component testing

V1

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01/02/2023

1. water flow sensor

Pin definition

VCC	5V
GND	GND
Signal	PWM Output (GPIO27)

Sample Program

This is the sample program to measure water flow rate and the total water flow through the sensor.

```
#include <Arduino.h>
#define LED_BUILTIN 2
#define SENSOR 27

long currentMillis = 0;
long previousMillis = 0;
int interval = 1000;
boolean ledState = LOW;
float calibrationFactor = 4.5;
volatile byte pulseCount;
byte pulse1Sec = 0;
float flowRate;
unsigned int flowMilliLitres;
unsigned long totalMilliLitres;

void IRAM_ATTR pulseCounter()
{
  pulseCount++;
}

void setup()
{
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
  pinMode(SENSOR, INPUT_PULLUP);

  pulseCount = 0;
  flowRate = 0.0;
  flowMilliLitres = 0;
```

```
  totalMilliLitres = 0;
  previousMillis = 0;
  attachInterrupt(digitalPinToInterrupt(SENSOR), pulseCounter, FALLING);
}

void loop()
{
  currentMillis = millis();
  if (currentMillis - previousMillis > interval)
  {
    pulse1Sec = pulseCount;
    pulseCount = 0;
    // Because this loop may not complete in exactly 1 second intervals we
calculate
    // the number of milliseconds that have passed since the last
execution and use
    // that to scale the output. We also apply the calibrationFactor to
scale the output
    // based on the number of pulses per second per units of measure
(litres/minute in
    // this case) coming from the sensor.
    flowRate = ((1000.0 / (millis() - previousMillis)) * pulse1Sec) /
calibrationFactor;
    previousMillis = millis();

    // Divide the flow rate in litres/minute by 60 to determine how many
litres have
    // passed through the sensor in this 1 second interval, then multiply
by 1000 to
    // convert to millilitres.
    flowMilliLitres = (flowRate / 60) * 1000;
    // Add the millilitres passed in this second to the cumulative total
    totalMilliLitres += flowMilliLitres;

    // Print the flow rate for this second in litres / minute
    Serial.print("Flow rate: ");
    Serial.print(int(flowRate)); // Print the integer part of the variable
    Serial.print("L/min");
    Serial.print("\t"); // Print tab space
    // Print the cumulative total of litres flowed since starting
    Serial.print("Output Liquid Quantity: ");
```

```
    Serial.print(totalMilliLitres);
    Serial.print("mL / ");
    Serial.print(totalMilliLitres / 1000);
    Serial.println("L");
  }
}
```

2. Ultrason sensor

Pin definition

VCC	Power Input
GND	Ground
RX	Processed Value/Real-time Value Output Selection (GPIO 16)
TX	UART Output (GPIO17)

Sample Code

```
#include <Arduino.h>
#include <SoftwareSerial.h>
//SoftwareSerial mySerial(11,10); // RX, TX
//#define mySerial Serial2 // RX2, TX2
#define RXD2 16
#define TXD2 17
unsigned char data[4]={};
float distance;
void setup()
{
 Serial.begin(9600);
 Serial2.begin(9600);
}
void loop()
{
 do{
 for(int i=0;i<4;i++)
 {
 data[i]=Serial2.read();
 }
 }while(Serial2.read()==0xff);
 Serial2.flush();
 if(data[0]==0xff)
```

```
 {
 int sum;
 sum=(data[0]+data[1]+data[2])&0x00FF;
 if(sum==data[3])
 {
 distance=(data[1]<<8)+data[2];
 if(distance>280)
 {
 Serial.print("distance=");
 Serial.print(distance/10);
 Serial.println("cm");
 }else
 {
 Serial.println("Below the lower limit");
 }
 }else Serial.println("ERROR");
 }
 delay(150);
}
```

3. Water pressure sensor

Pin definition

VCC	5V
GND	GND
Signal (Output:0.5~4.5V)	Analog Signal (GPIO15)

Sample Code

Read Data by Serial Port.

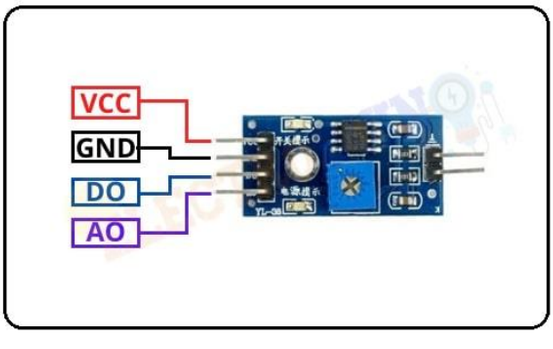
```
#include <Arduino.h>

const float OffSet = 0.483;
float V, P;

void setup()
```

```
{
  Serial.begin(9600); // open serial port, set the baud rate to 9600 bps
  Serial.println("/** Water pressure sensor demo **/");
}
void loop()
{
  // Connect sensor to Analog 0
  V = analogRead(15) * 5.00 / 1024; // Sensor output voltage
  P = (V - OffSet) * 400;           // Calculate water pressure
  Serial.print("Voltage:");
  Serial.print(V, 3);
  Serial.println("V");
  Serial.print(" Pressure:");
  Serial.print(P, 1);
  Serial.println(" KPa");
  Serial.println();
  delay(500);
}
```

4. Moisture sensor

Pin definition

VCC	5V
GND	GND
D0	Digital Output (0or1)
A0	Analog Output (range 0 to 1023)

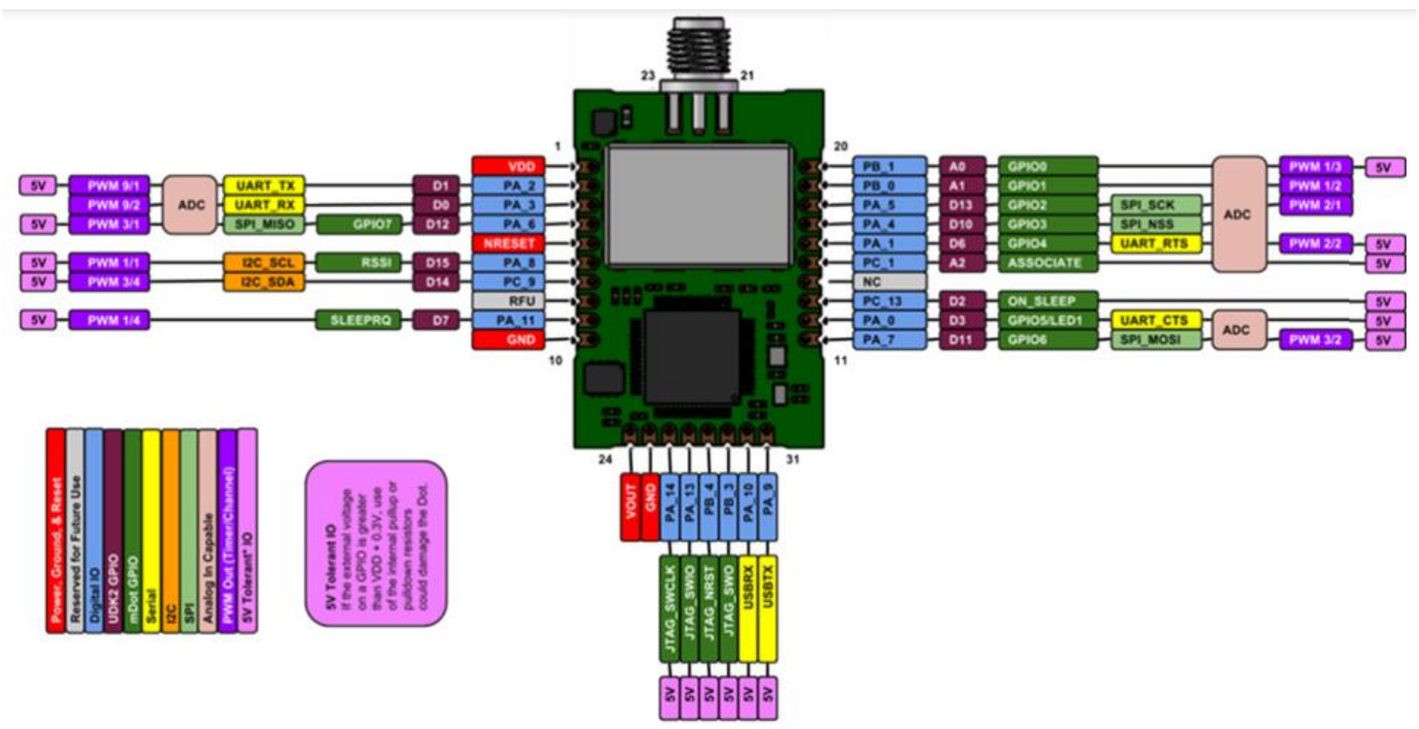


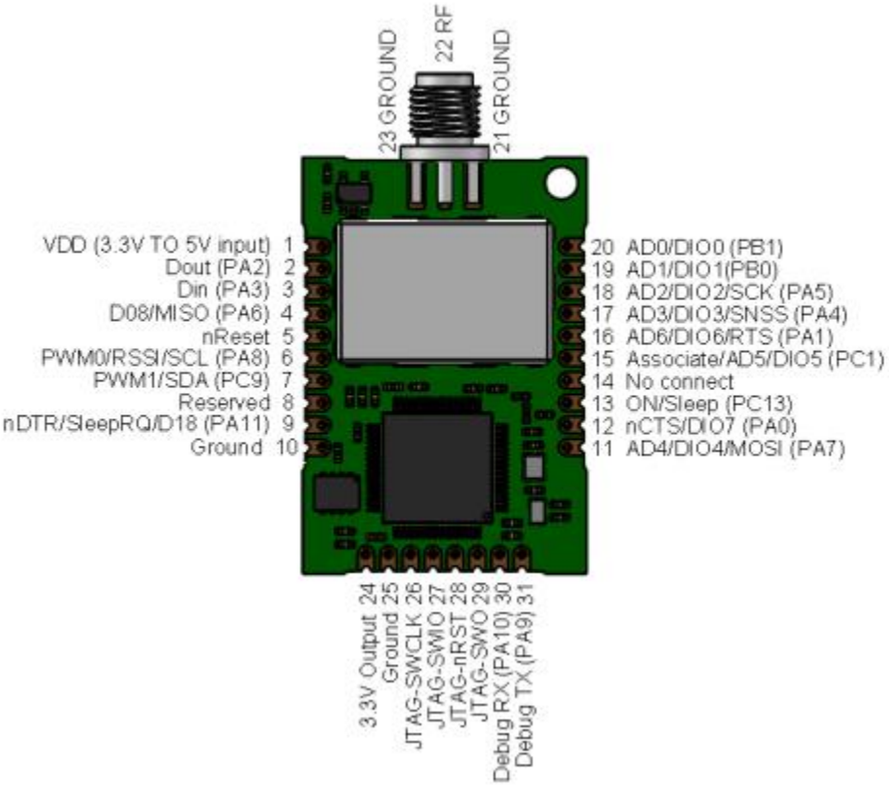
Sample code

```
#include <Arduino.h>

void setup()
{
  Serial.begin(115200);
}

void loop()
{
  Serial.println(analogRead(15) / (float)4095 * 3.3);
  delay(1000);
}
```

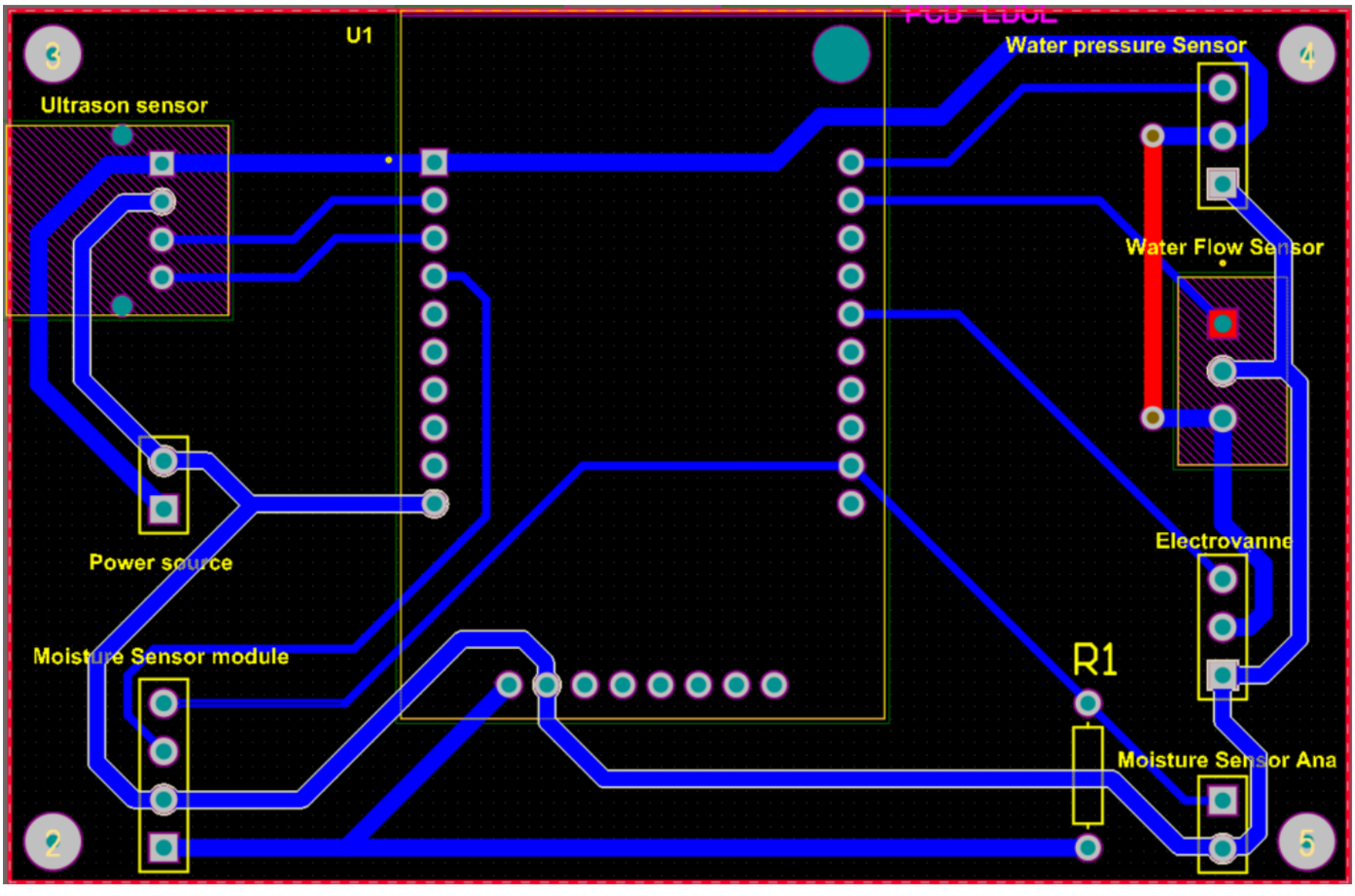
5. Pins interfaced with MtDot LoRaWAN 1.0.1

Sensor	Pin description		Interfaces
Water pressure sensor	Analog	PB1	
Water Flow Sensor	PMW Output	PB0	
Moisture Sensor	Analog	PA0	
Ultrason sensor	UART_RX	PA3	UART
	UART_TX	PA2	




23 GROUND
22 RF
21 GROUND
VDD (3.3V TO 5V input) 1
Dout (PA2) 2
Din (PA3) 3
D08/MISO (PA6) 4
nReset 5
PWM0/RSSI/SCL (PA8) 6
PWM1/SDA (PC9) 7
Reserved 8
nDTR/SleepRQ/D18 (PA11) 9
Ground 10
20 AD0/DIO0 (PB1)
19 AD1/DIO1(PB0)
18 AD2/DIO2/SCK (PA5)
17 AD3/DIO3/SNSS (PA4)
16 AD6/DIO6/RTS (PA1)
15 Associate/AD5/DIO5 (PC1)
14 No connect
13 ON/Sleep (PC13)
12 nCTS/DIO7 (PA0)
11 AD4/DIO4/MOSI (PA7)
3.3V Output 24
Ground 25
JTAG-SWCLK 26
JTAG-SWIO 27
JTAG-nRST 28
JTAG-SWO 29
Debug RX (PA10) 30
Debug TX (PA9) 31

6. PCB Design


U1
Ultrason sensor
Water pressure Sensor
Water Flow Sensor
Power source
Electrovanne
Moisture Sensor module
R1
Moisture Sensor Ana