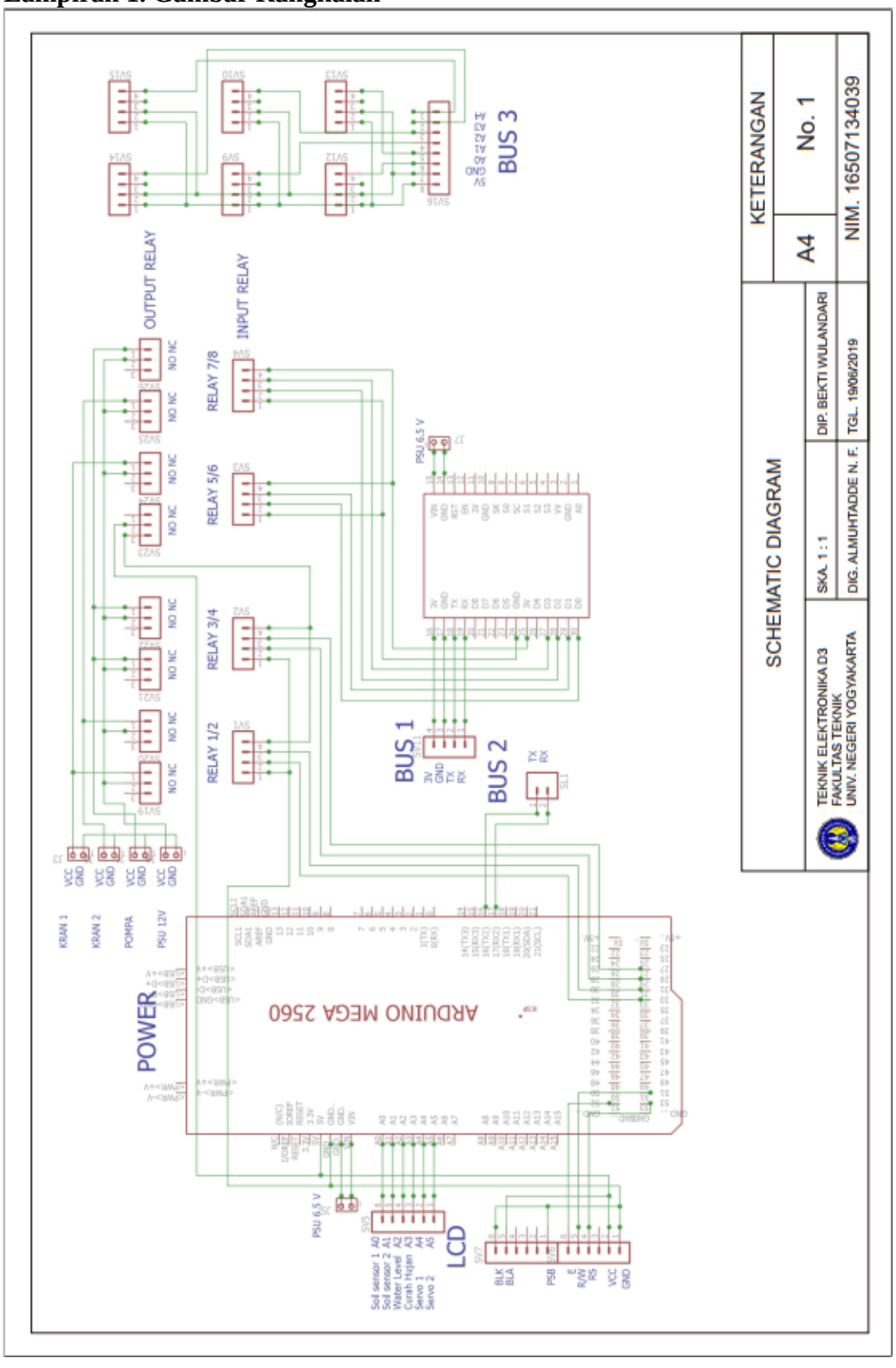
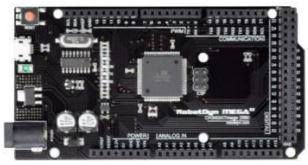
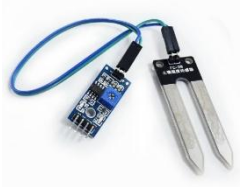
LAMPIRAN – LAMPIRAN

Lampiran 1. Gambar Rangkaian



Lampiran 2. Parts List

PARTS LIST

GAMBAR KOMPONEN	NAMA KOMPONEN	JUMLAH
	Power Supply MT-1205PS 12 VDC/ 5A	1 Unit
	*Switching* *Variable* XL4015 5VDC	1 Unit
	Arduino Mega	1 Unit
	ESP8266 Node MCU	1 Unit
	*Soil Moisture* Sensor	2 Unit
	*Water Level* Sensor	1 Unit

	Sensor Curah hujan	1 Unit
	*Selenoid Water* Valve 12 VDC	2 Unit
	Pompa Air 12 VDC	1 Unit
	Servo Motor	2 Unit
	LCD 128x64	1 Unit
	Blynk App Smartphone	1 Unit

Lampiran 3. Source Code

1. Arduino Mega Source Code

```
#include <Servo.h>
#include <SoftwareSerial.h>
#include <Wire.h>
#include "U8glib.h"

SoftwareSerial nodemcu(16,17);
Servo servoDAM;
Servo servoAtap;

const int pinTanah1 = A0;
const int pinTanah2 = A1;
const int pinHujan  = A2;
const int pinAir    = A3;
const int pinRelay1 = 27;
const int pinRelay2 = 29;
const int pinRelay3 = 31;
const int pinRelay4 = 33;

String cdata;
int kelembaban1,kelembaban2;
int data1,data2;
int hujan          = 0;
int Maxtinggi      = 1023;
float data3        = 0;
float ketinggian   = 0;
float panjangSensor = 4.0;

unsigned long previousMillis1  = 0;
unsigned long previousMillis2  = 0;
const int interval1           = 1000;
const int interval2           = 1000;


void setup() {
  pinMode(pinTanah1, INPUT);
  pinMode(pinTanah2, INPUT);
  pinMode(pinAir,    INPUT);
  pinMode(pinHujan,  INPUT);
  pinMode(pinRelay1, OUTPUT);
  pinMode(pinRelay2, OUTPUT);
  pinMode(pinRelay3, OUTPUT);
  pinMode(pinRelay4, OUTPUT);
```

```
  servoDAM.attach(A4);
  servoAtap.attach(A5);


void loop() {

  data1 = analogRead(pinTanah1);
  data2 = analogRead(pinTanah2);
  data3 = analogRead(pinAir);
  hujan = digitalRead(pinHujan);
  kelembaban1 = (100 - (data1 * 0.0977));
  kelembaban2 = (100 - (data2 * 0.0977));
  ketinggian  = data3*panjangSensor/Maxtinggi;

  Serial.println(ketinggian);
  Serial.println(data3);

  if (currentMillis1 - previousMillis1 >= interval1){
    previousMillis1 = currentMillis1;
    u8g.firstPage();
    do {
      draw();

      if (hujan == 0){
        charHujan();
        u8g.setPrintPos(6,57);
        u8g.print("Atp. Buka");
        servoAtap.write(0);
      }

      else if (hujan == 1){
        u8g.setPrintPos(6,57);
        u8g.print("Atp. Tutup");
        servoAtap.write(90);
      }

      if (kelembaban1 >= 0 && kelembaban1 <= 50){
        u8g.setPrintPos(6,33);
        u8g.print("Tnh. Kering");
      }

      else if (kelembaban1 >= 51 && kelembaban1 <= 100){
        u8g.setPrintPos(6,33);
        u8g.print("Tnh. Lembab");

      }
```

```
    if (kelembaban2 >= 0 && kelembaban2 <= 50){
      u8g.setPrintPos(6,45);
      u8g.print("Tnh. Kering");
    }

    else if (kelembaban2 >= 51 && kelembaban2 <= 100){
      u8g.setPrintPos(6,45);
      u8g.print("Tnh. Lembab");
    }

    u8g.setPrintPos(80,39);
    u8g.print("Pintu Air");

    if (ketinggian < 2){
      u8g.setPrintPos(79,51);
      u8g.print("Terbuka");
      servoDAM.write( 0);
    }

    else if (ketinggian < 3){
      u8g.setPrintPos(79,51);
      u8g.print("Tertutup");
      servoDAM.write(90);
    }

    else if (ketinggian < 4 ){
      u8g.setPrintPos(79,51);
      u8g.print("Tertutup");
      servoDAM.write(90);
    }
  } while( u8g.nextPage() );}


if (currentMillis2 - previousMillis2 >= interval2){
  previousMillis2 = currentMillis2;

  if (kelembaban1 < 50 ){
    digitalWrite(pinRelay1, LOW);
    digitalWrite(pinRelay3, LOW);
  }
  else {
    digitalWrite(pinRelay1,HIGH);
    digitalWrite(pinRelay3 ,HIGH);
  }
  if (kelembaban2 < 50 ){
```

```
        digitalWrite(pinRelay2, LOW);
        digitalWrite(pinRelay4, LOW);
      }
      else {
        digitalWrite(pinRelay2 ,HIGH);
        digitalWrite(pinRelay4 ,HIGH);

      }
    }
  }
```

2. Node Mcu Source Code

```
#define BLYNK_PRINT Serial


#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <SoftwareSerial.h>
#include <SimpleTimer.h>


char auth[] = "a4b5efb52aad464b843cabecf6fdc502";
char ssid[] = "alde";
char pass[] = "123456788";

SimpleTimer timer;
int firstVal, secondVal,thirdVal;
void sensorvalue1()
{
int sdata = firstVal;
  Blynk.virtualWrite(V2, sdata);

}
void sensorvalue2()
{
int sdata = secondVal;

  Blynk.virtualWrite(V3, sdata);

}
void sensorvalue3()
{
int sdata = thirdVal;

  Blynk.virtualWrite(V4, sdata);

}
void myTimerEvent()
{
  Blynk.virtualWrite(V1, millis() / 1000);

}
```

```
void setup()
{
  Serial.begin(9600);


}

void loop()
{

  if (Serial.available() > 0 )
  {
    rdata = Serial.read();
    myString = myString+ rdata;


}
```

Lampiran 4. Spesifikasi Alat

SPESIFIKASI ALAT

Pada pembuatan proyek akhir Rancang Bangun Sistem Irigasi dengan Dam Penampungan Air Otomatis Sebagai Upaya Penanggulangan Kekeringan Pada Musim Kemarau Menggunakan Arduino Mega Dan Esp8266 Node Mcu Berbasis IoT ini memiliki spesifikasi sebagai berikut :

1. Ukuran Rancang Bangun : Panjang 87 cm, Lebar 50 cm, Tinggi 26 cm.
2. Pengolah data : Arduino Mega dan ESP8266 Node MCU.
3. Input data : *Soil moisture* sensor
   Water level Sensor
   Sensor curah hujan
4. Output : *Selenoid water valve* 12VDC
   Pompa Air 12 VDC
   Servo Motor 5VDC
   LCD 128x64
5. Aplikasi : Blynk App Smartphone
6. Power : Catu daya 12 VDC dan Switching 5VDC.
7. Bahasa Pemograman : Bahasa C++
8. Objek yang dideteksi : Kelembaban tanah (kadar air dalam tanah)
   Ketinggian Air penampungan
   Kondisi curah hujan

Lampiran 5. Foto Alat

Berikut ini merupakan Foto Alat yang telah dibuat :

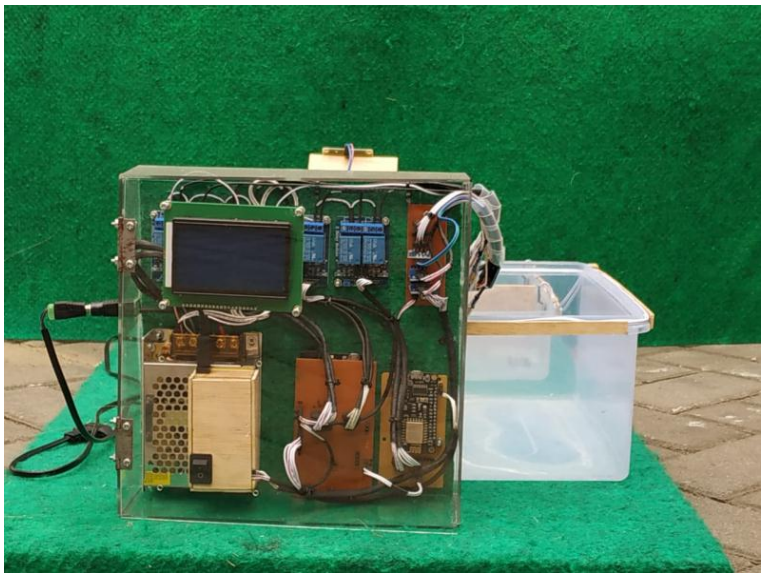


Foto tampak samping kiri

Foto tampak samping kanan

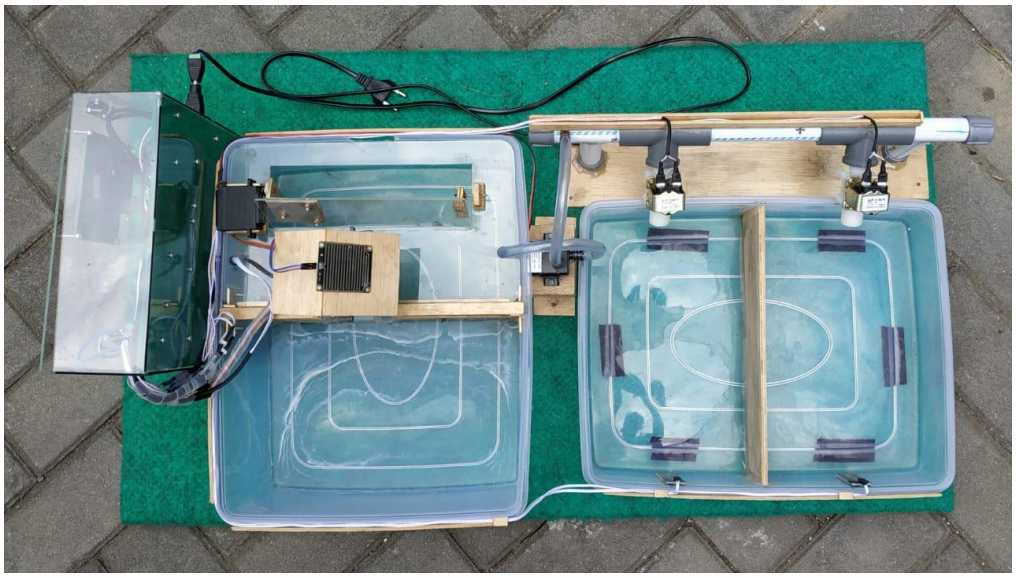
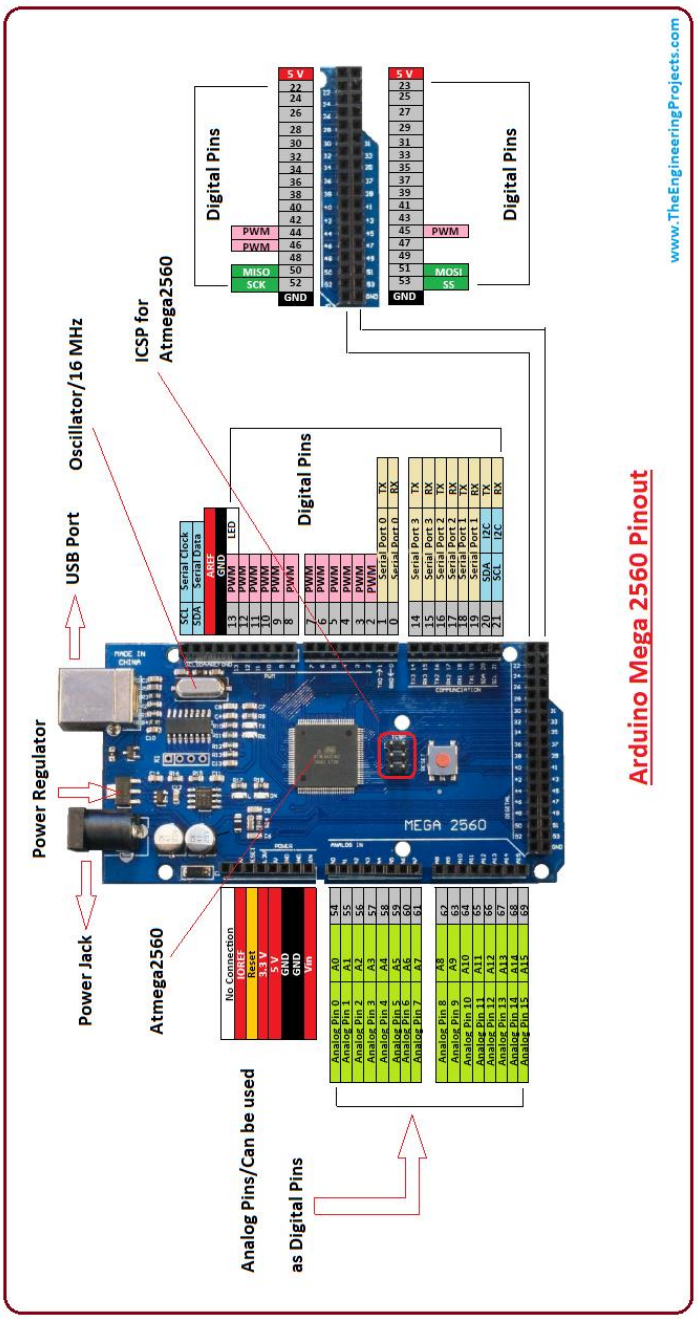


Foto tampak atas

Foto tampak depan

Lampiran 6. Datasheet Arduino Mega



Schematic: arduino-mega2560-schematic.pdf

Summary

Microcontroller	ATmega2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54 (of which 14 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB of which 8 KB used by bootloader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz

Power

The Arduino Mega can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

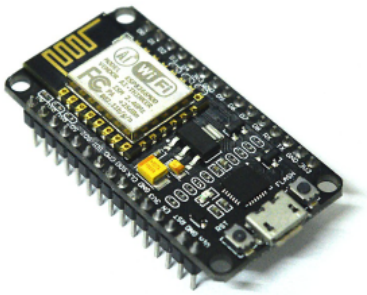
The Mega2560 differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

Lampiran 7. Datasheet Node mcu

Internet of Things

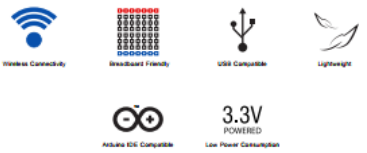
NodeMCU ESP8266 ESP-12E WiFi Development Board

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the DevKit. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson, and spiffs.



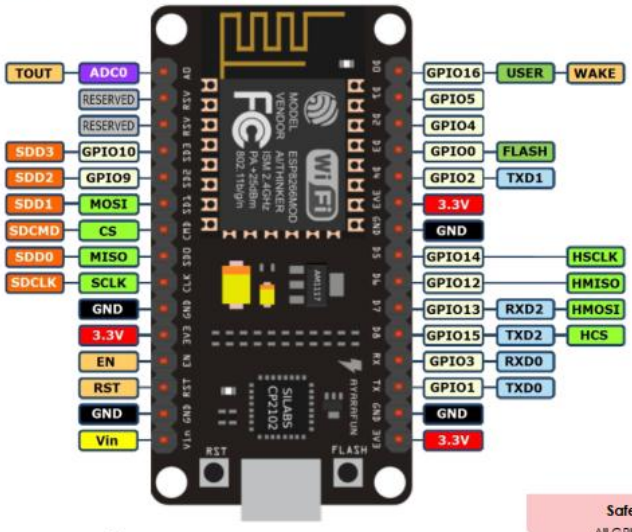
Features

- Version : DevKit v1.0
- Breadboard Friendly
- Light Weight and small size.
- 3.3V operated, can be USB powered.
- Uses wireless protocol 802.11b/g/n.
- Built-in wireless connectivity capabilities.
- Built-in PCB antenna on the ESP-12E chip.
- Capable of PWM, I2C, SPI, UART, 1-wire, 1 analog pin.
- Uses CP2102 USB Serial Communication interface module.
- Arduino IDE compatible (extension board manager required).
- Supports Lua (alike node.js) and Arduino C programming language.



PINOUT DIAGRAM

NodeMCU ESP8266 v1.0



Safety Precaution
All GPIO runs at 3.3V !!

Source
https://iotbytes.wordpress.com/nodemcu-pinout/

Lampiran 8. Datasheet soil moisture

Soil Moisture Sensor

This sensor can be used to test the moisture of soil, when the soil is having water shortage, the module output is at high level, else the output is at low level. By using this sensor one can automatically water the flower plant, or any other plants requiring automatic watering technique. Module triple output mode, digital output is simple, analog output more accurate, serial output with exact readings.

Features

- Sensitivity adjustable.
- Has fixed bolt hole, convenient installation.
- Threshold level can be configured.
- Module triple output mode, digital output is simple, analog output more accurate, serial output with exact readings.

Applications

- Agriculture
- Landscape irrigation

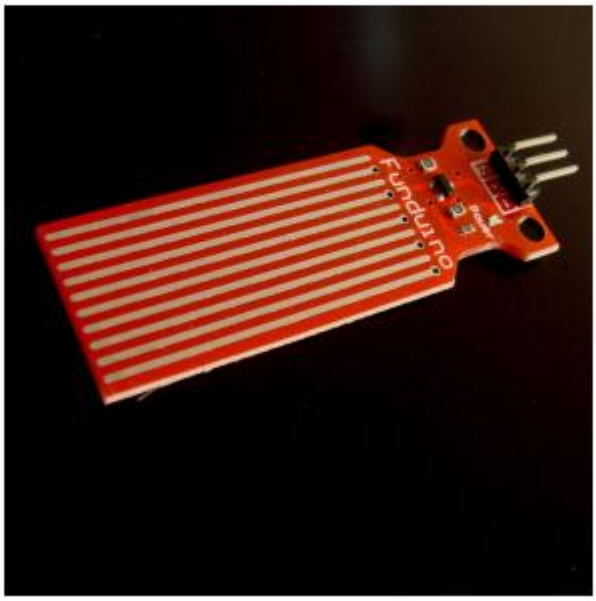
Specifications

Parameter	Value
Operating Voltage	+5v dc regulated
Soil moisture	Digital value is indicated by out pin

Lampiran 9. Datasheet Water level sensor

DIY ROBOT KEYES 产品手册 Http://keyes-arduino.taobao.com

Water Sensor Module User's Manual



I. Notice

(1) did not carefully read the instructions before you do not give the driver board is powered ! Avoid faulty wiring caused permanent damage to the drive plate .

(2) Please carefully check pin function , attention condensed identifier , correct wiring ! Do not reverse the power cord , resulting in
Electronic devices burned.

2. the product introduction

2013 latest Water Sensor is a Easy to use, compact and lightweight , high cost of water , droplets identification and detection sensors. This sensor is working The principle is to measure the size of the trace amount of water droplets through the line with a series of parallel wires exposed . And domestic and foreign Products compared not only small , powerful, and cleverly designed with the following features : First, the amount of water to simulate Conversion ; Second, plasticity , based on the sensor output analog values ; Third, low power consumption , high sensitivity ; Fourth, can Directly connected to a microprocessor or other logic circuitry , and the controller board for a variety of , for example : ArduinoController , STC microcontroller , AVR microcontroller and so on.

3, the specification parameters

1 Product Name: water level sensor
2 Item :. K-0135
3 Operating voltage :. DC5V
4 Working current : less than 20mA
5 Sensor Type : Analog
6 detection area :. 40mm x16mm
7 Production process :. FR4 double-sided HASL
8 mounting hole size : 3.0mm
9 user-friendly design : half-moon -slip handle depression
10 Working temperature :. 10 ℃ -30 ℃
11 Operating Humidity : 10% ~ 90 % non -condensing
12 Weight :. 3g
13 Product Dimensions : 65mm x 20mm x 8mm

Lampiran 10. Datasheet Rain Gauge Sensor

RAIN SENSOR MODULE

Description

The rain sensor module is an easy tool for rain detection. It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer.

The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the

switch indicator will turn on. Brush off the water droplets, and when restored to the initial state, outputs high level.

Specifications

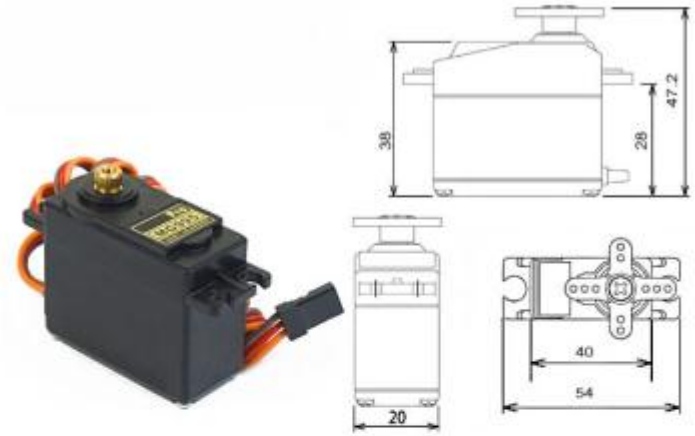
- Adopts high quality of RF-04 double sided material.
- Area: 5cm x 4cm nickel plate on side,
- Anti-oxidation, anti-conductivity, with long use time;
- Comparator output signal clean waveform is good, driving ability, over 15mA;
- Potentiometer adjust the sensitivity;
- Working voltage 5V;
- Output format: Digital switching output (0 and 1) and analog voltage output AO;
- With bolt holes for easy installation;
- Small board PCB size: 3.2cm x 1.4cm;
- Uses a wide voltage LM393 comparator

Pin Configuration

1. VCC: 5V DC
2. GND: ground
3. DO: high/low output
4. AO: analog output

Lampiran 11. Datasheet Motor servo M G995

MG995 High Speed
Metal Gear Dual Ball Bearing Servo

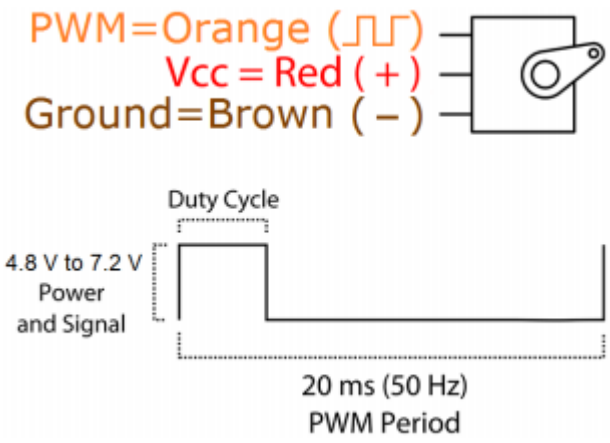


The unit comes complete with 30cm wire and 3 pin 'S' type female header connector that fits most receivers, including Futaba, JR, GWS, Cirrus, Blue Bird, Blue Arrow, Corona, Berg, Spektrum and Hitec.

This high-speed 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 MG995 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: 8.5 kgf·cm (4.8 V), 10 kgf·cm (6 V)
- Operating speed: 0.2 s/60º (4.8 V), 0.16 s/60º (6 V)
- Operating voltage: 4.8 V a 7.2 V
- Dead band width: 5 µs
- Stable and shock proof double ball bearing design
- Temperature range: 0 ºC – 55 ºC


PWM=Orange
Vcc = Red (+)
Ground=Brown (–)
Duty Cycle
4.8 V to 7.2 V
Power
and Signal
20 ms (50 Hz)
PWM Period

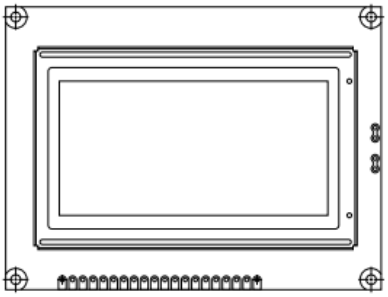
Lampiran 12. Datasheet LCD 128x64

VISHAY

LCD-128H064A

Vishay

128 x 64 Graphic LCD



FEATURES

- Type: Graphic
- Display format: 128 x 64 dots
- Built-in controller: Samsung KS 0107/KS 0108 (or equivalent)
- Duty cycle: 1/64
- + 5 V power supply
- N.V. built-in
- Compliant to RoHS directive 2002/95/EC

Pb-free RoHS COMPLIANT

MECHANICAL DATA		
ITEM	STANDARD VALUE	UNIT
Module Dimension	93.0 x 70.0	mm
Viewing Area	72.0 x 40.0	
Dot Size	0.48 x 0.48	
Dot Pitch	0.52 x 0.52	
Mounting Hole	88.0 x 65.0	
Character Size	N/a	

ABSOLUTE MAXIMUM RATINGS					
ITEM	SYMBOL	STANDARD VALUE			UNIT
		MIN.	TYP.	MAX.	
Power Supply	V_{DD} to V_{SS}	4.75	5.0	5.25	V
Input Voltage	V_I	- 0.3	-	V_{DD}	

Note

- V_{SS} = 0 V, V_{DD} = 5.0 V

INTERFACE PIN FUNCTION		
PIN NO.	SYMBOL	FUNCTION
1	V_{SS}	Ground
2	V_{DD}	Power supply (+ 5 V)
3	V_0	Contrast adjustment
4	D/I	Data/instruction
5	R/$\overline{W}$	Data read/write
6	E	H → L enable signal
7	DB0	Data bus line
8	DB1	Data bus line
9	DB2	Data bus line
10	DB3	Data bus line
11	DB4	Data bus line
12	DB5	Data bus line
13	DB6	Data bus line
14	DB7	Data bus line
15	CS1	Chip select for IC1
16	CS2	Chip select for IC1
17	$\overline{RST}$	Reset
18	V_{EE}	Negative voltage output
19	A	Power supply for LED (+ 4.2 V), R_A = 0 Ω
20	K	Power supply for LED (0 V)

Lampiran 13. Kartu Bimbingan

JURUSAN PENDIDIKAN TEKNIK ELEKTRONIKA
FAKULTAS TEKNIK UNIVERSITAS NEGERI YOGYAKARTA
Alamat : Kampus Karangmalang Yogyakarta 55281
Telp. : (0274) 554686 ; (0274) 586168 ext. 293

KARTU BIMBINGAN PROYEK AKHIR

FRM/EKA/05-00
25 Januari 2008

Nama Mahasiswa	:	Almuhtadde Nurian Firmanesa
No. Mahasiswa	:	16507134039
E-mail	:	Almuhtadde.nurian2016@student.uny.ac.id
Program Studi	:	Teknik Elektronika Jenjang : D3
Kelas	:	B
Dosen Pembimbing	:	Bekti Wulandari, S.Pd. T., M.Pd. HP : 085643577521
Judul	:	Rancang Bangun Sistem Irigasi dengan Dam Penampung Air Sebagai Upaya Penanggulangan Kekeringan Pada Musim Kemarau Menggunakan Arduino Mega Dan ESP8266 Node Mcu Berbasis IoT.

No	Tanggal	Uraian Bimbingan	Tandatangan Pembimbing
1.	26 Februari 2019	Bimbingan proposal	
2.	11 Maret 2019	Bimbingan Bab I, II, III	
3.	25 Maret 2019	Revisi Bab , IV, III	
4.	8 April 2019	Desain Alat	
5.	22 April 2019	Bimbingan alat & Revisi	
6.	29 April 2019	Pengunan Alat	
7.	9 Mei 2019	Bimbingan uji coba dan bab IV	
8.	16 Mei 2019	Bimbingan Bab V	
9.	20 Mei 2019	Revisi Bab IV, V	
10.			

Rekomendasi Pembimbing :

1. Mahasiswa yang bersangkutan siap untuk diuji.

Tanggal Persetujuan : 20 Mei 19 Tandatangan Dosen Pembimbing :

2. Kartu Bimbingan ini wajib dilampirkan pada saat pendaftaran ujian Proyek Akhir.

Lampiran 14. Kartu monitoring

JURUSAN PENDIDIKAN TEKNIK ELEKTRONIKA
FAKULTAS TEKNIK UNIVERSITAS NEGERI YOGYAKARTA
Alamat : Kampus Karangmalang Yogyakarta 55281
Telp. : (0274) 554686 ; 586168 ext. 293

KARTU MONITORING PROYEK AKHIR

FRM/EKA/06-00
25 Januari 2008

Nama Mahasiswa	:	Almuhtadde Nurian Firmanesa
No. Mahasiswa	:	16507134039 HP : 088808016588
E-mail	:	Almuhtadde.nurian2016@student.uny.ac.id
Program Studi	:	Teknik Elektronika Jenjang : D3
Kelas	:	B
Dosen Pembimbing	:	Bekti Wulandari, S.Pd. T., M.Pd.
Judul	:	Rancang Bangun Sistem Irigasi dengan Dam Penampung Air Sebagai Upaya Penanggulangan Kekeringan Pada Musim Kemarau Menggunakan Arduino Mega Dan ESP8266 Node Mcu Berbasis IoT.

No	Tanggal	Catatan Pembimbing
1.	26 Februari 2019	Pengajuan Judul Proposal Tugas Akhir
2.	11 Maret 2019	Pembahasan isi Bab I, II, III
3.	25 Maret 2019	Mencari Referensi kajian Teori dgn Thn yang Baru Bab II Perbaikan identifikasi kebutuhan Bab III
4.	8 April 2019	Pembahasan Bentuk Desain Alat yang akan dibuat
5.	22 April 2019	Penambahan Wirring Diagram Alat
6.	29 April 2019	Pembahasan Tabel untuk Pengujian Alat
7.	9 Mei 2019	Pembahasan Uji coba alat dan pengisian Tabel
8.	16 Mei 2019	Pembahasan Bab V kesimpulan dan saran
9.	20 Mei 2019	Perbaikan isi Tabel Pengujian dan kesimpulan
10.		

Keterangan :

Mahasiswa yang bersangkutan telah disetujui untuk ujian Proyek Akhir.

Tanggal Persetujuan 20 Mei 2019 Tandatangan