

LAMPIRAN A

	KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI	
	DIREKTORAT PENDIDIKAN TINGGI VOKASI POLITEKNIK NEGERI SRIWIJAYA Jalan Srijaya Negara, Palembang 30139 Telp. 0711-353414 Fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id	
KESEPAKATAN BIMBINGAN LAPORAN AKHIR (LA)		

Kami yang bertanda tangan di bawah ini,

Pihak Pertama

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan : Teknik Elektro
Program Studi : DIII Teknik Elektronika

Pihak Kedua

Nama : Ir. M. Nawawi, M.T.
NIP : 196312221991031006
Jurusan : Teknik Elektro
Program Studi : DIII Teknik Elektronika

Pada hari ini Selasa tanggal 15 Maret 2022 telah sepakat untuk melakukan konsultasi bimbingan Laporan Akhir.

Konsultasi bimbingan sekurang-kurangnya 1 (satu) kali dalam satu minggu. Pelaksanaan bimbingan pada setiap hari Jumat pukul 15.00., tempat di Politeknik Negeri Sriwijaya.

Demikianlah kesepakatan ini dibuat dengan penuh kesadaran guna kelancaran penyelesaian Laporan Akhir.

Pihak Pertama,

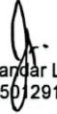

Bayu Putra Cakrawala
NIM 061930322838

Palembang, 15 Maret 2022

Pihak Kedua,


Ir. M. Nawawi, M.T.
NIP 196312221991031006

Mengetahui,
Ketua Jurusan


Ir. Iskandar Lutfi., M.T
NIP 196501291991031002

LAMPIRAN B

	KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI DIREKTORAT PENDIDIKAN TINGGI VOKASI POLITEKNIK NEGERI SRIWIJAYA Jalan Srijaya Negara, Palembang 30139 Telp. 0711-353414 Fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id	 
	KESEPAKATAN BIMBINGAN LAPORAN AKHIR (LA)	

Kami yang bertanda tangan di bawah ini,

Pihak Pertama

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan : Teknik Elektro
Program Studi : DIII Teknik Elektronika

Pihak Kedua

Nama : Anton Firmansyah, S.T., M.T
NIP : 197509242008121001
Jurusan : Teknik Elektro
Program Studi : DIII Teknik Elektronika

Pada hari ini Selasa tanggal 15 maret 2022 telah sepakat untuk melakukan konsultasi bimbingan Laporan Akhir.

Konsultasi bimbingan sekurang-kurangnya 1 (satu) kali dalam satu minggu. Pelaksanaan bimbingan pada setiap hari Kamis pukul 14.00, tempat di Politeknik Negeri Sriwijaya.

Demikianlah kesepakatan ini dibuat dengan penuh kesadaran guna kelancaran penyelesaian Laporan Akhir.

Palembang, 15 maret 2022

Pihak Pertama,


Bayu Putra Cakrawala
NIM 061930322838

Pihak Kedua,


Anton Firmansyah, S.T., M.T
NIP 197509242008121001






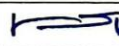




Mengetahui,
Ketua Jurusan


Ir. Iskandar Lutfi., M.T
NIP 196501291991031002

LAMPIRAN C

	KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI DIREKTORAT PENDIDIKAN TINGGI VOKASI POLITEKNIK NEGERI SRIWIJAYA Jalan Sriwijaya Negara, Palembang 30139 Telp. 0711-353414 Fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id	
	LEMBAR BIMBINGAN LAPORAN AKHIR	

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan/Program Studi : Teknik Elektro / DIII Teknik Elektronika
Judul Laporan Akhir : Rancang Bangun Simulator Turn and Bank Indicator Pada Pesawat Terbang Komersil
Pembimbing I : Ir. M. Nawawi, M.T.

No.	Tanggal	Uraian Bimbingan	Tanda Tangan Pembimbing
1.	19-1-22	Pengajuan Judul	
2.	9-2-22	Acc Judul	
3.	17-2-22	SOFTfile Proposal Via Wa	
4.	29-3-22	Pengajuan BAB I dan BAB II	
5.	29-3-22	Revisi Bab II dan Bab I	
6.	1-4-22	Acc Bab I dan Bab II	
7.	13-4-22	Pengajuan Bab III dan revisi	
8.	25/5-2022	Pengajuan Bab IV, revisi	
9.		Gambar Pada bab IV	
10.	27-5-2022	Acc bab IV	
11.	15-7-22	Pengajuan Bab V, revisi Penulisan	
12.		Pada Keterangan Gambar	

Mengetahui
 Koordinator Program Studi D III
 Teknik Elektronika



Dewi Permata Sari, S.T., M.Kom
 NIP 197612132000032001



Catatan:

*) melingkari angka yang sesuai.

Ketua Jurusan/Ketua Program Studi harus memeriksa jumlah pelaksanaan bimbingan sesuai yang dipersyaratkan dalam Pedoman Laporan Akhir sebelum menandatangani lembar bimbingan ini. Lembar pembimbingan LA ini harus dilampirkan dalam Laporan Akhir.

	KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI DIREKTORAT PENDIDIKAN TINGGI VOKASI POLITEKNIK NEGERI SRIWIJAYA Jalan Srijaya Negara, Palembang 30139 Telp. 0711-353414 Fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id	
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Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan/Program Studi : Teknik Elektro / DIII Teknik Elektronika
Judul Laporan Akhir : Rancang Bangun Simulator Turn and Bank Indicator Pada Pesawat Terbang Komersil
Pembimbing I : Ir. M. Nawawi, M.T.

No.	Tanggal	Uraian Bimbingan	Tanda Tangan Pembimbing
1.	19-7-22	Acc Bab V	
2.	19 Juli 2022	Dianakmendang menyikuk' CA	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

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 Koordinator Program Studi D III
 Teknik Elektronika



Dewi Permata Sari, S.T., M.Kom
 NIP 197612132000032001

Catatan:







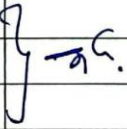



*) melingkari angka yang sesuai.

Ketua Jurusan/Ketua Program Studi harus memeriksa jumlah pelaksanaan bimbingan sesuai yang dipersyaratkan dalam Pedoman Laporan Akhir sebelum menandatangani lembar bimbingan ini. Lembar pembimbingan LA ini harus dilampirkan dalam Laporan Akhir.

LAMPIRAN D

	KEMENTERIAN RISET, TEKNOLOGI, DAN PENDIDIKAN TINGGI DIREKTORAT PENDIDIKAN TINGGI VOKASI POLITEKNIK NEGERI SRIWIJAYA Jalan Srijaya Negara, Palembang 30139 Telp. 0711-353414 Fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id	
	LEMBAR BIMBINGAN LAPORAN AKHIR	

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan/Program Studi : Teknik Elektro / DIII Teknik Elektronika
Judul Laporan Akhir : Rancang Bangun Simulator Turn and Bank Indicator Pada Pesawat Terbang Komersil
Pembimbing II : Anton Firmansyah, S.T., M.T

No.	Tanggal	Uraian Bimbingan	Tanda Tangan Pembimbing
1.	9-2-22	Pengajuan Judul	
2.	11-2-22	Acc Judul	
3.	17-2-22	Pengajuan Proposal	
4.		Pengajuan BAB 1	
5.	8-7-22	ACC Bab I	
6.		ACC Bab II	
7.	5-7-2021	Bab III Buatlah Narasi pd flowchart	
8.		Penulisan jangan terlalu banyak space	
9.		Kosong	
10.	10-7-2021	ACC Bab III, perbaiki data Bab 4	
11.	20-7-2021	ACC Bab 4, Rev. Bab 5	
12.	21-7-2021	ACC Bab 5 lanjut diujikan pd ujian LA	

Mengetahui
 Koordinator Program Studi D III
 Teknik Elektronika



Dewi Permata Sari, S.T., M.Kom
 NIP 197612132000032001

Catatan:

*) melingkari angka yang sesuai.

Ketua Jurusan/Ketua Program Studi harus memeriksa jumlah pelaksanaan bimbingan sesuai yang dipersyaratkan dalam Pedoman Laporan Akhir sebelum menandatangani lembar bimbingan ini. Lembar pembimbingan LA ini harus dilampirkan dalam Laporan Akhir.

LAMPIRAN E

	<p>KEMENTERIAN PENDIDIKAN, KEBUDAYAAN RISET, DAN TEKNOLOGI POLITEKNIK NEGERI SRIWIJAYA Jalan Srijaya Negara, Palembang 30139 Telp. 0711-353414 fax. 0711-355918 Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id</p>	
REKOMENDASI UJIAN LAPORAN AKHIR (LA)		

Pembimbing Laporan Akhir memberikan rekomendasi kepada,

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan/Program Studi : Teknik Elektro/Teknik Elektronika
Judul Laporan Akhir : Rancang Bangun *Simulator Tum And Bank* Indicator Pada Pesawat Terbang Komersil

Mahasiswa tersebut telah memenuhi persyaratan dan dapat mengikuti Ujian Laporan Akhir (LA) pada Tahun Akademik 2021/2022

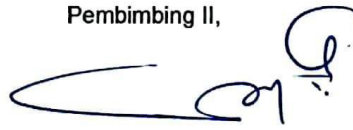
Palembang, 19 Juli 2022

Pembimbing I,

Pembimbing II,



Ir. M. Nawawi., M.T
NIP. 196312221991031006



Anton Firmansyah, ST., M.T
NIP. 197509242008121001

LAMPIRAN F



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN
RISET DAN TEKNOLOGI
POLITEKNIK NEGERI SRIWIJAYA
Jalan Srijaya Negara, Palembang 30139
Telp. 0711-353414 Fax. 0711-355918
Website : www.polisriwijaya.ac.id E-mail : info@polsri.ac.id



PELAKSANAAN REVISI LAPORAN AKHIR

Mahasiswa berikut,

Nama : Bayu Putra Cakrawala
NIM : 061930322838
Jurusan/Program Studi : Teknik Elektro / DIII Teknik Elektronika
Judul Laporan Akhir : Rancang Bangun Simulator *Turn And Bank Indicator* Pada Pesawat Terbang Komersil

Telah melaksanakan revisi terhadap Laporan Akhir yang diujikan pada hari Kamis tanggal 28 bulan Juli tahun 2022. Pelaksanaan revisi terhadap Laporan Akhir tersebut telah disetujui oleh Dosen Penguji yang memberikan revisi:

No.	Komentar	Nama Dosen Penguji ^{*)}	Tanggal	Tanda Tangan
1.	Telah diperbaiki.	Ir. M. Nawawi, M.T.	3/8/22	
2.	Tidak Ada Revisi	Masayu Anisah, S.T., M.T.	3/8/22	
3.		Dr. Eng. Tresna Dewi, S.T., M. Eng.		
4.	Telah direvisi sesuai saran	Dewi Permata Sari, S.T., M.Kom.	01/08/22	
5.		Destra Andika Pratama, S.T., M.T.		

Palembang, 03-05-2022
Ketua Penguji ^{**)},

(Ir. M. Nawawi, M.T.)
NIP. 196312221991031006

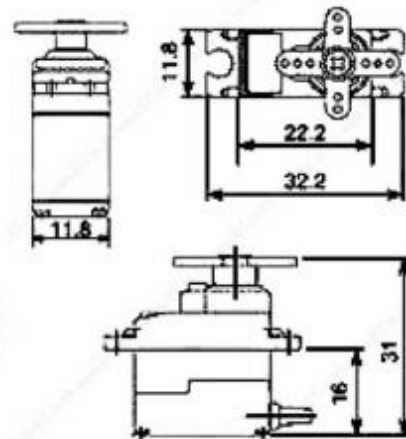
Catatan:

*) Dosen penguji yang memberikan revisi saat ujian laporan akhir.

**) Dosen penguji yang ditugaskan sebagai Ketua Penguji saat ujian LA.
Lembaran pelaksanaan revisi ini harus dilampirkan dalam Laporan Akhir.

LAMPIRAN G

SG90 9 g Micro Servo



Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but *smaller*. You can use any servo code, hardware or library to control these servos. Good 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. It comes with a 3 horns (arms) and hardware.

Specifications

- Weight: 9 g
- Dimension: 22.2 x 11.8 x 31 mm approx.
- Stall torque: 1.8 kgf·cm
- Operating speed: 0.1 s/60 degree
- Operating voltage: 4.8 V (~5V)
- Dead band width: 10 μ s
- Temperature range: 0 $^{\circ}$ C – 55 $^{\circ}$ C

Position "0" (1.5 ms pulse) is middle, "90" (~2ms pulse) is all the way to the left. ms pulse) is all the way to the right, ""-90" (~1ms pulse) is all the way to the left.

TowerPro SG90 - Micro Servo



Basic Information

Modulation: Analog

Torque: **4.8V:** 25.0 oz-in (1.80 kg-cm)

Speed: **4.8V:** 0.10 sec/60°

Weight: 0.32 oz (9.0 g)

Dimensions:

Length: 0.91 in (23.1 mm)

Width: 0.48 in (12.2 mm)

Height: 1.14 in (29.0 mm)

Motor Type: 3-pole

Gear Type: Plastic

Rotation/Support: Bushing

Additional Specifications

Rotational Range: 180°

Pulse Cycle: ca. 20 ms

Pulse Width: 500-2400 μ s

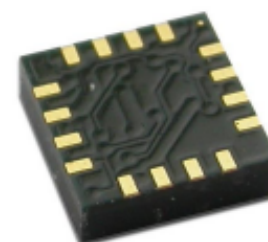
[SG90 Datasheet](#)

3-Axis Digital Compass IC HMC5883L

Honeywell

Advanced Information

The Honeywell HMC5883L is a surface-mount, multi-chip module designed for low-field magnetic sensing with a digital interface for applications such as low-cost compassing and magnetometry. The HMC5883L includes our state-of-the-art, high-resolution HMC118X series magneto-resistive sensors plus an ASIC containing amplification, automatic degaussing strap drivers, offset cancellation, and a 12-bit ADC that enables 1° to 2° compass heading accuracy. The I²C serial bus allows for easy interface. The HMC5883L is a 3.0x3.0x0.9mm surface mount 16-pin leadless chip carrier (LCC). Applications for the HMC5883L include Mobile Phones, Netbooks, Consumer Electronics, Auto Navigation Systems, and Personal Navigation Devices.



The HMC5883L utilizes Honeywell's Anisotropic Magneto-resistive (AMR) technology that provides advantages over other magnetic sensor technologies. These anisotropic, directional sensors feature precision in-axis sensitivity and linearity. These sensors' solid-state construction with very low cross-axis sensitivity is designed to measure both the direction and the magnitude of Earth's magnetic fields, from milli-gauss to 8 gauss. Honeywell's Magnetic Sensors are among the most sensitive and reliable low-field sensors in the industry.

FEATURES

- ▶ 3-Axis Magneto-resistive Sensors and ASIC in a 3.0x3.0x0.9mm LCC Surface Mount Package
- ▶ 12-Bit ADC Coupled with Low Noise AMR Sensors Achieves 5 milli-gauss Resolution in ±8 Gauss Fields
- ▶ Built-In Self Test
- ▶ Low Voltage Operations (2.16 to 3.6V) and Low Power Consumption (100 µA)
- ▶ Built-In Strap Drive Circuits
- ▶ I²C Digital Interface
- ▶ Lead Free Package Construction
- ▶ Wide Magnetic Field Range (+/-8 Oe)
- ▶ Software and Algorithm Support Available
- ▶ Fast 160 Hz Maximum Output Rate

BENEFITS

- ▶ Small Size for Highly Integrated Products. Just Add a Micro-Controller Interface, Plus Two External SMT Capacitors Designed for High Volume, Cost Sensitive OEM Designs Easy to Assemble & Compatible with High Speed SMT Assembly
- ▶ Enables 1° to 2° Degree Compass Heading Accuracy
- ▶ Enables Low-Cost Functionality Test after Assembly in Production
- ▶ Compatible for Battery Powered Applications
- ▶ Set/Reset and Offset Strap Drivers for Degaussing, Self Test, and Offset Compensation
- ▶ Popular Two-Wire Serial Data Interface for Consumer Electronics
- ▶ RoHS Compliance
- ▶ Sensors Can Be Used in Strong Magnetic Field Environments with a 1° to 2° Degree Compass Heading Accuracy
- ▶ Compassing Heading, Hard Iron, Soft Iron, and Auto Calibration Libraries Available
- ▶ Enables Pedestrian Navigation and LBS Applications

HMC5883L

SPECIFICATIONS (* Tested at 25°C except stated otherwise.)

Characteristics	Conditions*	Min	Typ	Max	Units
Power Supply					
Supply Voltage	VDD Referenced to AGND	2.16		3.6	Volts
	VDDIO Referenced to DGND	1.71	1.8	VDD+0.1	Volts
Average Current Draw	Idle Mode	-	2	-	µA
	Measurement Mode (7.5 Hz ODR; No measurement average, MA1:MA0 = 00) VDD = 2.5V, VDDIO = 1.8V	-	100	-	µA
Performance					
Field Range	Full scale (FS) – total applied field (Typical)	-8		+8	gauss
Mag Dynamic Range	3-bit gain control	±1		±8	gauss
Resolution	VDD=3.0V, GN=2		5		milli-gauss
Linearity	±2.0 gauss input range			0.1	±% FS
Hysteresis	±2.0 gauss input range		±25		ppm
Cross-Axis Sensitivity	Test Conditions: Cross field = 0.5 gauss, Applied = ±3 gauss		±0.2%		%FS/gauss
Output Rate (ODR)	Continuous Measurement Mode	0.75		75	Hz
	Single Measurement Mode			160	Hz
Measurement Period	From receiving command to data ready		6		msec
Turn-on Time	Ready for I2C commands		200		µs
Gain Tolerance	All gain/dynamic range settings		±5		%
I ² C Address	7-bit address		0x1E		hex
	8-bit read address		0x3D		hex
	8-bit write address		0x3C		hex
I ² C Rate	Controlled by I ² C Master			400	kHz
I ² C Hysteresis	Hysteresis of Schmitt trigger inputs on SCL and SDA - Fall (VDDIO=1.8V) Rise (VDDIO=1.8V)		0.2*VDDIO		Volts
			0.8*VDDIO		Volts
Self Test	X & Y Axes		±1.16		gauss
	Z Axis		±1.08		gauss
	X & Y Axes (GN=100) Z Axis (GN=100)		510		LSb
General					
ESD Voltage	Human Body Model (all pins)			2000	Volts
	CDM			750	Volts
Operating Temperature	Ambient	-30		85	°C
Storage Temperature	Ambient, unbiased	-40		125	°C
Reflow Classification	MSL 3, 260 °C Peak Temperature				
Package Size	Length and Width	2.85	3.00	3.15	mm
Package Height		0.8	0.9	1.0	mm

HMC5883L

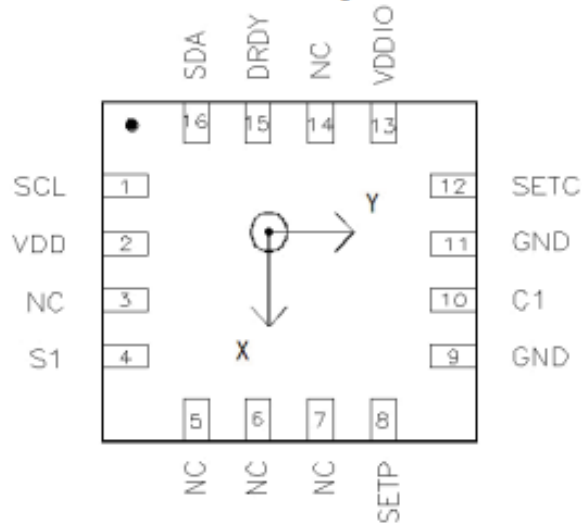
Absolute Maximum Ratings (* Tested at 25°C except stated otherwise.)

Characteristics	Min	Max	Units
Supply Voltage VDD	-0.3	4.8	Volts
Supply Voltage VDDIO	-0.3	4.8	Volts

PIN CONFIGURATIONS

Pin	Name	Description
1	SCL	Serial Clock – I ² C Master/Slave Clock
2	VDD	Power Supply (2.16V to 3.6V)
3	NC	Not to be Connected
4	S1	Tie to VDDIO
5	NC	Not to be Connected
6	NC	Not to be Connected
7	NC	Not to be Connected
8	SETP	Set/Reset Strap Positive – S/R Capacitor (C2) Connection
9	GND	Supply Ground
10	C1	Reservoir Capacitor (C1) Connection
11	GND	Supply Ground
12	SETC	S/R Capacitor (C2) Connection – Driver Side
13	VDDIO	IO Power Supply (1.71V to VDD)
14	NC	Not to be Connected
15	DRDY	Data Ready, Interrupt Pin. Internally pulled high. Optional connection. Low for 250 usec when data is placed in the data output registers.
16	SDA	Serial Data – I ² C Master/Slave Data

Table 1: Pin Configurations



TOP VIEW (looking through)

Arrow indicates direction of magnetic field that generates a positive output reading in Normal Measurement configuration.

**MPU-6000/MPU-6050 Product Specification**Document Number: PS-MPU-6000A-00
Revision: 3.3
Release Date: 5/16/2012**Primary Differences between MPU-6000 and MPU-6050**

Part / Item	MPU-6000	MPU-6050
VDD	2.375V-3.46V	2.375V-3.46V
VLOGIC	n/a	1.71V to VDD
Serial Interfaces Supported	I ² C, SPI	I ² C
Pin 8	/CS	VLOGIC
Pin 9	AD0/SDO	AD0
Pin 23	SCL/SCLK	SCL
Pin 24	SDA/SDI	SDA

ADVANCE INFORMATION



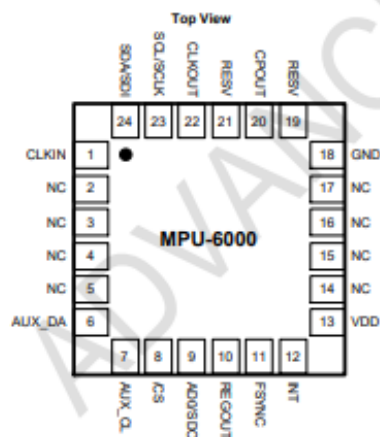
MPU-6000/MPU-6050 Product Specification

Document Number: PS-MPU-6000A-00
Revision: 3.3
Release Date: 5/16/2012

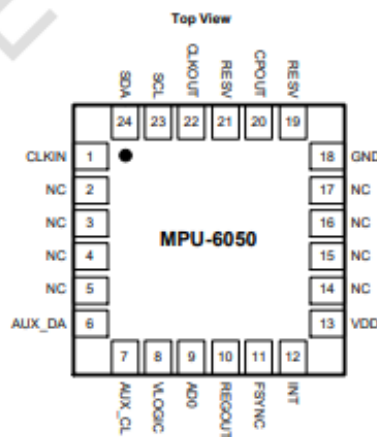
7 Applications Information

7.1 Pin Out and Signal Description

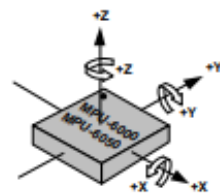
Pin Number	MPU-6000	MPU-6050	Pin Name	Pin Description
1	Y	Y	CLKIN	Optional external reference clock input. Connect to GND if unused.
6	Y	Y	AUX_DA	I ² C master serial data, for connecting to external sensors
7	Y	Y	AUX_CL	I ² C Master serial clock, for connecting to external sensors
8	Y		/CS	SPI chip select (0=SPI mode)
8		Y	VLOGIC	Digital I/O supply voltage
9	Y		AD0 / SDO	I ² C Slave Address LSB (AD0); SPI serial data output (SDO)
9		Y	AD0	I ² C Slave Address LSB (AD0)
10	Y	Y	REGOUT	Regulator filter capacitor connection
11	Y	Y	FSYNC	Frame synchronization digital input. Connect to GND if unused.
12	Y	Y	INT	Interrupt digital output (totem pole or open-drain)
13	Y	Y	VDD	Power supply voltage and Digital I/O supply voltage
18	Y	Y	GND	Power supply ground
19, 21	Y	Y	RESV	Reserved. Do not connect.
20	Y	Y	CPOUT	Charge pump capacitor connection
22	Y	Y	CLKOUT	System clock output
23	Y		SCL / SCLK	I ² C serial clock (SCL); SPI serial clock (SCLK)
23		Y	SCL	I ² C serial clock (SCL)
24	Y		SDA / SDI	I ² C serial data (SDA); SPI serial data input (SDI)
24		Y	SDA	I ² C serial data (SDA)
2, 3, 4, 5, 14, 15, 16, 17	Y	Y	NC	Not internally connected. May be used for PCB trace routing.



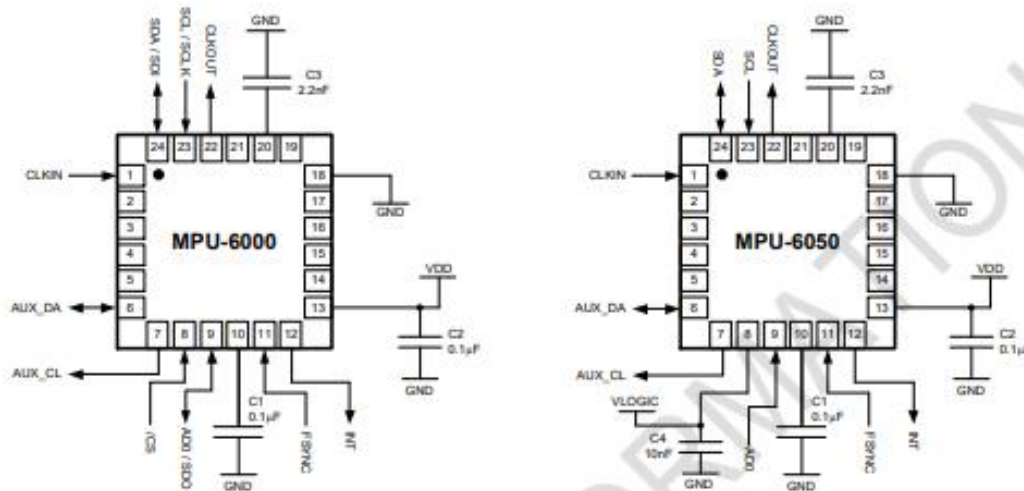
QFN Package
24-pin, 4mm x 4mm x 0.9mm



QFN Package
24-pin, 4mm x 4mm x 0.9mm



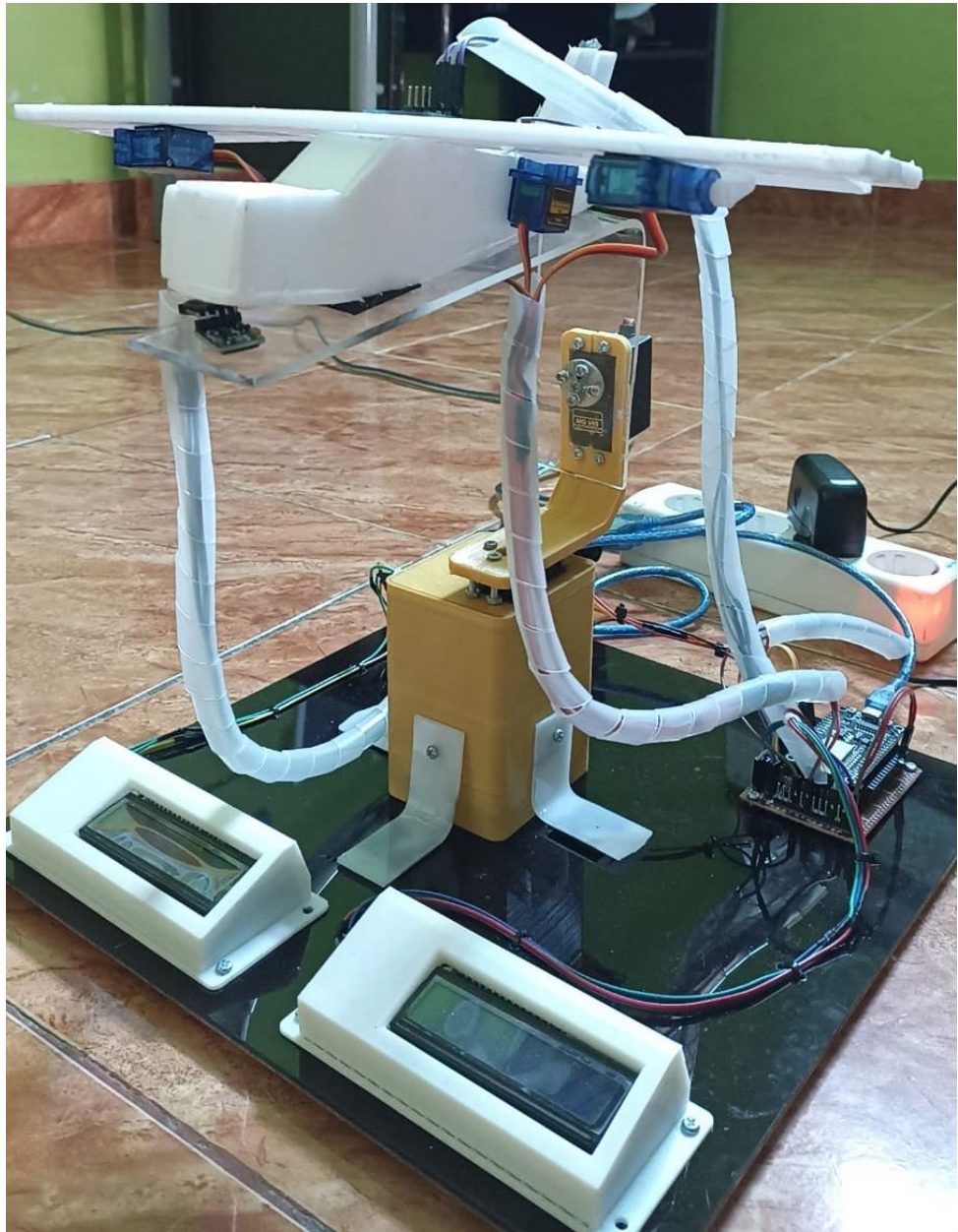
Orientation of Axes of Sensitivity and
Polarity of Rotation

7.2 Typical Operating Circuit

Typical Operating Circuits
7.3 Bill of Materials for External Components

Component	Label	Specification	Quantity
Regulator Filter Capacitor (Pin 10)	C1	Ceramic, X7R, 0.1µF ±10%, 2V	1
VDD Bypass Capacitor (Pin 13)	C2	Ceramic, X7R, 0.1µF ±10%, 4V	1
Charge Pump Capacitor (Pin 20)	C3	Ceramic, X7R, 2.2nF ±10%, 50V	1
VLOGIC Bypass Capacitor (Pin 8)	C4*	Ceramic, X7R, 10nF ±10%, 4V	1

* MPU-6050 Only.

LAMPIRAN H





LAMPIRAN I

```

// Basic demo for accelerometer readings from Adafruit MPU6050
//https://randomnerdtutorials.com/esp8266-nodemcu-mpu-6050-accelerometer-
gyroscope-arduino/
#include <LiquidCrystal_I2C.h>
#include<Wire.h>
#include <SPI.h>
// set the LCD number of columns and rows
int lcdColumns = 16;
int lcdRows = 2;

// set LCD address, number of columns and rows
// if you don't know your display address, run an I2C scanner sketch
LiquidCrystal_I2C lcd(0x27, lcdColumns, lcdRows);

#include <Servo.h>
// Fill-in information from your Blynk Template here
//#define BLYNK_TEMPLATE_ID      "TMPLxxxxxx"
//#define BLYNK_DEVICE_NAME      "Device"
#define BLYNK_TEMPLATE_ID "TMPL2GDa1DEt"
#define BLYNK_DEVICE_NAME "Bayu tnb"
#define BLYNK_FIRMWARE_VERSION  "0.1.0"

#define BLYNK_PRINT Serial
//#define BLYNK_DEBUG

#define APP_DEBUG

// Uncomment your board, or configure a custom board in Settings.h
//#define USE_SPARKFUN_BLYNK_BOARD
#define USE_NODE_MCU_BOARD
//#define USE_WITTY_CLOUD_BOARD
//#define USE_WEMOS_D1_MINI

#include "BlynkEdgent.h"

Servo d0;
//Servo d3;
Servo d8;
Servo d5;
Servo d6;
Servo d7;

int data1, data2, data3, data4, data5, data6;

```

```
const int MPU_addr=0x68;
int16_t AcX,AcY,AcZ,Tmp,GyX,GyY,GyZ;

int minVal=265;
int maxVal=402;

double x;
double y;
double z;

void setup()
{
  Serial.begin(115200);
  delay(100);

  BlynkEdgent.begin();
  d0.attach(16);
  d8.attach(15);
  d5.attach(14);
  d6.attach(12);
  d7.attach(13);

  lcd.begin();
  // turn on LCD backlight
  lcd.backlight();
  BlynkEdgent.begin();

  Wire.begin();
  Wire.beginTransmission(MPU_addr);
  Wire.write(0x6B);
  Wire.write(0);
  Wire.endTransmission(true);
}

void loop() {
  BlynkEdgent.run();
  Wire.beginTransmission(MPU_addr);

  Wire.write(0x3B);
  Wire.endTransmission(false);
  Wire.requestFrom(MPU_addr,14,true);
  AcX=Wire.read()<<8|Wire.read();
  AcY=Wire.read()<<8|Wire.read();
```

```

AcZ=Wire.read()<<8|Wire.read());
int xAng = map(AcX,minVal,maxVal,-90,90);
int yAng = map(AcY,minVal,maxVal,-90,90);
int zAng = map(AcZ,minVal,maxVal,-90,90);

x= RAD_TO_DEG * (atan2(-yAng, -zAng)+PI);
y= RAD_TO_DEG * (atan2(-xAng, -zAng)+PI);
z= RAD_TO_DEG * (atan2(-yAng, -xAng)+PI);

Serial.print("AngleX= ");
Serial.println(x);
Serial.print("AngleY= ");
Serial.println(y);
Serial.print("AngleZ= ");
Serial.println(z);
Blynk.virtualWrite (V6,z);
Blynk.virtualWrite (V7,x);
lcd.setCursor(0, 0);
lcd.print(" AIRCRAFT ROLL");
lcd.setCursor(0,1);
lcd.print("DEGREE= ");
lcd.print(x);
Serial.println(" ");
}
BLYNK_WRITE(V1) {
  data1 = param.asInt();
  d0.write(data1);
  Serial.println(data1);
}
BLYNK_WRITE(V2) {
  data2 = param.asInt();
  d8.write(data2);
  Serial.println(data2);
}
BLYNK_WRITE(V3) {
  data3 = param.asInt();
  d5.write(data3);
  Serial.println(data3);
}
BLYNK_WRITE(V4) {
  data4 = param.asInt();
  d6.write(data4);
  Serial.println(data4);
}

```

```
}  
BLYNK_WRITE(V5) {  
  data5 = param.asInt();  
  d7.write(data5);  
  Serial.println(data5);  
}
```

LAMPIRAN J

```

#include <Wire.h> //I2C Arduino Library
#include <LiquidCrystal_I2C.h> //i2c LCD Library
LiquidCrystal_I2C lcd(0x27, 16, 2); //library i2c lcd
#define addr 0x0D //I2C Address for The HMC5883

void setup() {
  Serial.begin(9600);
  Wire.begin();
  lcd.begin(); //set lcd i2c
  lcd.backlight();

  Wire.beginTransmission(addr); //start talking
  Wire.write(0x0B); // Tell the HMC5883 to Continuously Measure
  Wire.write(0x01); // Set the Register
  Wire.endTransmission();
  Wire.beginTransmission(addr); //start talking
  Wire.write(0x09); // Tell the HMC5883 to Continuously Measure
  Wire.write(0x1D); // Set the Register
  Wire.endTransmission();
}
void loop() {

  int x, y, z; //triple axis data

  //Tell the HMC what regist to begin writing data into

  Wire.beginTransmission(addr);
  Wire.write(0x00); //start with register 3.
  Wire.endTransmission();
  //Read the data.. 2 bytes for each axis.. 6 total bytes
  Wire.requestFrom(addr, 6);
  if (6 <= Wire.available()) {
    x = Wire.read(); //MSB x
    x |= Wire.read() << 8; //LSB x
    z = Wire.read(); //MSB z
    z |= Wire.read() << 8; //LSB z
    y = Wire.read(); //MSB y
    y |= Wire.read() << 8; //LSB y
  }
  //Serial.println();
  float heading = atan2(y,x);

```



```
// Correct for when signs are reversed.
if(heading < 0)
  heading += 2*PI;

// Check for wrap due to addition of declination.
if(heading > 2*PI)
  heading -= 2*PI;

// Convert radians to degrees for readability.
float headingDegrees = heading * 180/M_PI;

Serial.print("Heading (degrees): ");
Serial.println(headingDegrees);
// Show Values
  lcd.setCursor(0,0);
  lcd.print(" AIRCRAFT YAW");
  lcd.setCursor(0,1);
  lcd.print("DEGREE= ");
  lcd.print(headingDegrees);
  Serial.print("X Value: ");
  Serial.println(x);
  Serial.print("Y Value: ");
  Serial.println(y);
  Serial.print("Z Value: ");
  Serial.println(z);
  delay(500);
}
```