Wednesday, November 4, 2015

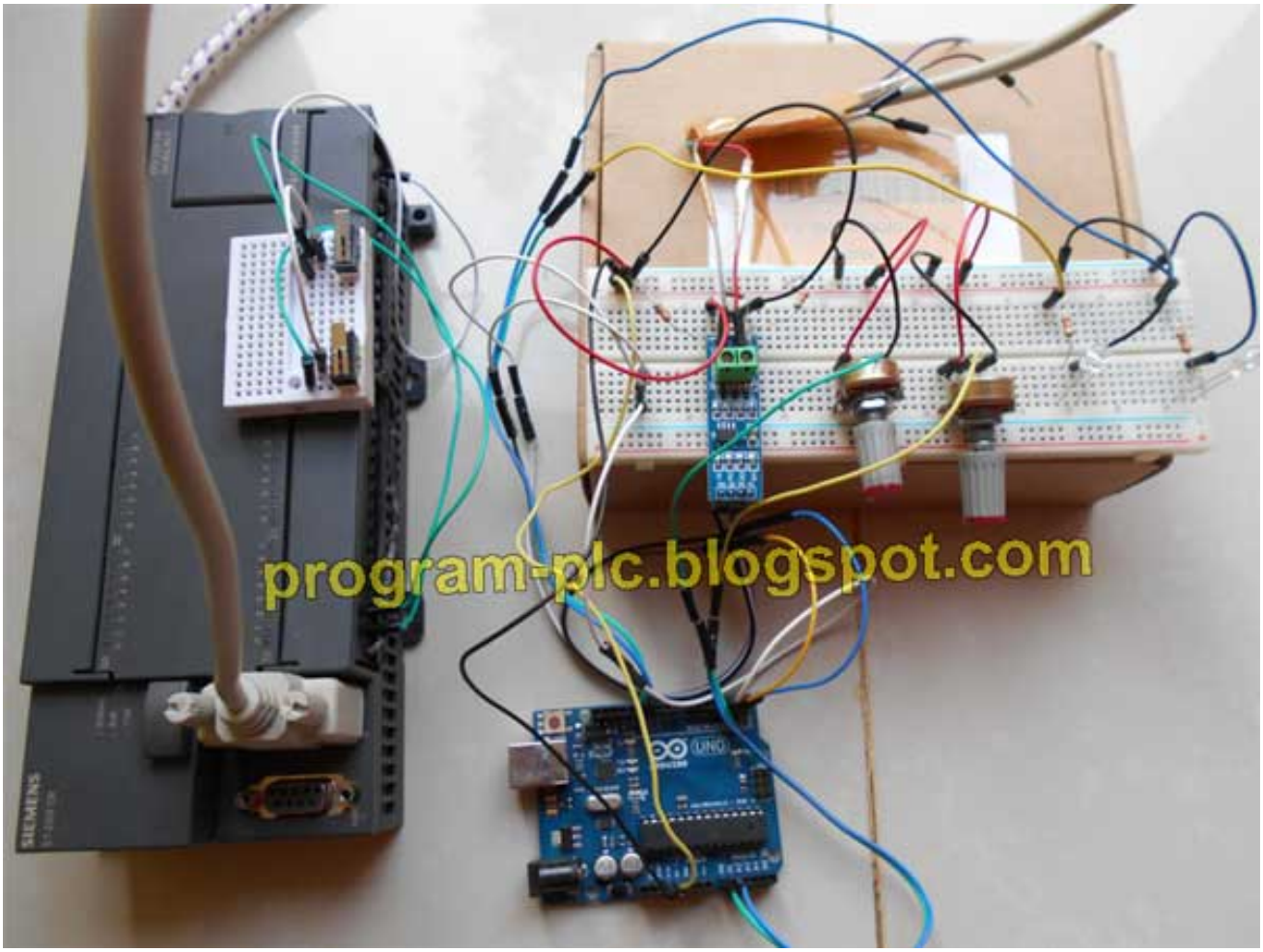
PLC Modbus Master - Arduino Modbus Slave - 2 Wire RS485 Communication Module

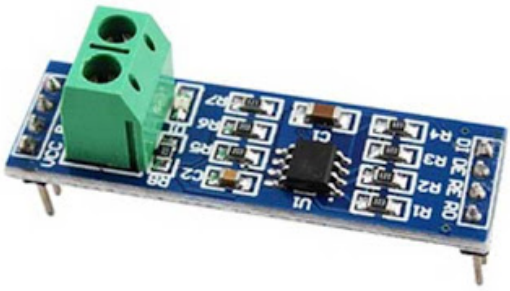
How to make PLC such as Modbus Master and Communicate with Arduino such as Modbus Slave ?
This article about RS454 communication between PLC Modbus Master and Arduino Modbus Slave using RS485 Module.
This application not use RS-232 PPI Multi-Master Cable of S7-200 PLC for communication between PLC and Arduino.
let us read this article and let's go watch the YouTube video below:
Video demonstration about RS485 Communication Between PLC Modbus Master and Arduino Modbus Slave

RS485 Communication Between PLC Modbus Master and Arduino Modbus Slave

The hardware you need

1. Arduino UNO
2. Serial TTL to RS485 Transceiver MAX485 Module
3. Siemens S7-200 PLC
4. 1 Resistor 220 ohm
5. 2 Resistors 330 ohm
6. Power supply for Arduino UNO
7. DB9 Male Connector
8. Optional Hardware for testing:
    - 2 Potentiometer 10 K ohm
    - 1 LED Blue and 1 LED Red
    - 2 Resistors 330 ohm
    - 2 Push Button

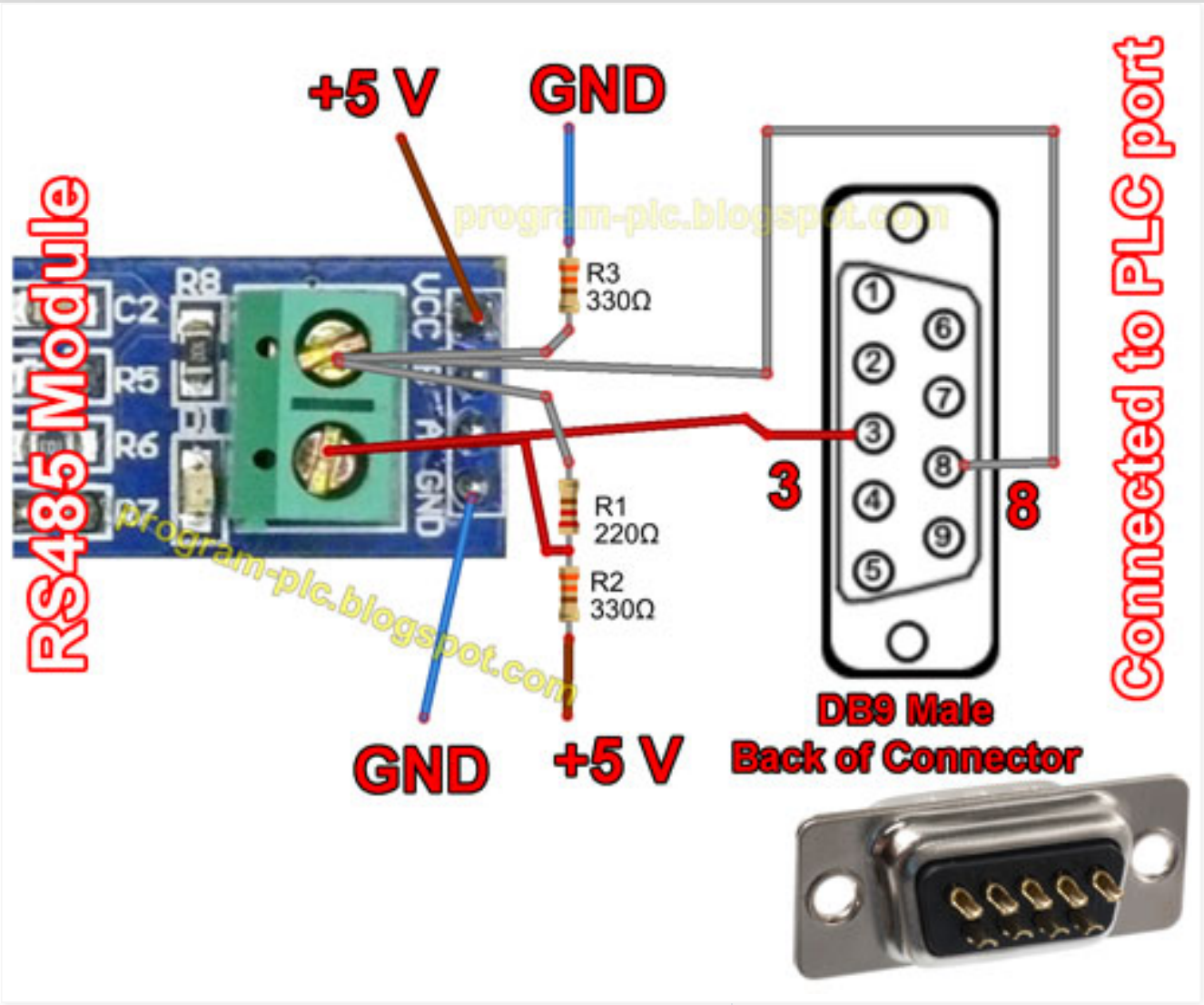




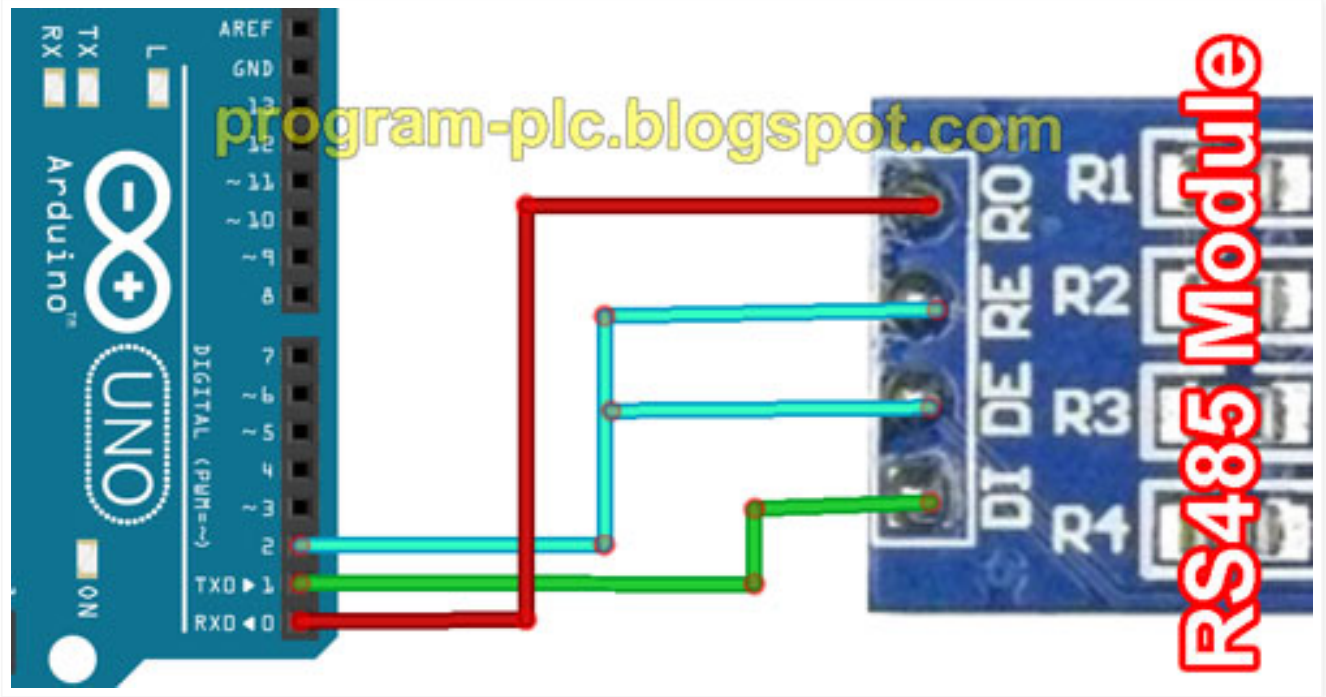
RS485 Transceiver Module

Hardware Connections

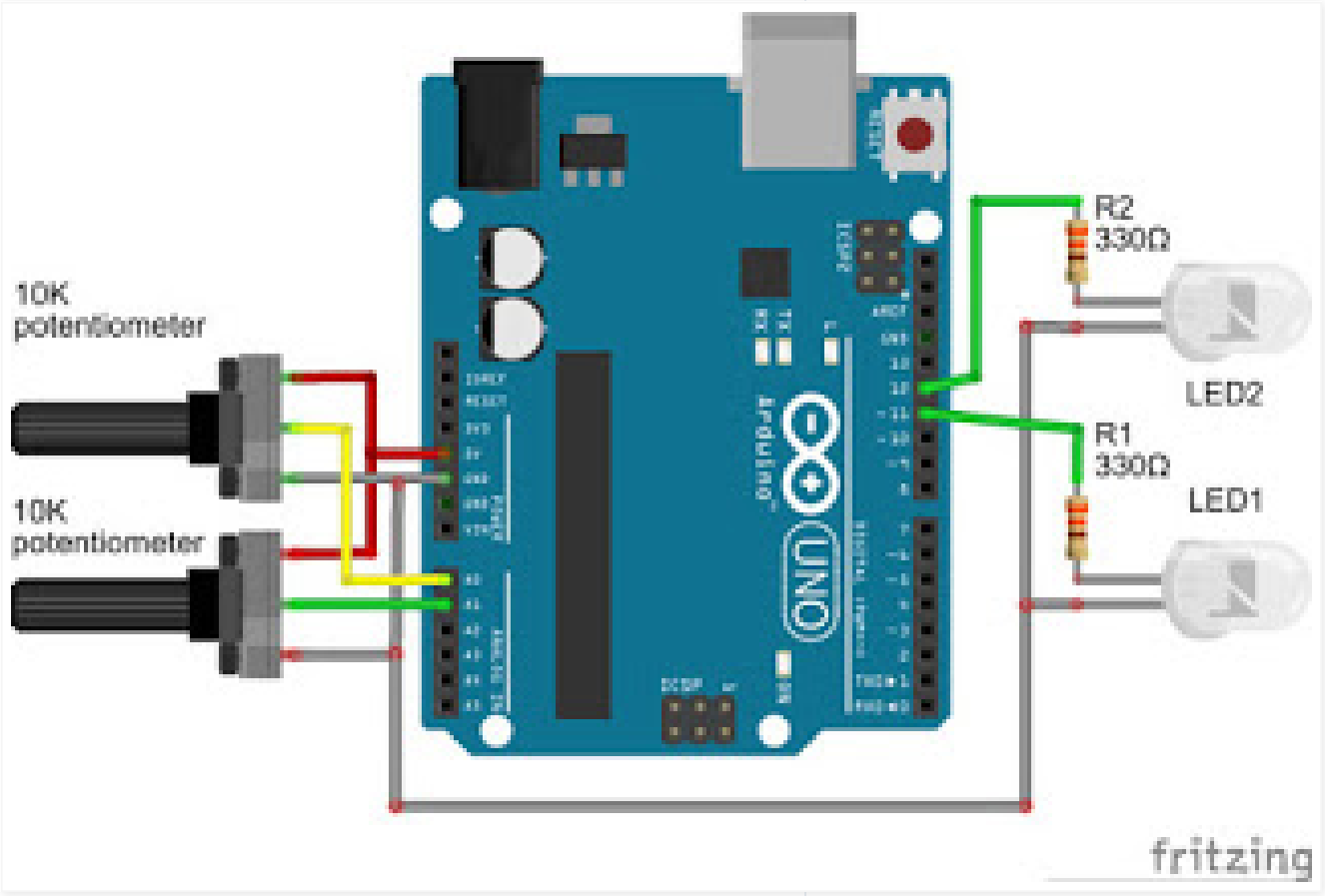
1. Connections between RS485 Module and PLC



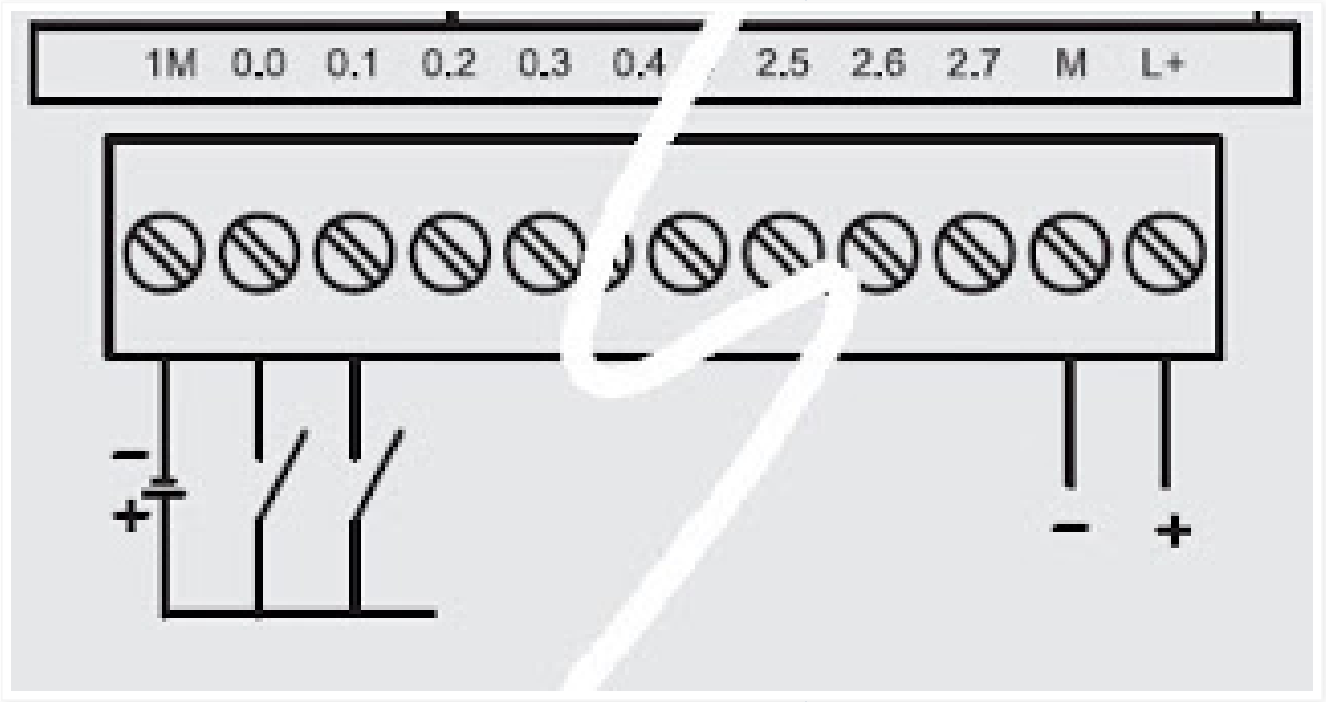
2. Connections between RS485 Module and Arduino



3. Connections between Arduino, Potentiometers and LEDs



4. Connections between PLC and Push Button



The software you need

1. Download the Arduino Software : https://www.arduino.cc/en/Main/Software
   and I use ARDUINO SOFTWARE HOURLY BUILDS version 1.6.6 for Windows

2. Download Arduino Modbus Slave library : click here
   Unzip and Copy Paste to folder C:\arduino-nightly\libraries (Only ModbusSlaveLib folder)

Project file for RS485 Communication Between PLC and Arduino

1. Download Arduino Project File : click here
   Upload to Arduino UNO

2. Download PLC Project File : click here
   Download to Siemens S7-200 PLC

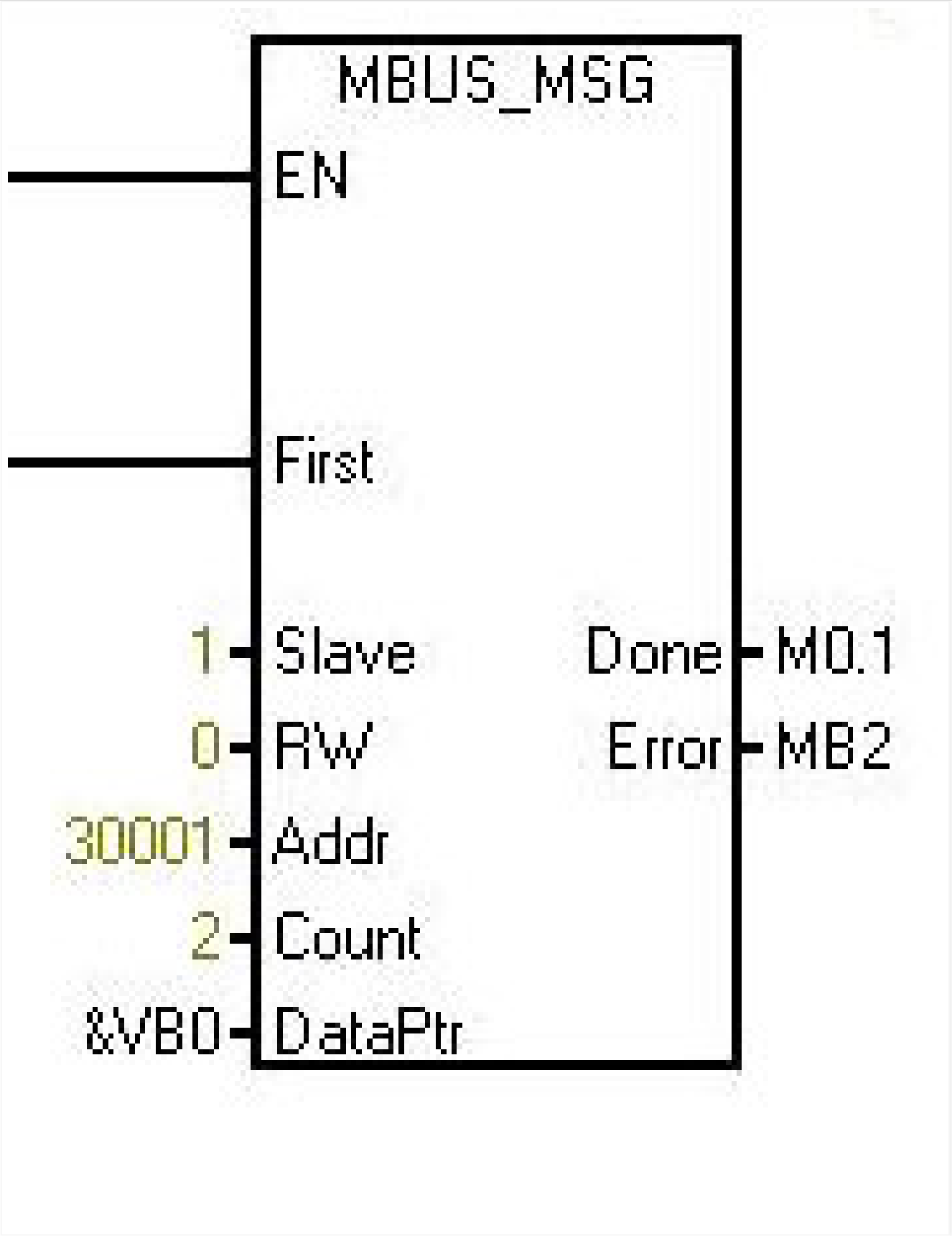
Modbus Data
In Arduino Modbus Slave with slave address 1:

1. Analog data from potentiometer1 and potentiometer2 for set Modbus Registers 30001 and 30002
2. Modbus Registers 40001 and 40002 for drive LED1 and LED2

```
void loop()
{
  digitalWrite(LED1, regBank.get(40001));
  digitalWrite(LED2, regBank.get(40002));
  regBank.set(30001, (word) analogRead(A0)); //from 0 - 1023
  regBank.set(30002, (word) analogRead(A1)); //from 0 - 1023
  slave.run();
}
```

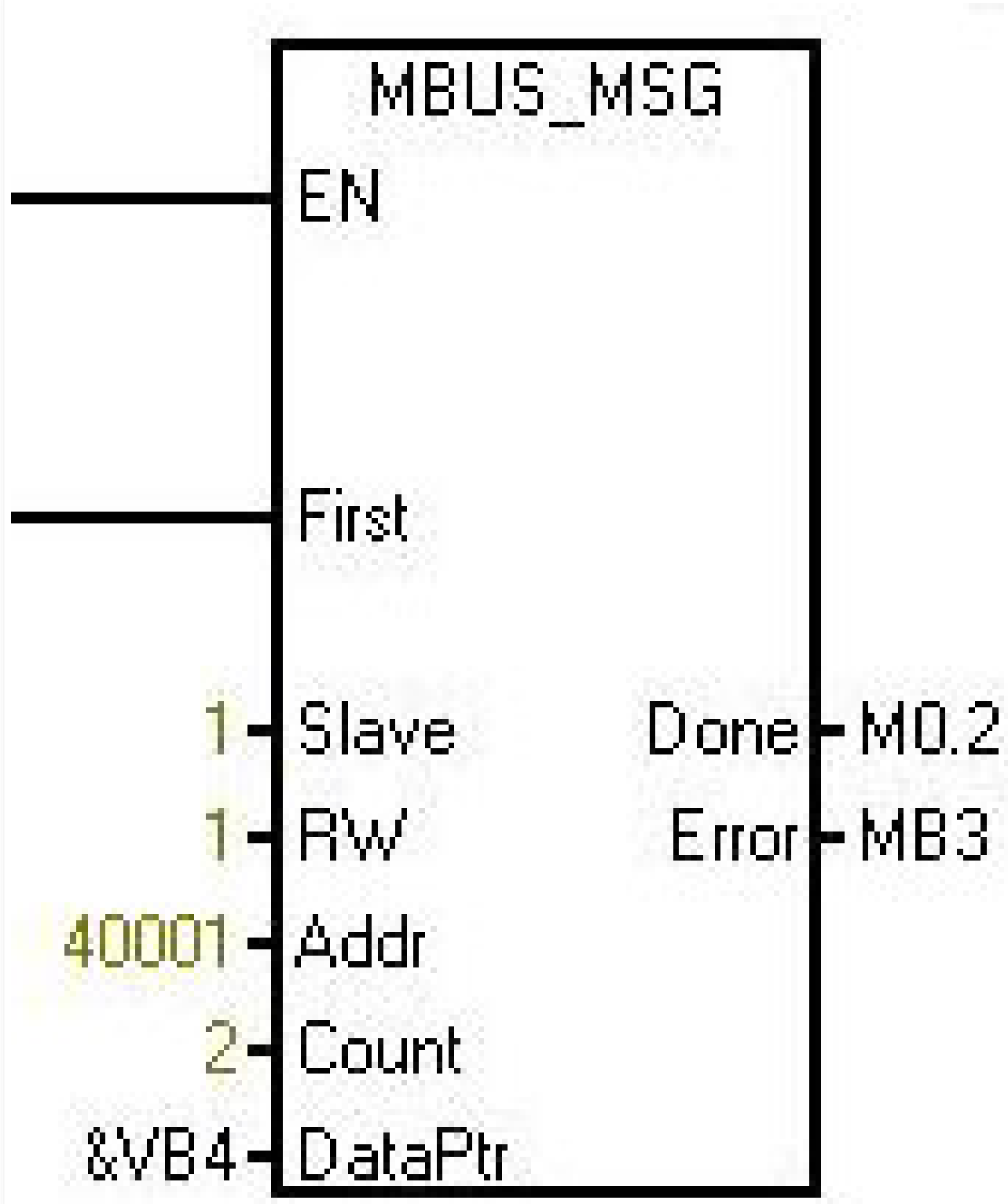
In PLC Modbus Master:
Read Modbus Registers 30001 and 30002

1. Read Data from Modbus Registers 30001 and 30002
2. Save to VW0 for 30001 and VW2 for 30002
3. VW0 for drive PLC Output Q1.0 to Q1.7
4. VW2 for drive PLC Output Q0.0 to Q0.7



Write Modbus Registers 40001 and 40002

1. Write Data to Modbus Registers 40001 and 40002
2. Value from VW4 to 40001
3. Value from VW6 to 400002



Arduino Code for RS485 Communication Between PLC and Arduino