# TEST PLAN

Automatic Irrigation System

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ABHISHA BHESANIYA
Embedded Systems Hardware Design

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# 1. Introduction

## 1.1 Objective

The purpose of this document is to set forth a complete test plan for all the onboard components and peripherals of the automatic irrigation system's PCB.

## 1.2 System Block Diagram

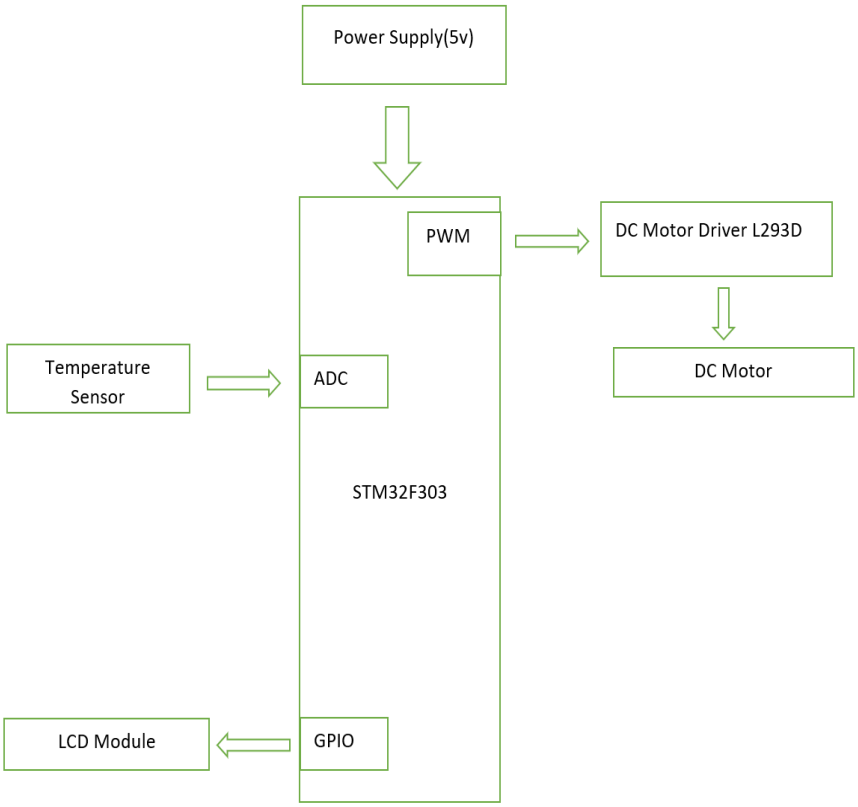


**Figure 1 System Block Diagram**

## 1.3 Phase Breakdown

1. Visual Inspection
    a. Individual component inspection
    b. Solder check
    c. Jumper check
2. Power Supply and Regulator Testing
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4. Peripheral Circuit Testing
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    e. LCD
5. System-Level Testing
    a. System software loading
    b. Performance testing

# PHASE 1: VISUAL INSPECTION

## Individual Component Inspection

Inspect every component given in the list below.

| Sr. No | Components | Good solder connection | Proper orientation | Correct values |
|---|---|---|---|---|
| 1 | 16X2 LCD | | | |
| 2 | Temperature Sensor | | | |
| 3 | DC Motor | | | |
| 4 | DC Motor Driver L293D | | | |
| 5 | STM32F303 Board | | | |
| 6 | Resistor 1 | | | |
| 7 | Resistor 2 | | | |
| 8 | Resistor 3 | | | |
| 9 | Resistor 4 | | | |
| 10 | Resistor 5 | | | |
| 11 | Capacitor 1 | | | |
| 12 | Capacitor 2 | | | |
| 13 | Capacitor 3 | | | |
| 14 | Diode | | | |
| 15 | Transistor (BC846B) | | | |

**Table 1 Components List for Inspection**

### Solder Check

During checking for solder joints if you find any open or short circuit please log it in below given text box.

## PHASE 2: POWER SUPPLIES AND REGULATORS

### Voltage Verification

Make sure STM 303 is getting 5 V DC.

### Power Pin Verification

For the below-given list measure the voltage level.

| Location | Expected Voltage | Measured Voltage |
|---|---|---|
| GPIO | 0/3.3 | |
| Headers | ------- | |
| Header p3 | 3.3 | |
| Header P5 | 5 | |
| Vias | ------- | |

**Table 2 List of the location to verify the voltage**

## PHASE 3: SOFTWARE LOADING

### I/O Testing

Once the tester has successfully loaded test software on the board measure the voltage at following PINs.

| Sr. No (header pin no) | PIN Name | Expected Voltage at Logic 1 (HIGH) | Measured Voltage at Logic 1 (HIGH) | Expected Voltage at Logic 0 (LOW) | Measured Voltage at Logic 0 (LOW) |
|---|---|---|---|---|---|
| 8 | GND | ------- | ------- | 0 | |
| 12 | 3V3 | 3.3 | | ------- | |
| 16 | 3V3 | 3.3 | | ------- | |
| 18 | 5V0 | 5.0 | | ------- | |
| 19 | GND | ------- | ------- | 0 | |
| 20 | GND | ------- | ------- | 0 | |
| 21 | PB7 | 3.3 | | 0 | |

| | | | | | |
|---|---|---|---|---|---|
| 22 | GND | ------- | ------- | 0 | |
| 28 | PA0 | 3.3 | | 0 | |
| 30 | PA1 | 3.3 | | 0 | |
| 32 | PA4 | 3.3 | | 0 | |
| 35 | PC2 | 3.3 | | 0 | |
| 36 | PC1 | 3.3 | | 0 | |
| 38 | PC0 | 3.3 | | 0 | |

**Table 3 List of Pins for Header P1**

| Sr. No (header pin no) | PIN Name | Expected Voltage at Logic 1 (HIGH) | Measured Voltage at Logic 1 (HIGH) | Expected Voltage at Logic 0 (LOW) | Measured Voltage at Logic 0 (LOW) |
|---|---|---|---|---|---|
| 7 | AVDD | 3.3 | | -------- | ------- |
| 9 | GND | ------- | ------- | 0 | |
| 13 | PA6 | 3.3 | | 0 | |
| 15 | PA7 | 3.3 | | 0 | |
| 16 | PB12 | 3.3 | | 0 | |
| 17 | PB6 | 3.3 | | 0 | |
| 18 | PB11 | 3.3 | | 0 | |
| 20 | GND | ------- | ------- | 0 | |
| 21 | PA9 | 3.3 | | 0 | |
| 23 | PA8 | 3.3 | | 0 | |
| 25 | PB10 | 3.3 | | 0 | |
| 26 | PB15 | 3.3 | | 0 | |
| 27 | PB4 | 3.3 | | 0 | |
| 29 | PB5 | 3.3 | | 0 | |
| 30 | PB13 | 3.3 | | 0 | |
| 32 | AGND | ------- | ------- | 0 | |
| 33 | PA10 | 3.3 | | 0 | |

**Table 4 List of Pins for Header P2**

# PHASE 4: PERIPHERAL CIRCUIT TESTING

## DC Motor and Feedback

After loading, software check the voltage level at every pin on header p5.

| Sr. No | Name | Expected Voltage | Measured Voltage |
|---|---|---|---|
| 1 | M2 | 5.0 | |
| 2 | VCC | 3.3 | |
| 3 | C2 | ------ | |
| 4 | C1 | ------ | |
| 5 | GND | 0 | |
| 6 | M1 | 5.0 | |

**Table 5 List of Pins for Header P5**

Once you check the voltage on every pin test it with software.

## DC Motor Power

After loading, software check the voltage level at every pin on header p4.

| Sr. No | Name | Expected Voltage | Measured Voltage |
|---|---|---|---|
| 1 | V motor | ---- | |
| 2 | GND | 0 | |

**Table 6 List of Pins for Header P4**

Once you check the voltage on every pin test it with software.

## Temperature Sensor

After loading, software check the voltage level at every pin of Q2.

| Sr. No | Name | Expected Voltage | Measured Voltage |
|---|---|---|---|
| 1 | VCC | 3.3 | |
| 2 | Output | ------- | |
| 3 | GND | 0 | |

**Table 7 List of Pins for Header Q2**

Once you check the voltage on every pin test it with software.

## Analog I/O

After loading, software check the voltage level at every pin on header p3.

| Sr. No | Name | Expected Voltage | Measured Voltage |
|---|---|---|---|
| 1 | AGND | 0 | |
| 2 | PC0 | ------- | |
| 3 | PC1 | ------- | |
| 4 | PC2 | ------- | |
| 5 | PA4 | ------- | |
| 6 | AVDD | | |

**Table 8 List of Pins for Header P3**

Once you check the voltage on every pin test it with software.

## LCD

Check voltage level at every pin of header p6 which is listed below.

| Sr. No | Name | Expected Voltage | Measured Voltage |
|---|---|---|---|
| 1 | VSS | 0 | |

| | | | |
|---|---|---|---|
| 2 | VDD | 3.3 | |
| 3 | Vo | ------ | |
| 4 | RS | 0/3.3 | |
| 5 | R/W | 0/3.3 | |
| 6 | E | 3.3 | |
| 7 | DB0 | 0/3.3 | |
| 8 | DB1 | 0/3.3 | |
| 9 | DB2 | 0/3.3 | |
| 10 | DB3 | 0/3.3 | |
| 11 | DB4 | 0/3.3 | |
| 12 | DB5 | 0/3.3 | |
| 13 | DB6 | 0/3.3 | |
| 14 | DB7 | 0/3.3 | |
| 15 | LED+ | 3.3 | |
| 16 | LED- | 0 | |

**Table 9 List of Pins for Header P6**

After checking voltage on pin check voltage at vias and test it with software too.

# PHASE 4: SYSTEM LEVEL TESTING

## System-Level Software

After loading the software and testing the individual part of it with hardware test it for the entire system together.

## Performance Testing

Test all the peripherals with it's maximum and minimum limits.