Data collection device

Jakub Jíra
github.com/japawBlob

Goal of project

To create a logging device used in smart home setup

Monitor temperature, humidity, and vibrations and provide measurements to a connected device via UART

Display and store measured values for the user to access

Measuring values

Sensor DHT11 provides measurements for temperature and humidity

Monitoring temperature using an internal temperature sensor proved highly inaccurate

Built-in accelerometer AIS226DS is used for measuring vibrations

Measuring time

Initially wanted to use an external module DS3231 for RTC

This approach was discarded in favor of built-in RTC on the chip to simplify the design

Displaying logged data

All logged data is stored on the EEPROM

It is able to be read out using UART in .csv format or viewed directly on the display

UART Communication

Receiving `0xdd` byte sends data in .csv format

Receiving `0xcc` byte clears all stored data

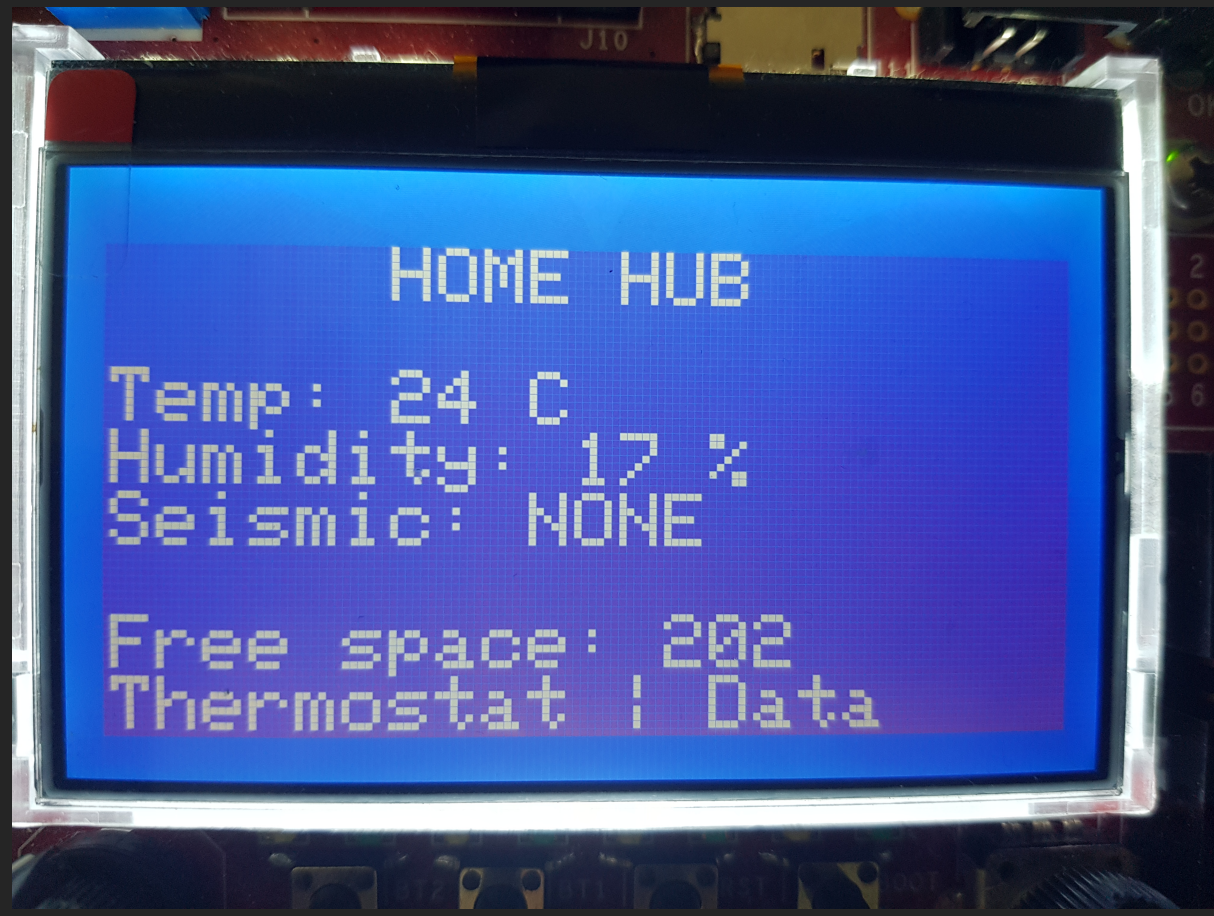
User interface

Home hub

Refreshes every second with new data

Displays current Temperature, Humidity, and Seismic reading

Displayed free space for data entries



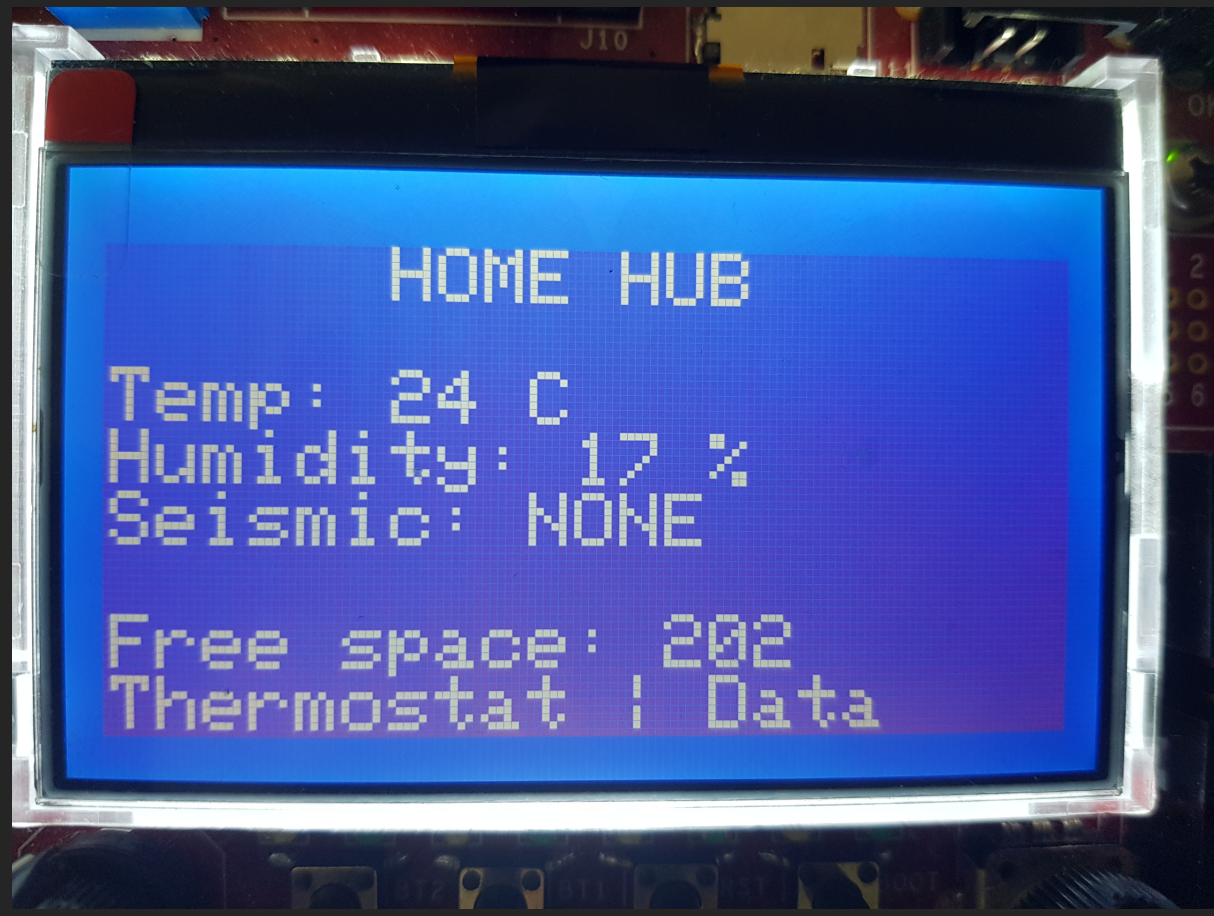
User interface

Home hub - Interactions

Button BT2: Open thermostat screen

Button BT1: Open data screen

Rotary encoder: dormant



User interface

Thermostat

Used for sending the desired temperature to a device connected via UART

For setting a temperature on a external device

User interface

Thermostat - Interaction

Button BT2: Send displayed temperature

Button BT1: Back to the Home screen

Rotary encoder: Modify displayed temperature

User interface

Data screen

Screen displaying all recorded data

User interface

Data screen - Interaction

Button BT2: Send data in .csv format to UART

Button BT1: Back to the Home screen

Rotary encoder: Scroll through entries

Conclusion

With initial simplifications (removing external RTC etc.), all described functionalities work without any known issues

The device successfully records and stores measurements and communicates with connected devices

Overall, I would rate the project as a success