RS-485 Interfacing through Odroid-C2 and Arduino

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CONTENTS

Arduino	Max485	USB-RS485
Tx	DI	
Rx	RO	
D4	DE	
D5	RE	
5V	VCC	
GND	GND	
	A	A
	B	B

TABLE 2

1 COMPONENTS

Component	Quantity
USB-RS485	1
Max485	2
Arduino	2
Known Resistors	2
Unknown Resistors	2

TABLE 1

Fig. 2.1

2 SINGLE SLAVE

2.1 Hardware Connections

Problem 2.1. Make the pin connections as in Table 2. Also connect the Resistors R_1 and R_2 according to Fig. 2.1.

2.2 Software Setup

For Arduino: This library needs to be copied to the libraries folder in the sketchbook directory of Arduino. https://github.com/smarmengol/Modbus-Master-Slave-for-Arduino

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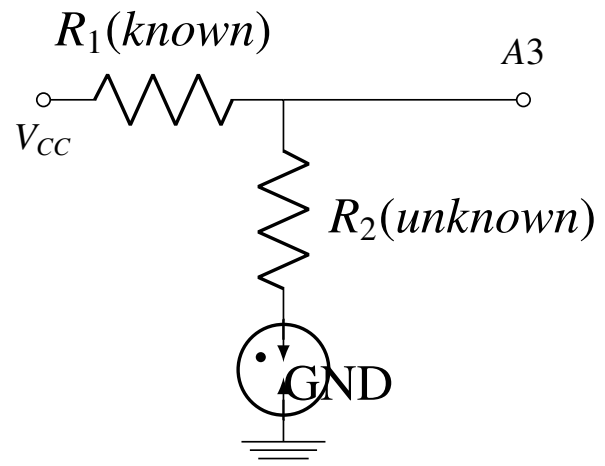
2.3 Configuring Arduino as slave

Problem 2.2. Run the following program on the odroid using Arduino software. This will configure the Arduino as a slave.

```
#include "Arduino.h"
#include <ModbusRtu.h>
#define TXEN    4

// Storing resistance value
```

```
uint16_t resistance[1] = {0};
//To initialize the slave arduino
    with address 1
//And using 0/1 pin of arduino as
    TX/RX
//TXEN enables MAX485 transmission
Modbus slave(1,0,TXEN);

void setup() {
//analog pin A3 used for received
    resistance value
  pinMode(A3, INPUT);
 // Baudrate at which modbus works
  slave.begin(19200);
}
void loop() {
  resistance[0]=(analogRead(A3));
  slave.poll(resistance, 1);
}
```

2.4 On Odroid

The following commands are for an Odroid running Archlinuxarm. The process for running it on other Linux distributions is similar.

```
#For minimalmodbus,
#python module to control RS-485
sudo pip install minimalmodbus
```

2.5 Odroid as Master

Problem 2.3. Run the following code on Odroid. You will see the resistance value being displayed.

```
#!usr/bin/env python

import time
import minimalmodbus
import serial


instrument = minimalmodbus.
    Instrument('/dev/ttyUSB0',1)
vi=5;#VCC
r1=1000;#1K known resistance

#Modbus Configuration for Master
instrument.serial.baudrate =
    19200
instrument.serial.bytesize = 8
instrument.serial.parity =
    serial.PARITY_NONE
instrument.serial.stopbits = 1
instrument.serial.timeout = 1
instrument.mode =
    minimalmodbus.MODE_RTU


while 1:

        try:
                #Reading resistor
                    [0] in slave
                test_reg =
                    instrument.
                    read_registers
                    (0,1)
        #
            print (test_reg)
                #Calculating the
                    resistance using
                    voltage level
                vo=(test_reg[0]*vi
                    )/1024.0;
                b=(vi/vo)-1;
                r2=r1/b;
                print ('The
                    resistance value
                    measured from 1
                    is:', r2)
                #polling every 0.5
                    seconds
                time.sleep (0.5)
        except:
                print ("error USB2
                    -----")
                time.sleep (1)
```

3 MULTIPLE SLAVES

Problem 3.1. Configure another arduino as a slave with address 2. Use problem 2.2.

Problem 3.2. Connect one more arduino to the odroid using a breadboard according to Table 2. You will have to make multiple connections using the breadboard.

Problem 3.3. Modify the code in problem 2.3 to verify if the second arduino is active.

Problem 3.4. Run the following program to control both arduinos on the RS-485 bus. Note that the bus is nothing but the connection from multiple RS-485 interfaces on the common A,B lines.

```python
#!usr/bin/env python

import time
import minimalmodbus
import serial


instrument = minimalmodbus.
    Instrument('/dev/ttyUSB0',1)
instrument2 = minimalmodbus.
    Instrument('/dev/ttyUSB0',2)
vi=5;
b=0;
r1=1000;

instrument.serial.baudrate    =
    19200
instrument.serial.bytesize    = 8
instrument.serial.parity      =
    serial.PARITY_NONE
instrument.serial.stopbits    = 1
instrument.serial.timeout     = 1
instrument.mode               =
    minimalmodbus.MODE_RTU

instrument2.serial.baudrate   =
    19200
instrument2.serial.bytesize   = 8
instrument2.serial.parity     =
    serial.PARITY_NONE
instrument2.serial.stopbits   = 1
instrument2.serial.timeout    = 1
instrument2.mode              =
    minimalmodbus.MODE_RTU

usb1_on = True
usb2_on = True

while 1:
        if usb2_on == True :
                try :
                        print ("
                            USB1")
                        test_reg =
                            instrument2
                            .
                            read_registers
                            (0,1)
                        print (
                            test_reg
                            [0])
                        vo=(
                            test_reg
                            [0]*vi)
                            /1024.0;
                        b=(vi/vo)
                            -1;
                        r2=r1/b;
                        print ('
                            The
                            resistance
                            value
                            measured
                            from 1
                            is:', r2
                            )
                        time.sleep
                            (0.05)
                except :
                        print ("
                            error
                            USB1")
                        time.sleep
                            (1)

        if usb1_on == True :
                try :
                        print ("
                            USB2")
                        test_reg =
                            instrument
                            .
                            read_registers
                            (0,1)
                        print (
                            test_reg
                            )
                        vo=(
                            test_reg
                            [0]*vi)
                            /1024.0;
                        b=(vi/vo)
```

```
                -1;
        r2=r1/b;
        print ('
            The
            resistance
            value
            measured
            from 2
            is:', r2
            )
        time.sleep
            (0.5)
    except:
        print ("
            error
            USB2 ")
        time.sleep
            (1)
```