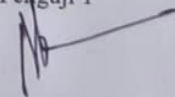
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No	Hari/Tanggal	Uraian	Tanda Tangan
1	26/8-2024	Revisi Laporan	
2	27/8-2024	Revisi Kelembangan dan Masalah Alat	
3	28/8	Revisi Laporan ke Revisi proposal	

Penguji 1



Martselani Adias Sabara, M. Kom

Lampiran 10 Form Revisi Penguji 2

FORMULIR REVISI

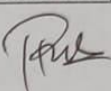
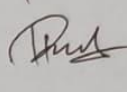
UJIAN TUGAS AKHIR

NAMA : HANIF MUZAKI

NIM : 22010011

JUDUL : RANCANG BANGUN VENDING MACHINE OTOMATIS BERBASIS
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PENGUJI 2

No	Hari/Tanggal	Uraian	Tanda Tangan
1	21/08-2025	Revisi minor	
2	22/08-2025	Revisi minor	
3	25/08-2025	Acc	

Penguji 2



Ratri Wikaningtyas, M.Pd

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