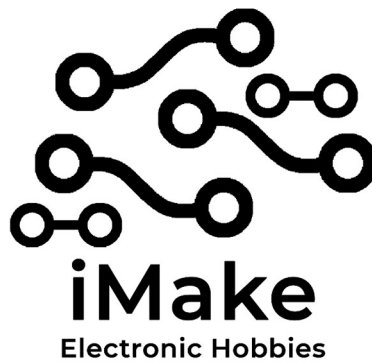JOB SHEET FOR FINAL PROJECT

RANCANG BANGUN SISTEM KONTROL
MEDIA TUMBUH MAGGOT BSF
BERBASIS IoT (Internet of Things)

iMake
Electronic Hobbies

START DATE   : March 16, 2022

JOB SHEET NO.   : FP-2022-16

No.	DATE	REVISION DESCRIPTION
R0	16 March 2022	Issued as part of contract proposed

MARCH 2022

DAFTAR ISI

1. PROJECT CONTRACT

1.1 DETAIL CLIENT & ENGINEER

DETAIL CLIENT

Nama	:	Riki Anwar
Alamat	:	Politeknik Negeri Malang
Nomor HP	:	+62 858-9619-9719
Judul	:	Rancang Bangun Sistem Kontrol Media Tumbuh Maggot BSF Berbasis IoT (Internet of Things)

DETAIL ENGINEER

Team Leader	:	Muhammad Nur Hidayatullah Adzani
Supervisor	:	Dwi Setia Fardhana
Commissioning Engineer	:	Dwi Setia Fardhana
Microcontroller Programmer	:	Taufiq Sofyan Rahman
Website Programmer	:	Bintang Azhar Nafis

Malang,   2022

Client   Team Leader/Representative

Riki Anwar   ……………………………..

1.2 PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
0	16-Project Schedule_RIKI POLINEMA	31 days	Mon 14/03/22	Tue 12/04/22
1	Jobsheet Clarification	2 days	Mon 14/03/22	Tue 15/03/22
2	Invoice Project	1 day	Tue 15/03/22	Tue 15/03/22
3	Start Project	29 days	Tue 15/03/22	Tue 12/04/22
4	1st Payment -FULL Equipments	0 days	Tue 15/03/22	Tue 15/03/22
5	Buying ALL Equipments	7 days	Wed 16/03/22	Tue 22/03/22
6	Hardware Fabrication	9 days	Wed 16/03/22	Thu 24/03/22
7	PCB Detail Design	3 days	Wed 16/03/22	Fri 18/03/22
8	PCB Manufacture	5 days	Sat 19/03/22	Wed 23/03/22
9	PCB Soldering	1 day	Wed 23/03/22	Thu 24/03/22
10	Quality Check Soldering	1 day	Wed 23/03/22	Thu 24/03/22
11	Electrical Installation	3 days	Thu 24/03/22	Sun 27/03/22
12	Power System Installation	3 days	Thu 24/03/22	Sun 27/03/22
13	Input-Ouput Installation	3 days	Thu 24/03/22	Sun 27/03/22
14	Quality Check Installation	3 days	Thu 24/03/22	Sun 27/03/22
15	Software Developments	19 days	Wed 16/03/22	Sun 03/04/22
16	Microcontroller Programming	19 days	Wed 16/03/22	Sun 03/04/22
17	I/O Listing	1 day	Wed 16/03/22	Wed 16/03/22
18	Input-Ouput Programming	18 days	Thu 17/03/22	Sun 03/04/22
19	Debugging Sequence	18 days	Thu 17/03/22	Sun 03/04/22
20	Website Programming	19 days	Wed 16/03/22	Sun 03/04/22
21	Database Listing	1 day	Wed 16/03/22	Wed 16/03/22
22	Front-End & Back-End Develops	18 days	Thu 17/03/22	Sun 03/04/22
23	Test Local Connection	18 days	Thu 17/03/22	Sun 03/04/22
24	Debugging Program	18 days	Thu 17/03/22	Sun 03/04/22
25	Hosting	5 days	Tue 20/03/22	Sun 03/04/22
26	Commissioning	8 days	Sun 03/04/22	Sun 10/04/22
27	PCB and Microcontroller TEST	1 day	Sun 03/04/22	Mon 04/04/22
28	Microcontroller and Database TEST	3 days	Mon 04/04/22	Thu 07/04/22
29	Database and Website TEST	3 days	Thu 07/04/22	Sun 10/04/22
30	TEST ALL SYSTEM	1 day	Sun 10/04/22	Sun 10/04/22
31	2nd Payment - 50% Engineer	7 days	Sun 03/04/22	Sun 10/04/22
32	Client Training	3 days	Sun 10/04/22	Tue 12/04/22
33	Hardware and Electrical Training	1 day	Sun 10/04/22	Sun 10/04/22
34	Microcontroller and Website Training	3 days	Sun 10/04/22	Tue 12/04/22
35	Jobsheet Final Report	1 day	Tue 12/04/22	Tue 12/04/22
36	Final Payment - 50% Engineer	3 days	Sun 10/04/22	Tue 12/04/22
37	Project Completion	0 days	Tue 12/04/22	Tue 12/04/22

Project Start Date   : 16 Maret 2022

Project Finish Date   : 12 April 2022 (Estimated)

1.3 SCOPE OF WORKS

1.3.1 HARDWARE FABRICATION AND ELECTRICAL INSTALLATION

1. PCB Detail Design Schematic and Board with Main Components.
2. PCB Manufacture.
3. PCB Soldering and Quality Check.
4. Input and Output Installation on PCB Board and Quality Check
5. Power System Installation and Quality Check

1.3.2 MICROCONTROLLER PROGRAMMING

1. I/O Listing of project necessary.
2. C++ Programming.
3. Debugging Program.

1.3.3 WEBSITE PROGRAMMING

1. Database listing of project necessary using MySQL.
2. Front-End Designer.
3. Back-End Designer.
4. Debugging Program.
5. Hosting

1.3.4 COMMISSIONING

1. Check Installation between PCB and Power System.

iMake
Electronic Hobbies

2. Check Installation between PCB and Microcontroller.

3. Check Installation between PCB and Sensor-Actuator.

4. Check connection between Microcontroller and Database.

5. Check connection between Database and Website.

6. TEST ALL SYSTEM

1.3.5 CLIENT TRAINING

1. Explain how Hardware and Electrical works.

2. Explain how system works.

1.4 PRICE

KATEGORI	No	Nama Komponen	Qty	Satuan	Harga(@)		Total		KETERANGAN
MCU	1	Raspberry Pi 3B	1	pcs	Rp	-	Rp	-	SUDAH ADA
	2	Arduino Mega	1	pcs	Rp	-	Rp	165.000,00	
INPUT	3	DHT22	1	pcs	Rp	-	Rp	-	SUDAH ADA
	4	Soil Moisture	3	pcs	Rp	-	Rp	-	SUDAH ADA
	5	Sensor pH	3	pcs	Rp	300.000,00	Rp	900.000,00	
RADIO COMMUNICATION	6	Lora Hope RFM95	2	pcs	Rp	185.000,00	Rp	370.000,00	
	7	Antenna Lora 915MHz	2	pcs	Rp	125.000,00	Rp	250.000,00	
OUTPUT	8	Kamera Raspberry Pi	1	pcs	Rp	100.000,00	Rp	100.000,00	
	9	LCD 20x4	1	pcs	Rp	60.000,00	Rp	60.000,00	
	10	Relay 16CH	1	pcs	Rp	100.000,00	Rp	100.000,00	
	11	Lampu Bohlam 10W	3	psc	Rp	5.000,00	Rp	15.000,00	
	12	Kipas DC 12V	3	pcs	Rp	30.000,00	Rp	90.000,00	
	13	Water Pump Aquarium	3	pcs	Rp	65.000,00	Rp	195.000,00	
POWER	14	PSU 12V/3A	1	pcs	Rp	100.000,00	Rp	100.000,00	
	15	Stepdown LM2596	1	pcs	Rp	15.000,00	Rp	15.000,00	
	16	Kabel Power + Socket	1	pcs	Rp	15.000,00	Rp	15.000,00	
LAIN-LAIN	17	Terminal Blok 2P	1	pcs	Rp	3.000,00	Rp	3.000,00	
	18	Female Header	2	pcs	Rp	2.500,00	Rp	5.000,00	
	19	Male Header	2	pcs	Rp	2.500,00	Rp	5.000,00	
	20	Kabel Tambahan	1	set	Rp	100.000,00	Rp	100.000,00	
	21	Fitting Lampu	3	pcs	Rp	5.000,00	Rp	15.000,00	
	22	Spacer 1cm	4	pcs	Rp	2.500,00	Rp	10.000,00	
	23	Cetak PCB	1	pcs	Rp	50.000,00	Rp	50.000,00	
	24	Sewa hosting	1	Periode	Rp	100.000,00	Rp	100.000,00	
JASA	25	Custom PCB + Design Electric	1	orang	Rp	150.000,00	Rp	150.000,00	
	26	Embedded Program	1	Group	Rp	2.000.000,00	Rp	2.000.000,00	
						Discount	Rp	148.000,00	
						TOTAL HARGA	Rp	4.665.000,00	

Note:

1. This price does not include the cost of project revision. If this project has a revision, first we will learn about the revision. If it's minor revision, we will not charge at all. But, if it's major revision, we will charge start from Rp. 200.000, - (depends on the difficult revision) in every single revision.

2. This price does not include mechanical services.

3. This price is including services of

    a. Free consulting.

    b. Block Diagram.

    c. Programming

    d. Schematic (VISIO).

e. PCB Schematic and Board Drawings.

f. Flowchart.

g. Covering components damage at the time of purchase and installation.

4. This price is absolute and cannot be added or subtracted in the future.
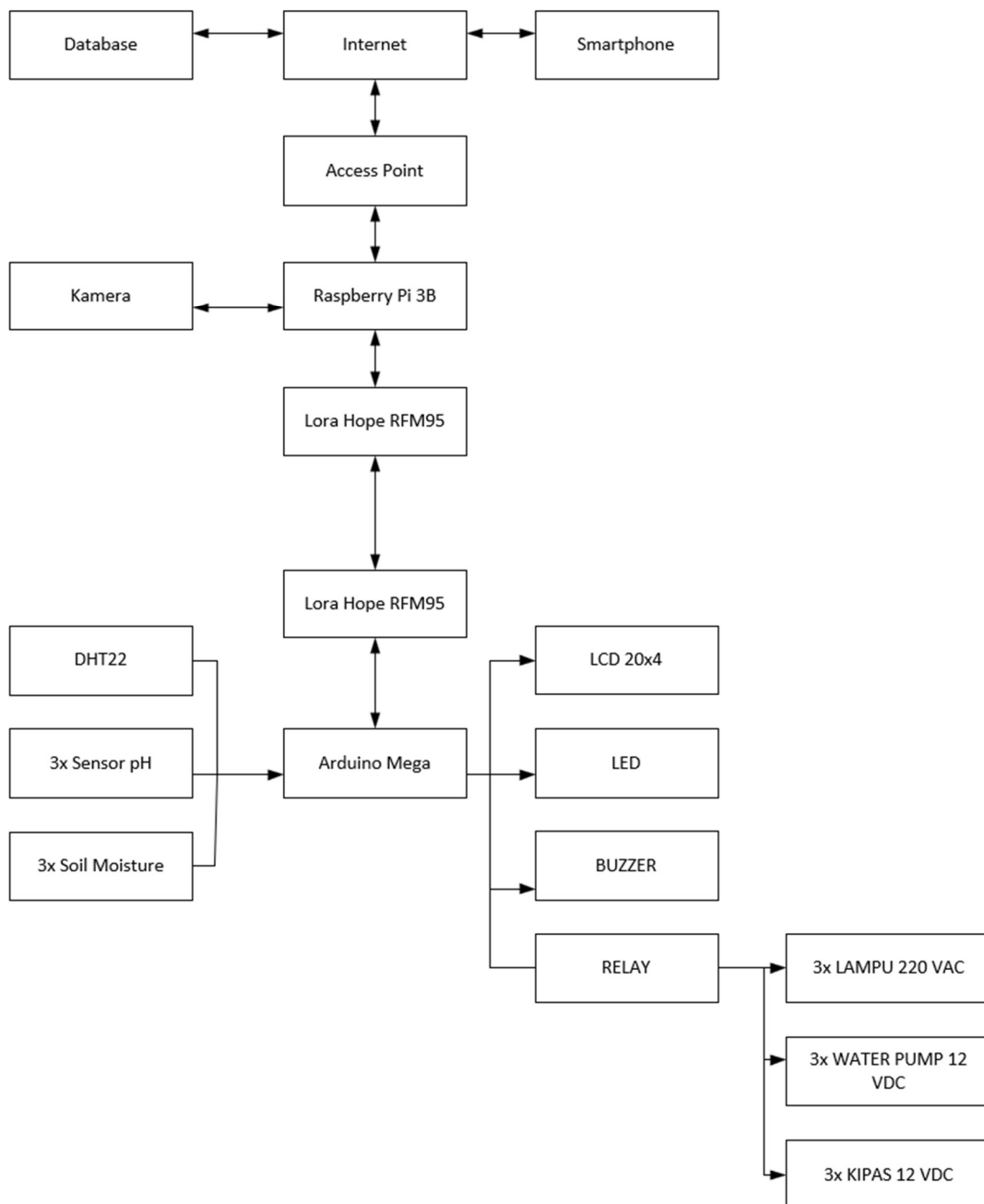
1.5 PAYMENT TERMS

1. First payment is 100% of the total amount equipment's (Rp. 2.665.000, -) for advance.

2. Second payment is 50% of the total amount engineering services (Rp. 1.000.000, -) shall be paid before client training.

3. Final payment is 50% of the total residual amount engineering services (Rp. 1.000.000, -) shall be paid before project completion.

4. Please remit the total amount shown above to Bank Account BCA 0881420693 a/n Muhammad Nur Hidayatullah Adzani

1.6 NOTES

1. This job sheet is valid for 60 days after first payment.

2. This project shall finish earlier or overdue (estimated 1-2 weeks) depends on communications between **Client and Engineer.**

3. All documents will be sent in PDF Files.

4. In the event of error of omissions, we will correct the project as soon as possible.

5. Depending on the thesis schedule. If the project is delayed from project schedule, we will do our best to our clients for final thesis exam in stage 3.

6. All documents or everything can change the project must be submitted to us in time.

2. BLOCK DIAGRAM

Responsible   :   Muhammad Nur Hidayatullah Adzani

               :   Dwi Setia Fardhana

```
  Database  <--->  Internet  <--->  Smartphone

                  Access Point

  Kamera   <--->  Raspberry Pi 3B

                  Lora Hope RFM95

                  Lora Hope RFM95

  DHT22                                  LCD 20x4

  3x Sensor pH  --->  Arduino Mega --->  LED

  3x Soil Moisture                       BUZZER

                                         RELAY  --->  3x LAMPU 220 VAC

                                                      3x WATER PUMP 12 VDC

                                                      3x KIPAS 12 VDC
```

3. WORKING PRINCIPLE

Responsible : Muhammad Nur Hidayatullah Adzani

: Dwi Setia Fardhana

3.1 Daftar komponen yang digunakan

No	Nama Barang	Deskripsi Barang
1	Arduino Mega 2560	Sebagai microcontroller untuk mengendalikan sensor dan aktuator
2	DHT 22	Sebagai sensor untuk mendapatkan nilai suhu dalam satuan Celcius dan kelembapan dalam satuan persentase pada RUANGAN
3	Sensor pH	Sebagai sensor untuk mendapatkan nilai pH dalam media cair.
4	Sensor Moisture	sensor untuk mendapatkan nilai kelembapan dari tanah dalam satuan persentase 0-100%
5	LCD 20x4	Menampilkan seluruh data pada poin 1-3 dengan durasi yang ditentukan
6	LED	Sebagai indikator lampu
7	Buzzer	Sebagai indikator suara
8	Relay	Sebagai saklar otomatis untuk aktuator
9	Lampu AC 220VAC	Sebagai aktuator untuk penghangat media
10	Water Pump 12VDC	Sebagai aktuator untuk mendistribusikan air ke media
11	Kipas DC 12VDC	Sebagai media untuk mengeluarkan udara kotor
12	Lora Hope RFM95	Sebagai saluran komunikasi antara dua hardware yang tidak saling terhubung atau berjauhan
13	Raspberry Pi 3B	Sebagai Mini-PC untuk merekam kondisi media dalam bentuk foto dan mengirim data dari hardware pada poin nomor 1 ke database

| 14	Access Point	Sebagai saluran komunikasi antara raspberry dengan Internet
15	Database	Sebagai tempat untuk menyimpan data dari setiap sensor
16	Smartphone	Sebagai tempat untuk memonitoring data real-time dari jarak jauh

3.2 Cara Kerja

1. Nilai dari DHT22 di tampilkan pada LCD 20x4 dan website
2. Nilai dari pH ditampilkan pada LCD 20x4 dan website
3. Nilai dari soil moisture ditampilkan pada LCD 20x4 dan website
4. Ketika nilai soil moisture dibawah 50% maka water pump akan ON
5. Ketika nilai soil moisture diatas 50% maka water pump akan OFF
6. Lampu akan ON ketika suhu ruang <30 C
7. Lampu akan OFF ketika suhu ruang >34 C
8. Kipas akan ON ketika suhu ruang >34 C
9. Kipas akan OFF ketika suhu ruang <34 C
10. LED Hijau akan ON ketika start system
11. LED Merah dan buzzer akan ON ketika nilai pH dibawah 4 dan diatas 8, suhu terlalu tinggi atau rendah, kelembapan media terlalu rendah
12. Kamera pada raspberry hanya digunakan untuk memfoto dengan bantuan button pada website
13. Apabila raspberry tidak mendapatkan jaringan internet maka smartphone tidak dapat mengupdate data pada media
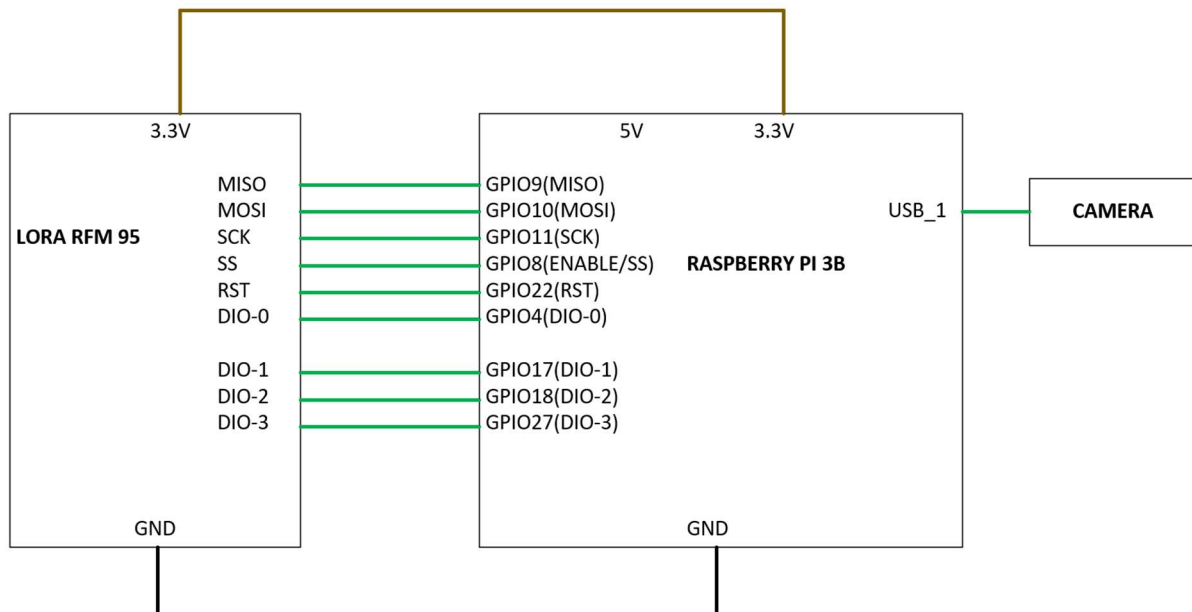
4. SCHEMATIC

Responsible   :   Muhammad Nur Hidayatullah Adzani

            :   Dwi Setia Fardhana

4.1 Full Schematic
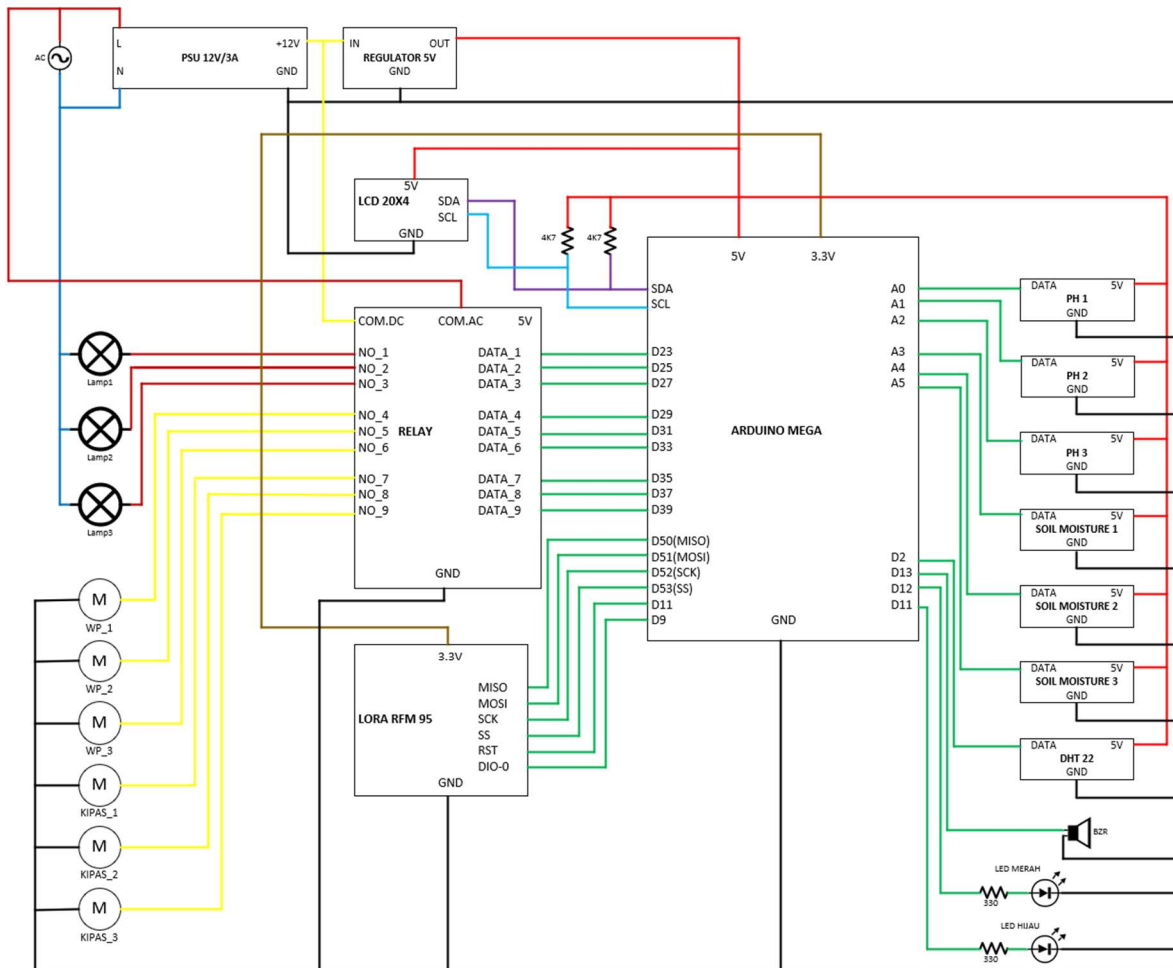
4.2 Arduino Mega & pH Sensor Connection

4.3 Arduino Mega & Soil Moisture Connection

4.4 Arduino Mega & DHT22 Connection

4.5 Arduino Mega & Lora Hope RFM95 Connection

4.6 Arduino Mega & Relay Connection

4.7 Arduino Mega & LCD 20x4 Connection

4.8 Arduino Mega & Indicator Connection

4.9 Raspberry Pi 3B & Lora Hope RFM95 Connection

4.10 Raspberry Pi 3B & Camera Connection

5. FLOWCHART

Responsible : Bintang Azhar Nafis

       Taufiq Sofyan Rahman

6. COMMISSIONING

Responsible : Dwi Setia Fardhana

Helper   : Bintang Azhar Nafis

             : Taufiq Sofyan Rahman

7. DOCUMENTATION

Responsible   : Dwi Setia Fardhana

                    : Bintang Azhar Nafis

                    : Taufiq Sofyan Rahman