

# *Application Note ArduiTouch MKR MODBUS Thermostat*



Rev.	Date	Description
A	2019-03-18	First release

## 1. Introduction

This application note will show you how to make a good-looking touch-screen thermostat with optional Modbus support via RS485 with ArduiTouch MKR, an Arduino MKR board and the MKR RS485 Shield.

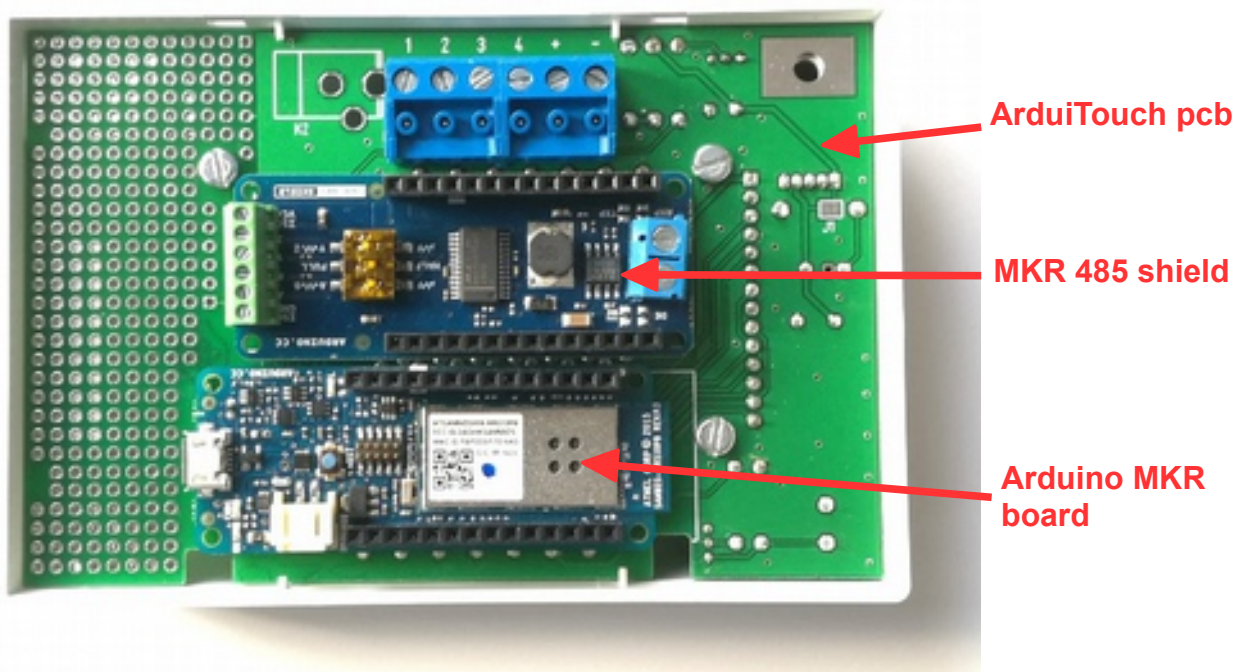
## 2. Bill of Material

- MKR board of your choice
- MKR 485 Shield
- ArduiTouch MKR kit

## 2. Assembly

Please follow for the assembly of the ArduiTouch MKR our construction manual for ArduiTouch MKR.

You have to plug the Arduino MKR board and the MKR 485 shield into the marked slots on backside of the ArduiTouch pcb:



### 3. Configuration of MKR 485 shield

You will find a 3pole DIP switch in front of the MKR 485 shield. Please set the DIP switches to following positions:

DIP switch	Description	Position
1	Termination Resistor A – B line	OFF
2	Half duplex / full duplex	OFF
3	Termination Resistor Y – Z line	ON

### 4. Connection to RS485 bus

We will use the half duplex mode of the RS485. Please note: you have to connect A and B line of the RS485 bus to the Y and Z terminal of the MKR 485 shield:



## 5. Programming

### 5.1 Installation of additional libraries

Install the following libraries through Arduino Library Manager

Adafruit GFX Library

<https://github.com/adafruit/Adafruit-GFX-Library/archive/master.zip>

Adafruit ILI9341 Library

[https://github.com/adafruit/Adafruit\\_ILI9341](https://github.com/adafruit/Adafruit_ILI9341)

XPT2046\_Touchscreen by Paul Stoffregen

[https://github.com/PaulStoffregen/XPT2046\\_Touchscreen/blob/master/XPT2046\\_Touchscreen.h](https://github.com/PaulStoffregen/XPT2046_Touchscreen/blob/master/XPT2046_Touchscreen.h)

SimpleModbusMKR by Hartmut Wendt

<https://github.com/HWHardsoft/SimpleModbusSlaveMKR>

You can also download the library also directly as ZIP file and uncompress the folder under yourarduinodesketchfolder/libraries/

After installing the Adafruit libraries, restart the Arduino IDE.

### 5.2 Source Code

You will find the source code on our website.

<https://www.hwhardsoft.de/english/projects/arduitouch-mkr/>

### 5.3 Run the demo

Please open this sample in the Arduino IDE. Compile and upload it.

After compilation and upload you will see the Main screen with default values for room temperature, set temperature and ventilation. You can change the set temperature and ventilation level without RS485 connection also.

You can open via the gear in the upper right corner an option menu. This menu includes a function to adjust the Modbus ID number and a screen cleaning function.

## 6. Modbus test

We will use in this example the PC as MODBUS master. You've to download [Modbustester](#). Please unpack the zip archive to a new directory on your haddisk. Open the software and change the marked fields as in the picture above. You have to connect the USB-RS485-adaptor before. For simple tests a serial connection via USB cable between your PC and the NodeMCU will also work. Please choose the right COM-port for this adaptor in Modbustester.

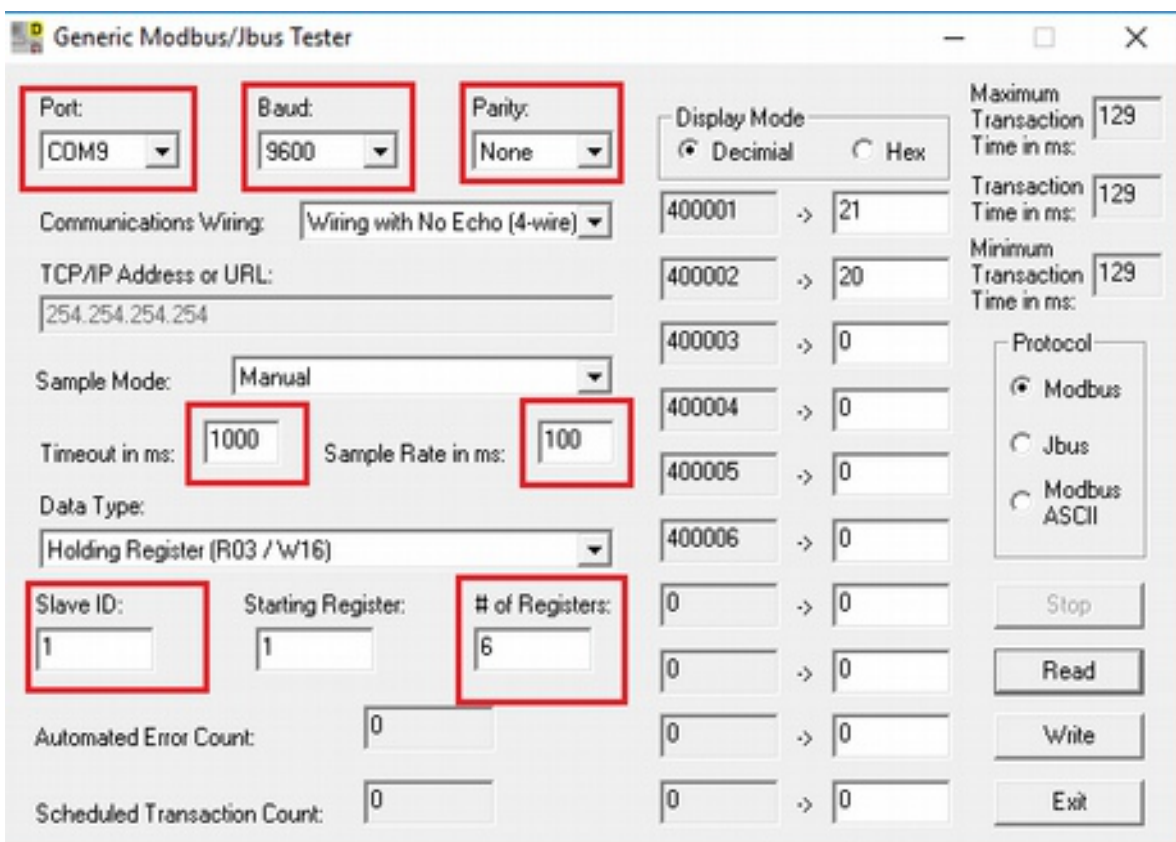


Fig 1: Modbustester

You can press the Read button in Modbustester. This command will read 6 bytes of the memory of our new slave device the ArduiTouch. You can click also in the fields beside the addresses and manipulate the values. With the write button you send this manipulated values to the ArduiTouch. Please see the table below about the register function.

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Register	Variable	Description
400001	ROOM_TEMP	measured room temperatur from external sensor (values 5 - 50)
400002	SET_TEMP	set-point temperature by user (values 18 - 28)
400003	FAN_LEVEL	level for ventilation (values 0 - 5)
400004	BEEPER	any value between 500 and 4000 will set the beeper with the given frequency for 100ms
400005	DISP_ONOFF	timer for display automatic off function (0 switch backlight off, >0 set timer for automatic)
400006	TOTAL_ERRORS	Counted communication errors