

# 1-wire Temperature Grid

Netzwerk Teilchenwelt Projektwochen

25.10 – 6.10.2015

Janna Vischer



NETZWERK  
TEILCHENWELT

# Project Aim

# Project Aim

- Temperature Grid

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- Temperature Grid
  - precise

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- Temperature Grid
  - precise
  - high resolution

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- Temperature Grid
  - precise
  - high resolution
  - small

# Project Aim

- Temperature Grid
  - precise
  - high resolution
  - small
  - as less wires than possible

# Project Aim

- build and programm an 1-wire Temperature Grid



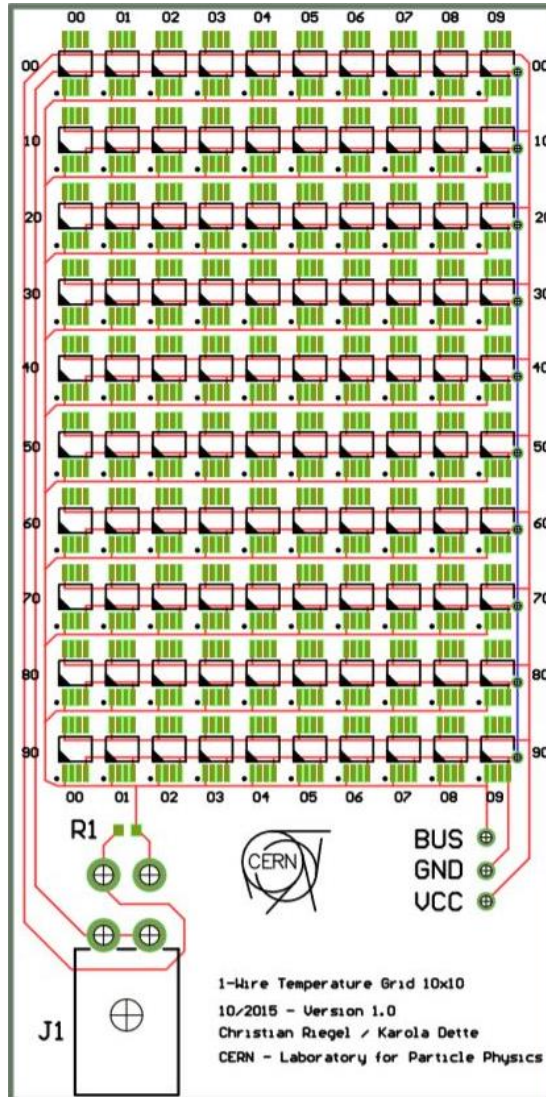
# Project Aim

- Build and programm an 1-wire Temperature Grid
  - parallel circuit

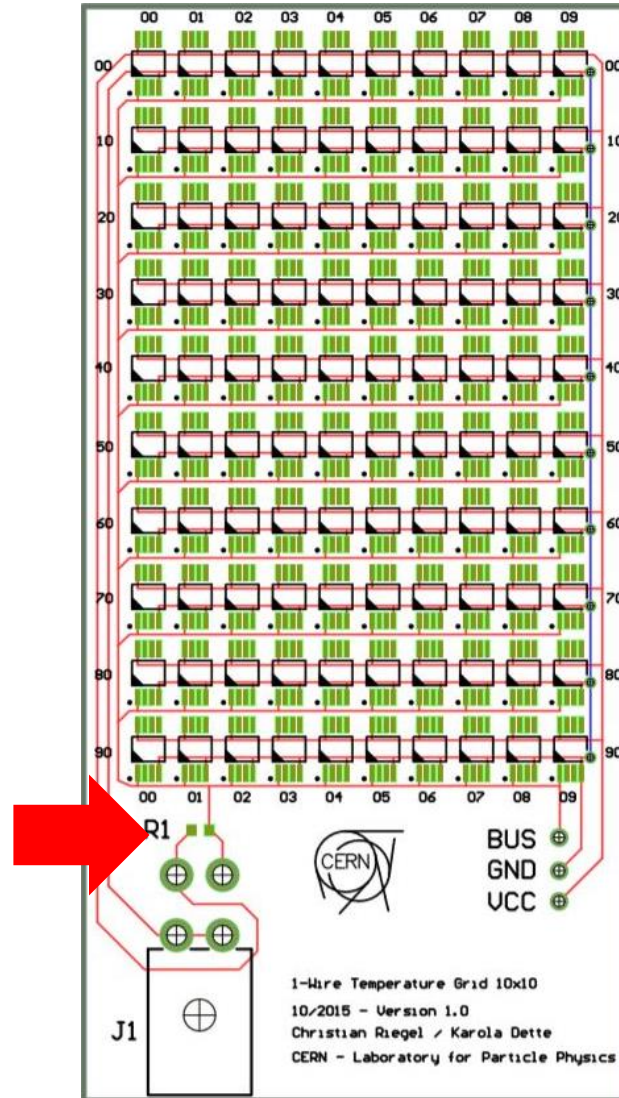
# Project Aim

- Build and programm an 1-wire Temperature Grid
  - parallel circuit
  - only one GND, 5V and DQ wire

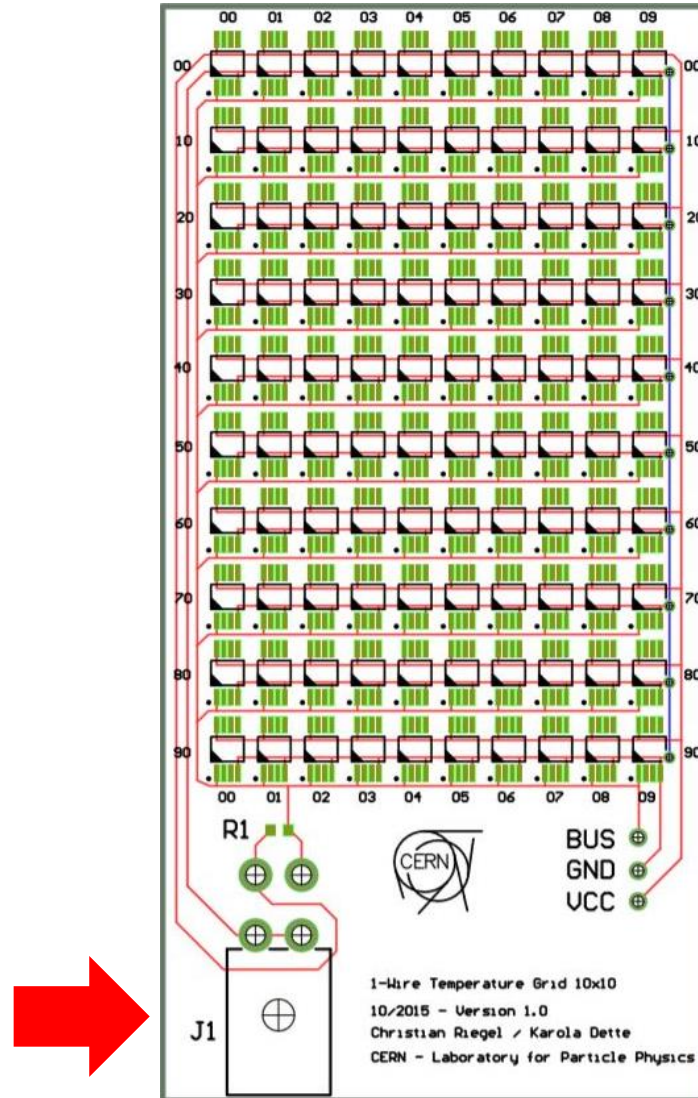
# Circuit Board



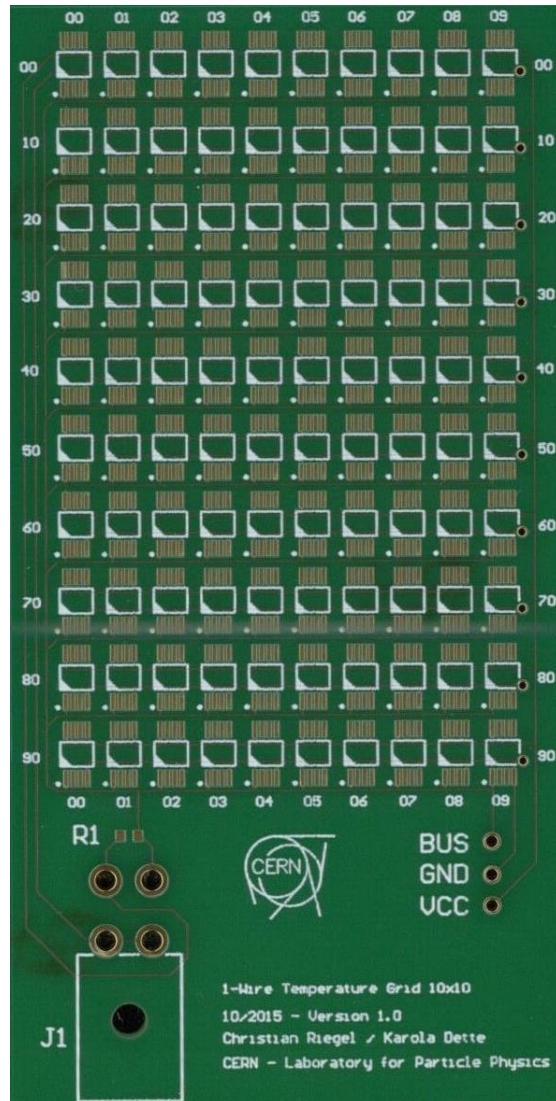
# Circuit Board



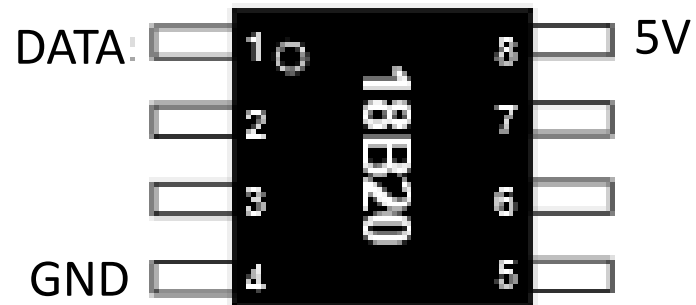
# Circuit Board



# Circuit Board

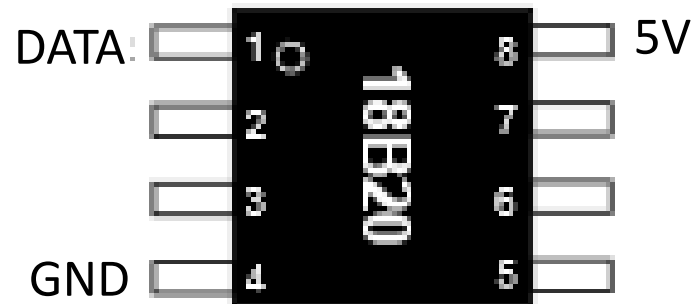


# Sensors



# Sensors

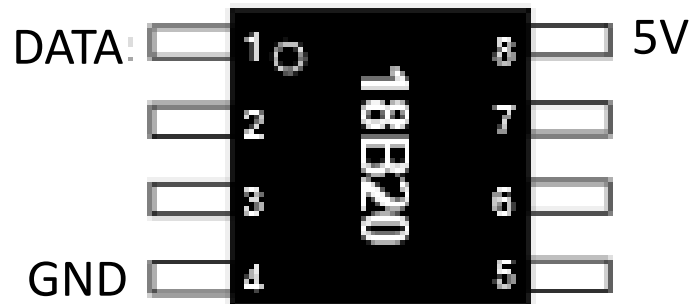
- DS18B20 1-wire digital thermometer





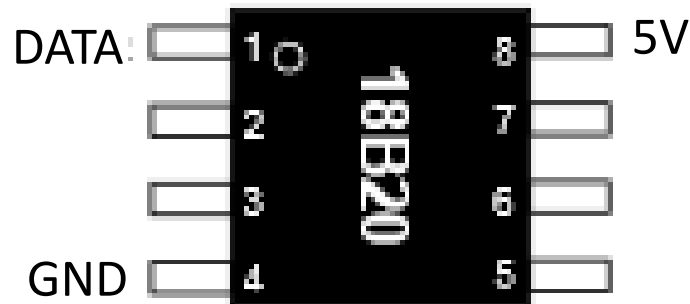
# Sensors

- DS18B20 1-wire digital thermometer
- temperatures from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

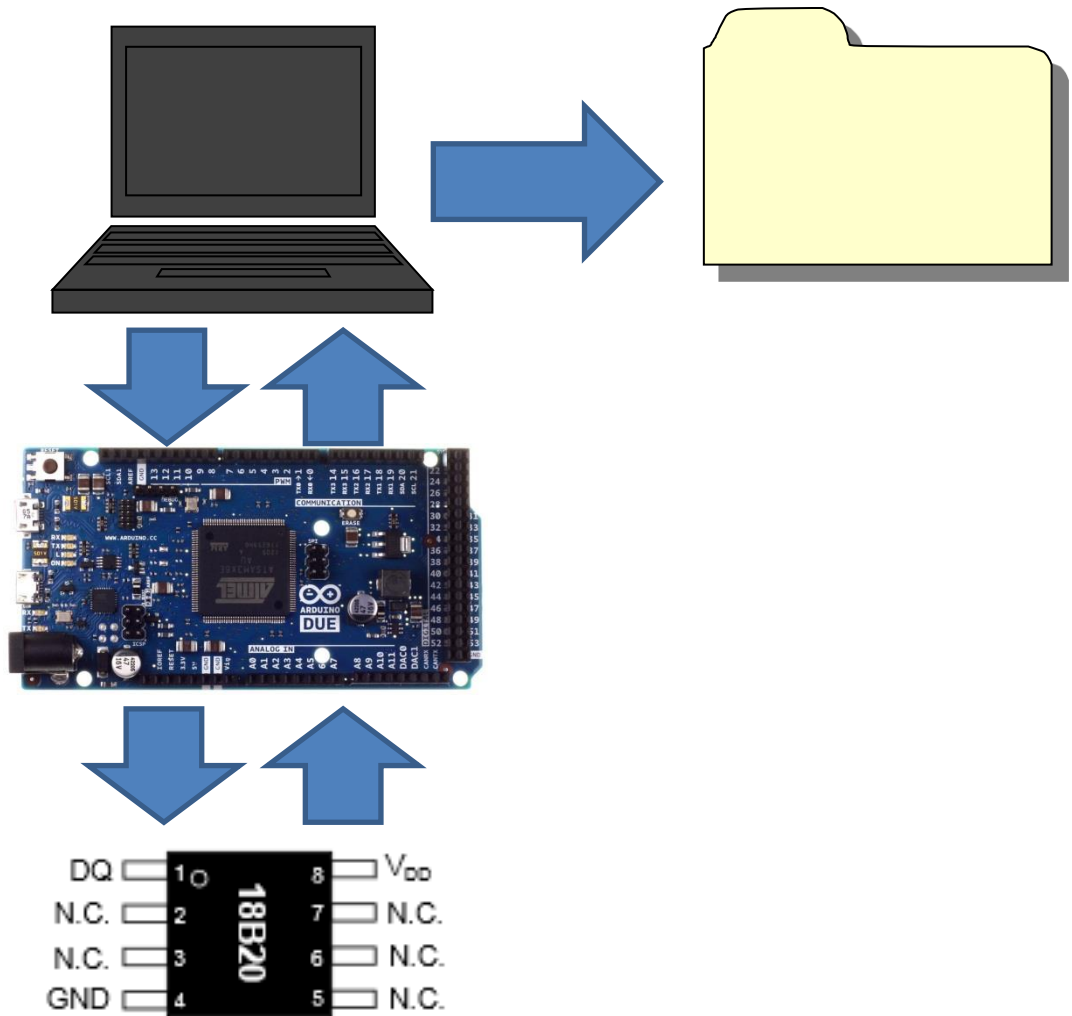


# Sensors

- DS18B20 1-wire digital thermometer
- temperatures from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- unique 64 bit serial code (unknown)



# Software



# Software

Test\_Pro2

Adresse abfragen

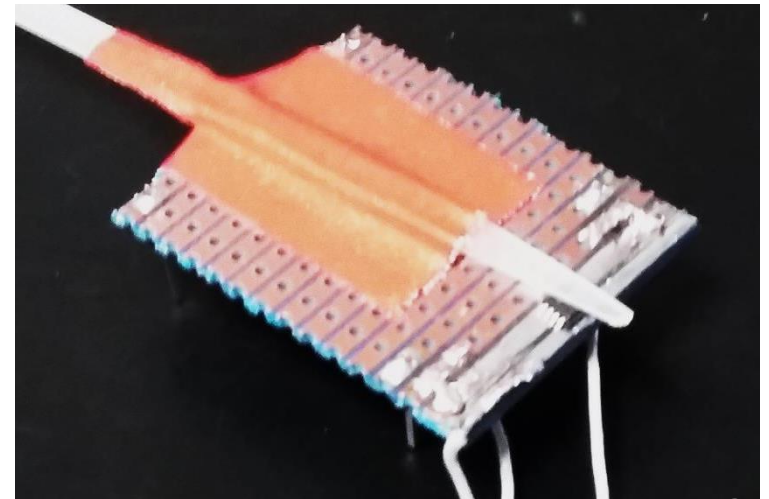
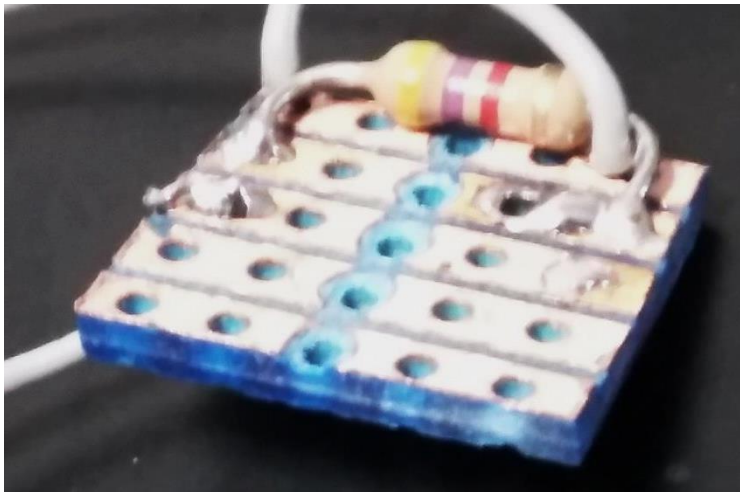
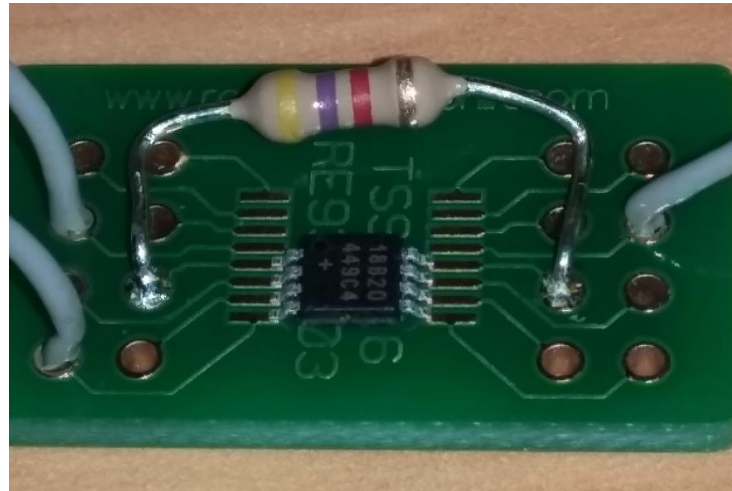
Zeile 0

Spalte 0

Speichern

Eintrag löschen

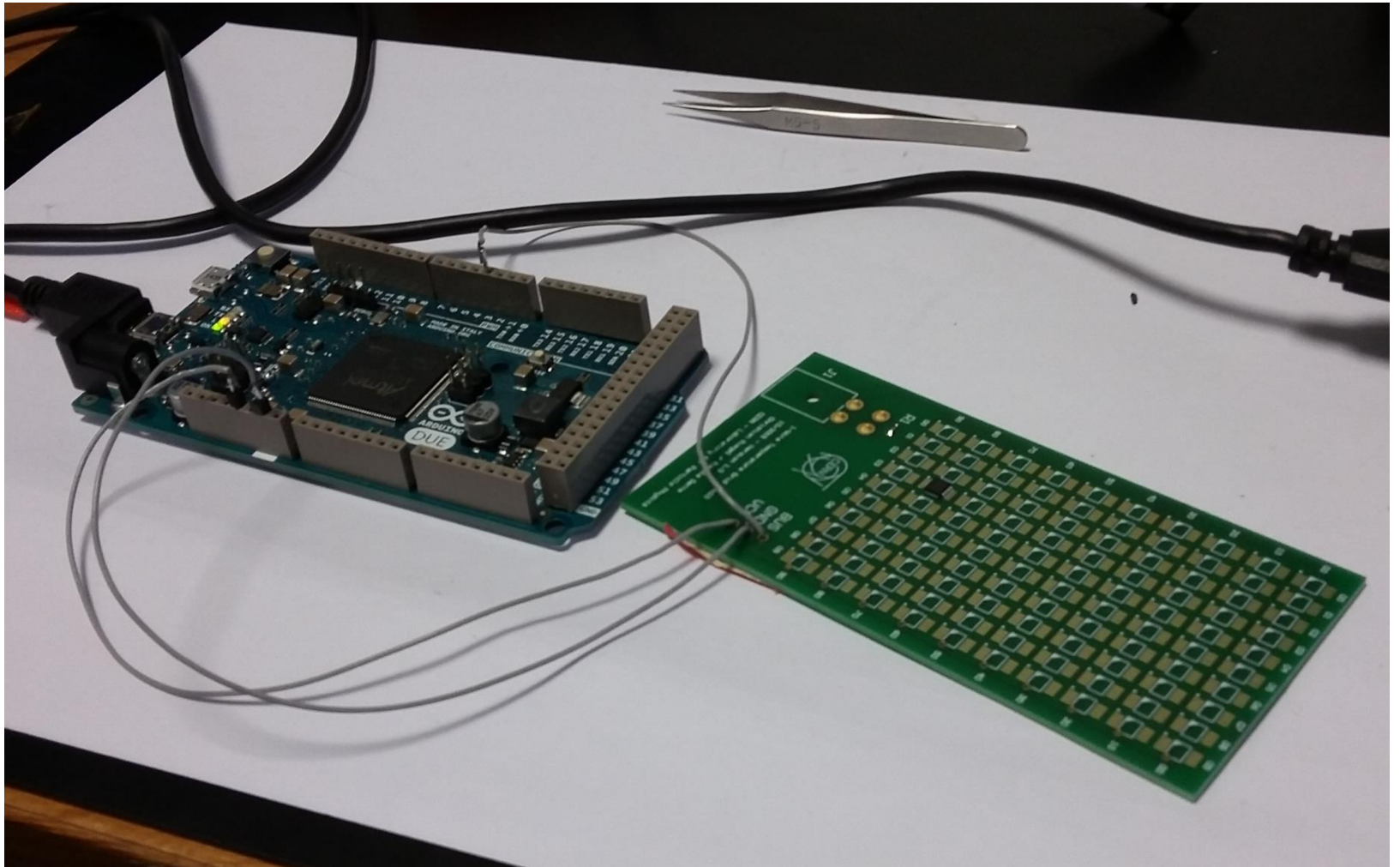
# Prototypes



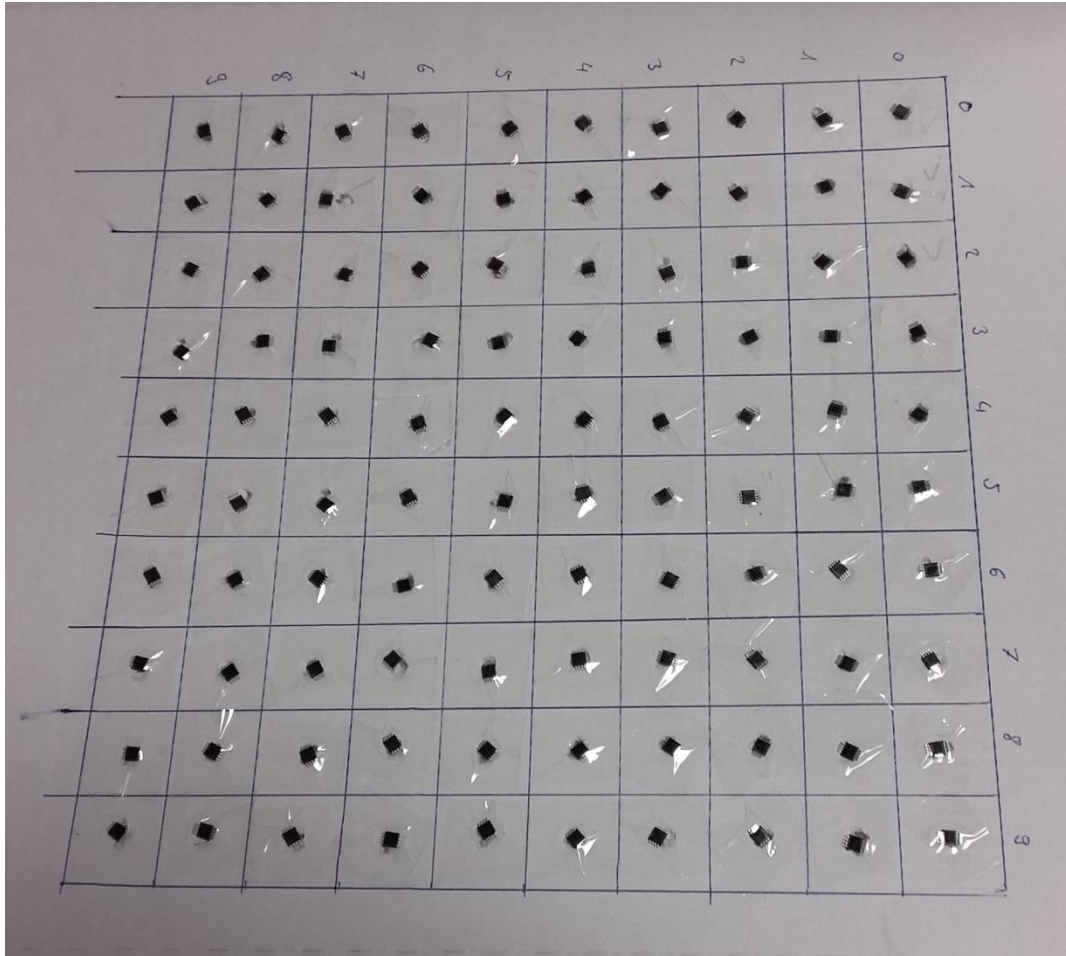
03.11.2015

Janna Vischer

# Addressfinding

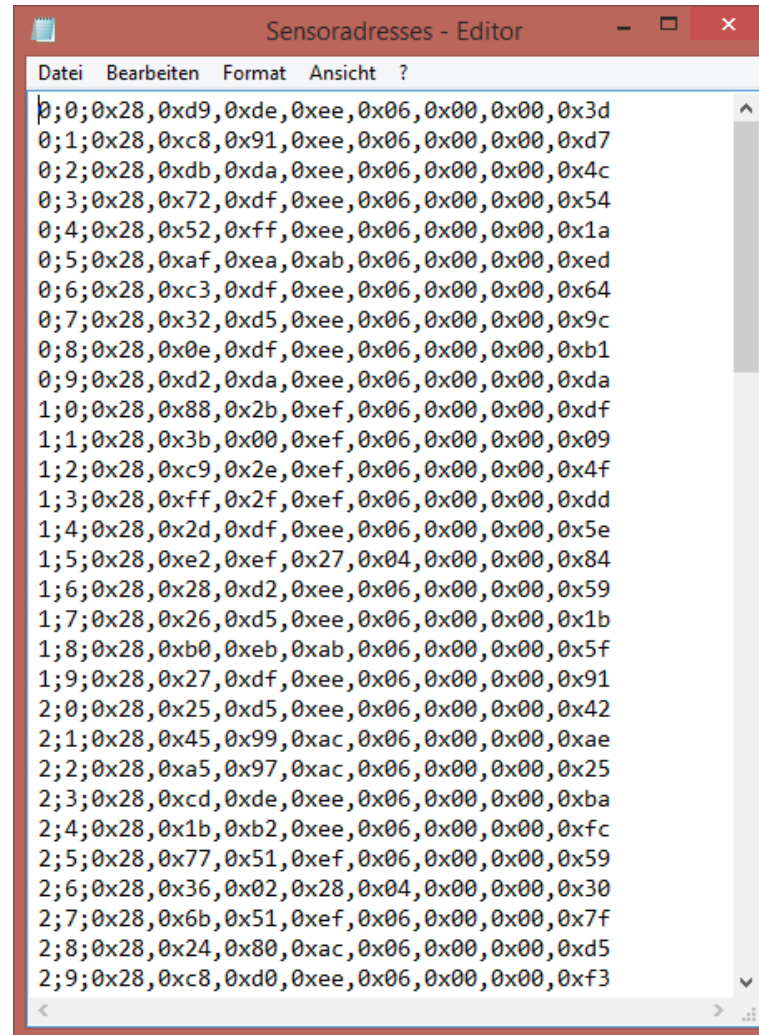


# Addressfinding





# Addressfinding



```
Sensoraddresses - Editor
Datei Bearbeiten Format Ansicht ?
0;0;0x28,0xd9,0xde,0xee,0x06,0x00,0x00,0x3d
0;1;0x28,0xc8,0x91,0xee,0x06,0x00,0x00,0xd7
0;2;0x28,0xdb,0xda,0xee,0x06,0x00,0x00,0x4c
0;3;0x28,0x72,0xdf,0xee,0x06,0x00,0x00,0x54
0;4;0x28,0x52,0xff,0xee,0x06,0x00,0x00,0x1a
0;5;0x28,0xaf,0xea,0xab,0x06,0x00,0x00,0xed
0;6;0x28,0xc3,0xdf,0xee,0x06,0x00,0x00,0x64
0;7;0x28,0x32,0xd5,0xee,0x06,0x00,0x00,0x9c
0;8;0x28,0x0e,0xdf,0xee,0x06,0x00,0x00,0xb1
0;9;0x28,0xd2,0xda,0xee,0x06,0x00,0x00,0xda
1;0;0x28,0x88,0x2b,0xef,0x06,0x00,0x00,0xdf
1;1;0x28,0x3b,0x00,0xef,0x06,0x00,0x00,0x09
1;2;0x28,0xc9,0x2e,0xef,0x06,0x00,0x00,0x4f
1;3;0x28,0xff,0x2f,0xef,0x06,0x00,0x00,0xdd
1;4;0x28,0x2d,0xdf,0xee,0x06,0x00,0x00,0x5e
1;5;0x28,0xe2,0xef,0x27,0x04,0x00,0x00,0x84
1;6;0x28,0x28,0xd2,0xee,0x06,0x00,0x00,0x59
1;7;0x28,0x26,0xd5,0xee,0x06,0x00,0x00,0x1b
1;8;0x28,0xb0,0xeb,0xab,0x06,0x00,0x00,0x5f
1;9;0x28,0x27,0xdf,0xee,0x06,0x00,0x00,0x91
2;0;0x28,0x25,0xd5,0xee,0x06,0x00,0x00,0x42
2;1;0x28,0x45,0x99,0xac,0x06,0x00,0x00,0xae
2;2;0x28,0xa5,0x97,0xac,0x06,0x00,0x00,0x25
2;3;0x28,0xcd,0xde,0xee,0x06,0x00,0x00,0xba
2;4;0x28,0x1b,0xb2,0xee,0x06,0x00,0x00,0xfc
2;5;0x28,0x77,0x51,0xef,0x06,0x00,0x00,0x59
2;6;0x28,0x36,0x02,0x28,0x04,0x00,0x00,0x30
2;7;0x28,0x6b,0x51,0xef,0x06,0x00,0x00,0x7f
2;8;0x28,0x24,0x80,0xac,0x06,0x00,0x00,0xd5
2;9;0x28,0xc8,0xd0,0xee,0x06,0x00,0x00,0xf3
```



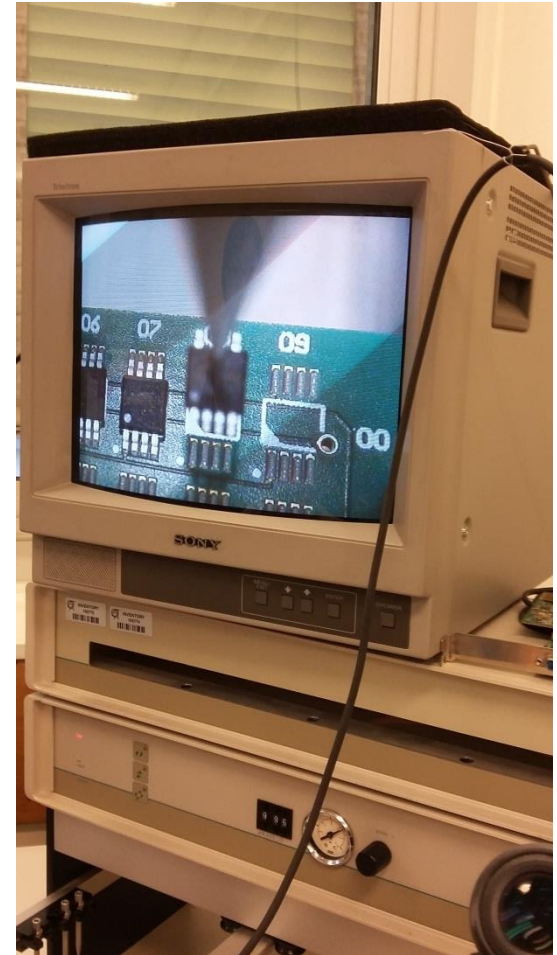
# Circuit Board

# Circuit Board

- soldering paste

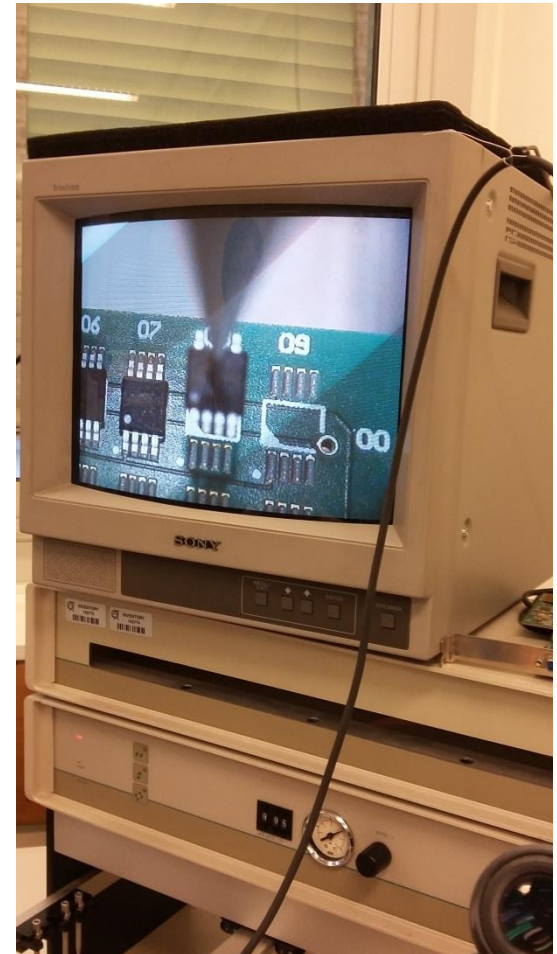
# Circuit Board

- soldering paste
- place SMD sensors



# Circuit Board

- soldering paste
- place SMD sensors
- Reflow soldering



# First Tests

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- asking for addresses

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- asking for addresses
  - 90/100 addresses found

# First Tests

- asking for addresses
  - 90/100 addresses found
- searching for short circuits



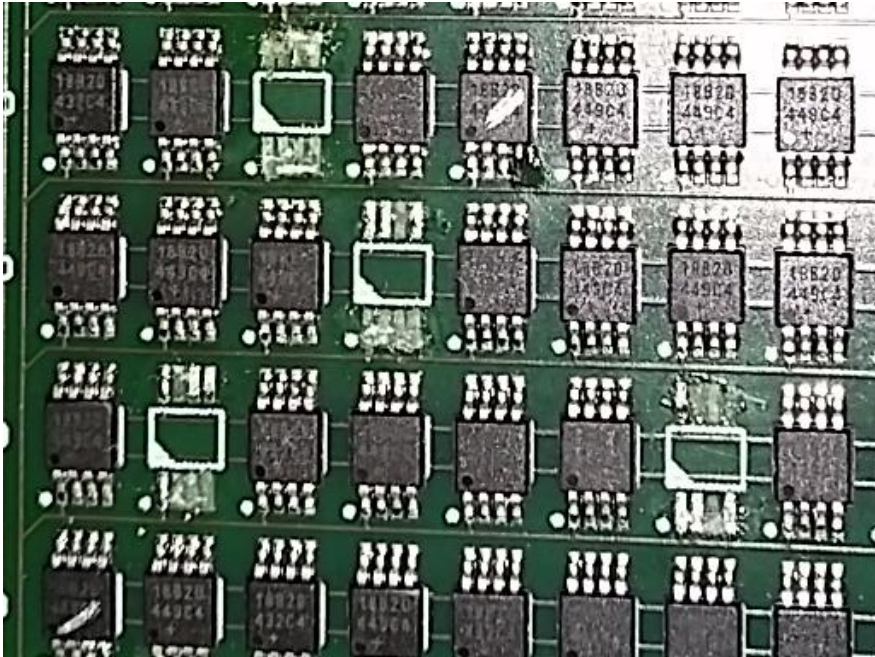
# First Tests

- asking for addresses
  - 90/100 addresses found
- searching for short circuits
- correcting solderings points

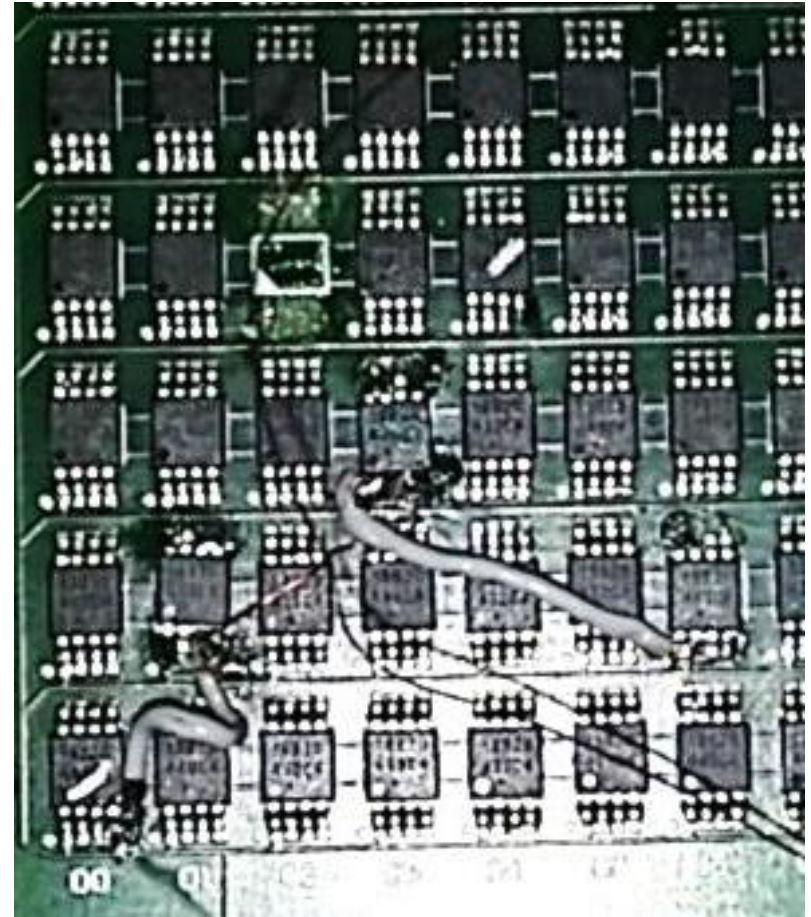
# First Tests

- asking for addresses
  - 90/100 addresses found
- searching for short circuits
- correcting solderings points
- replaceing SMDs

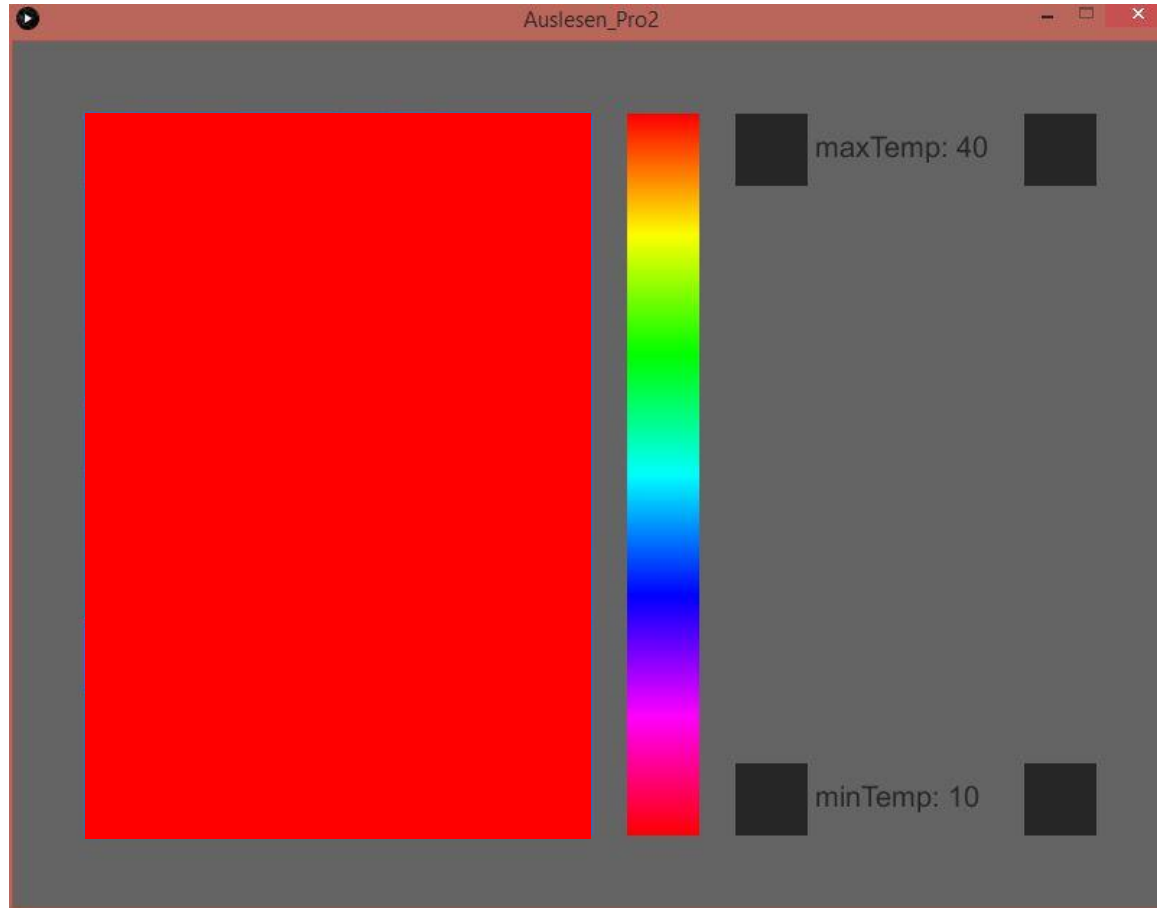
# First Tests



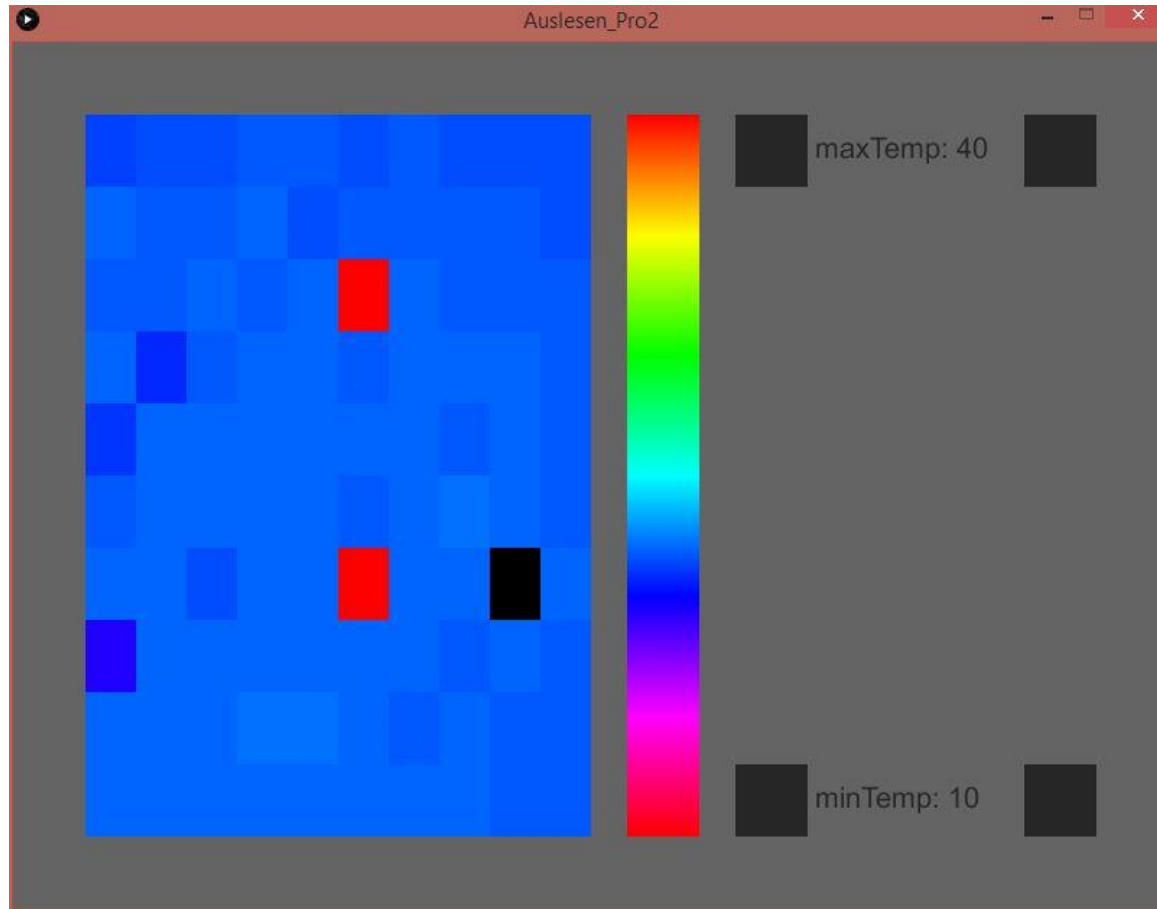
# First Tests



# Final Programm



# Final Programm



# Final Programm

- 3-4 dead pixels

# Final Programm

- 3-4 dead pixels
  - less time left



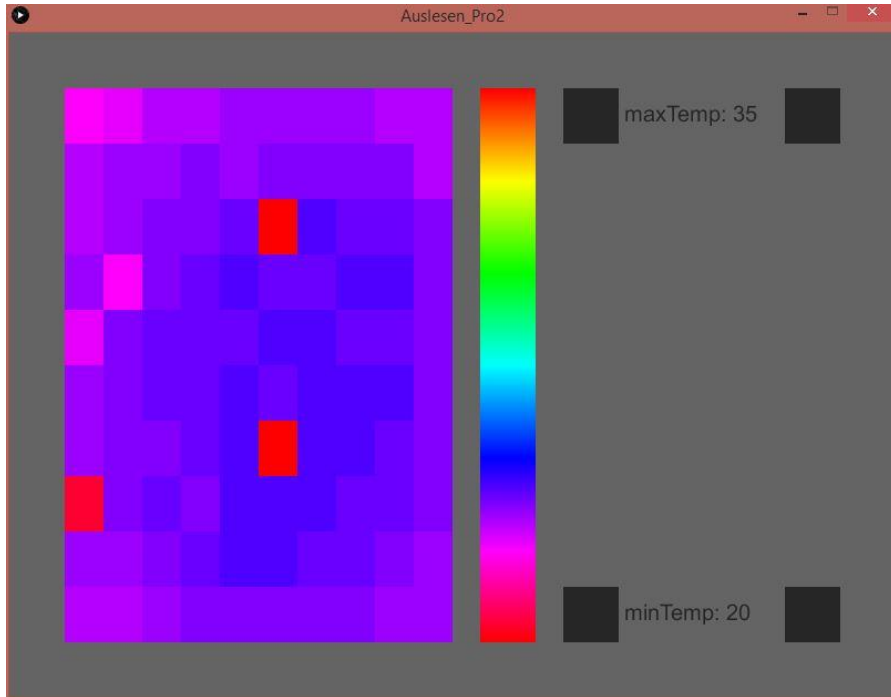
# Final Programm

- 3-4 dead pixels
  - less time left
  - risk of damage

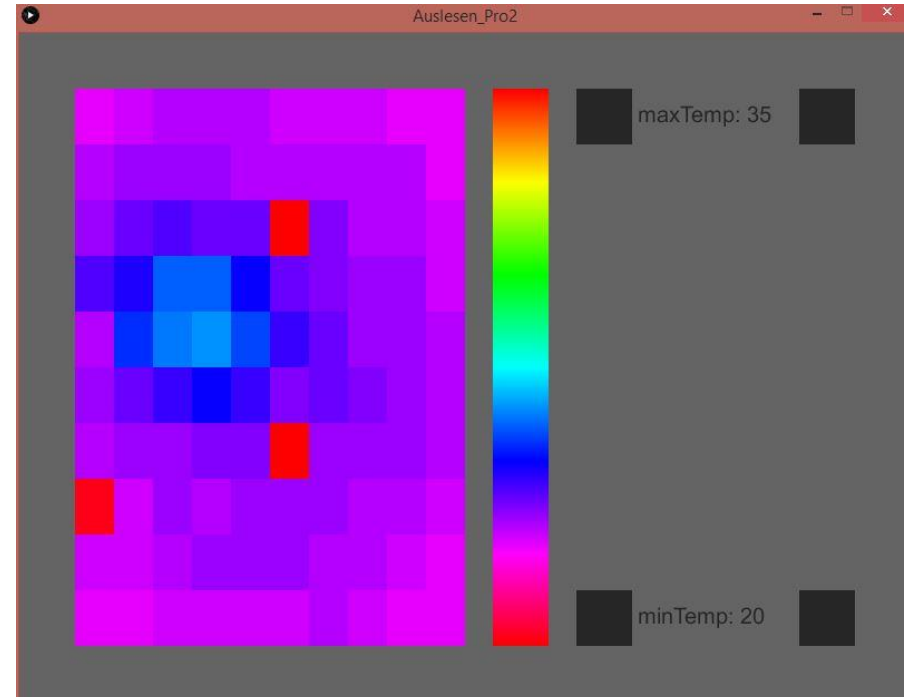
# Final Programm

- 3-4 dead pixels
  - less time left
  - risk of damage
  - only 4%

# Experiments

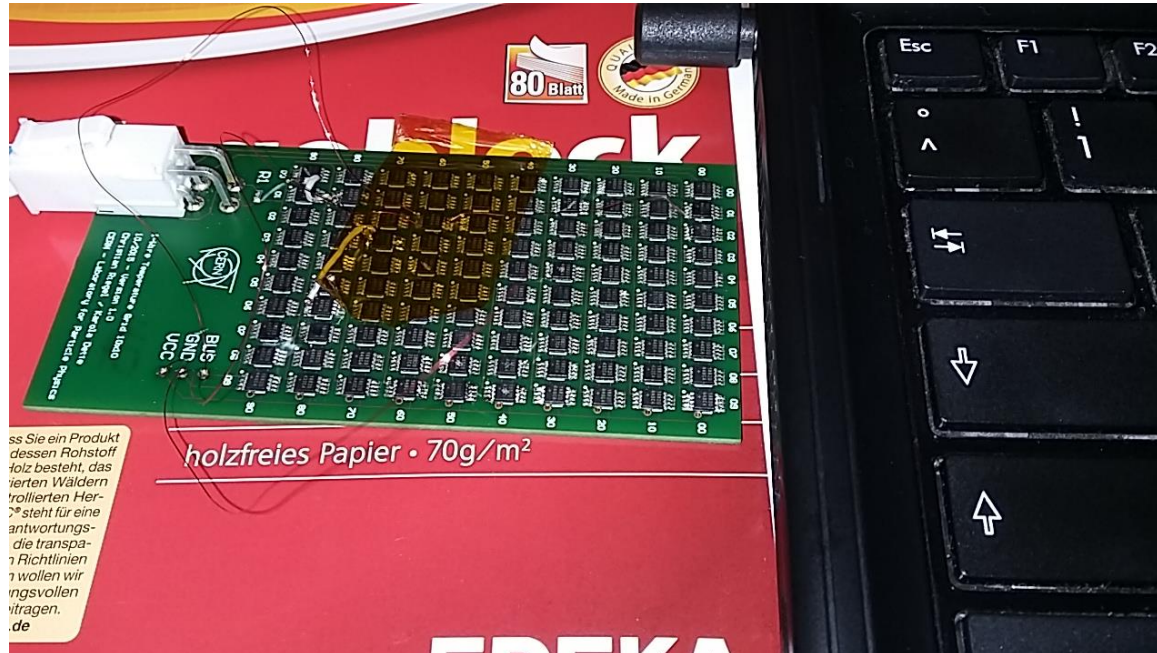


the Temperature Grid

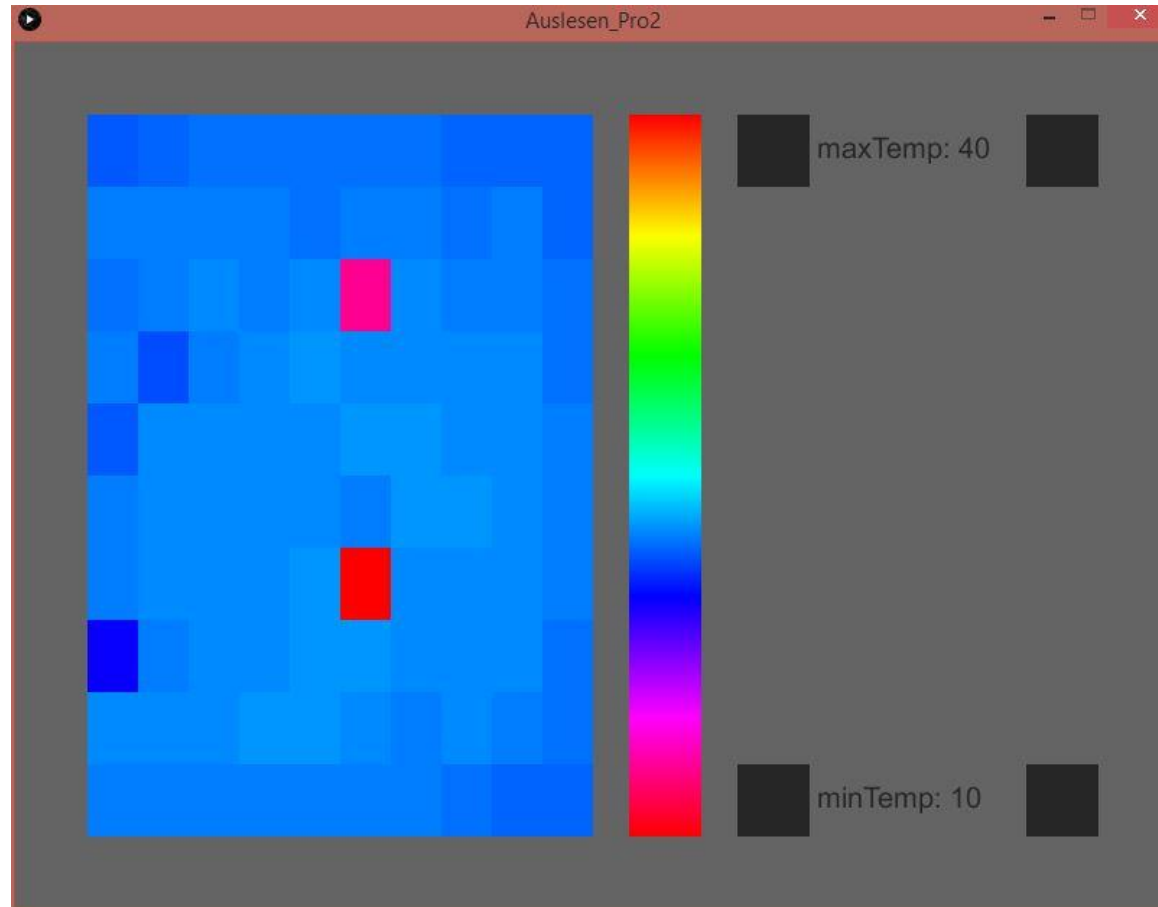


fingerprint on the Temperature Grid

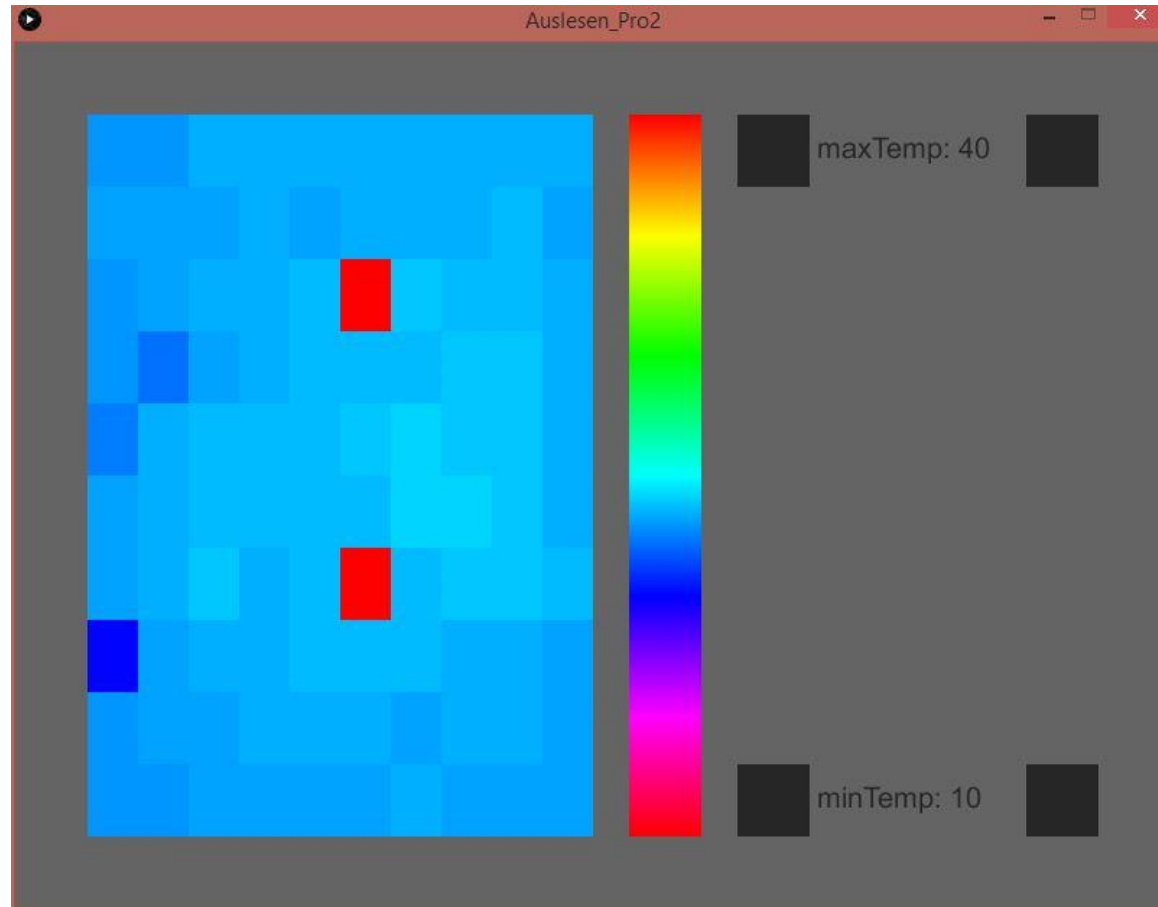
# Experiments



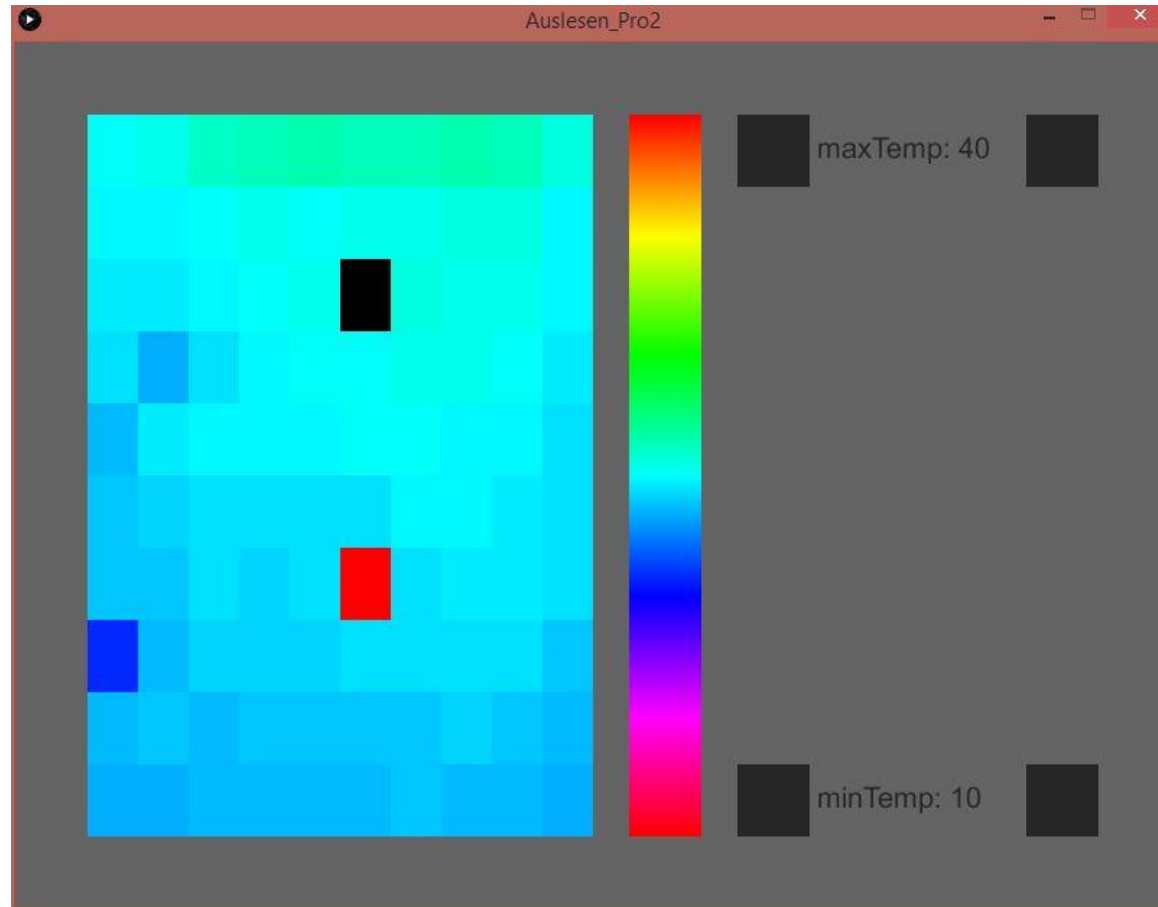
# Experiments



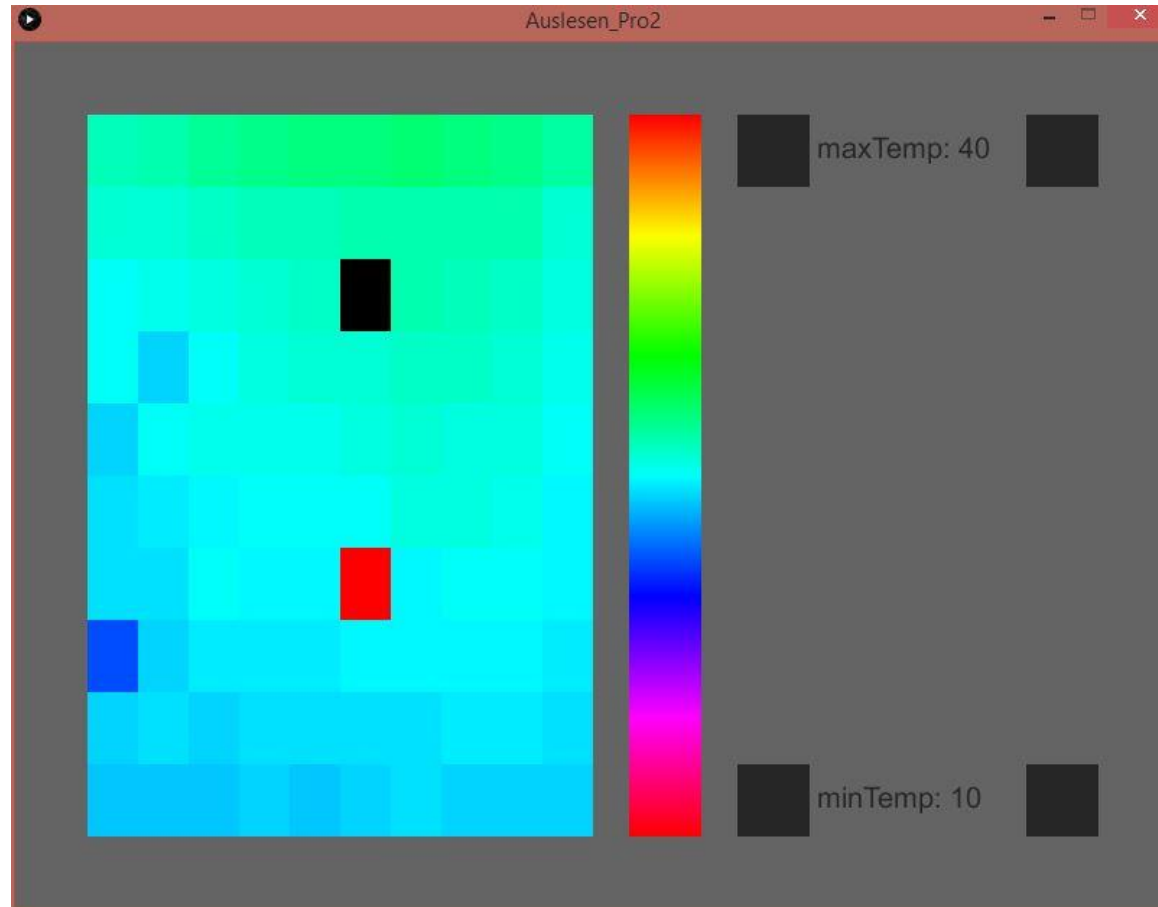
# Experiments



# Experiments

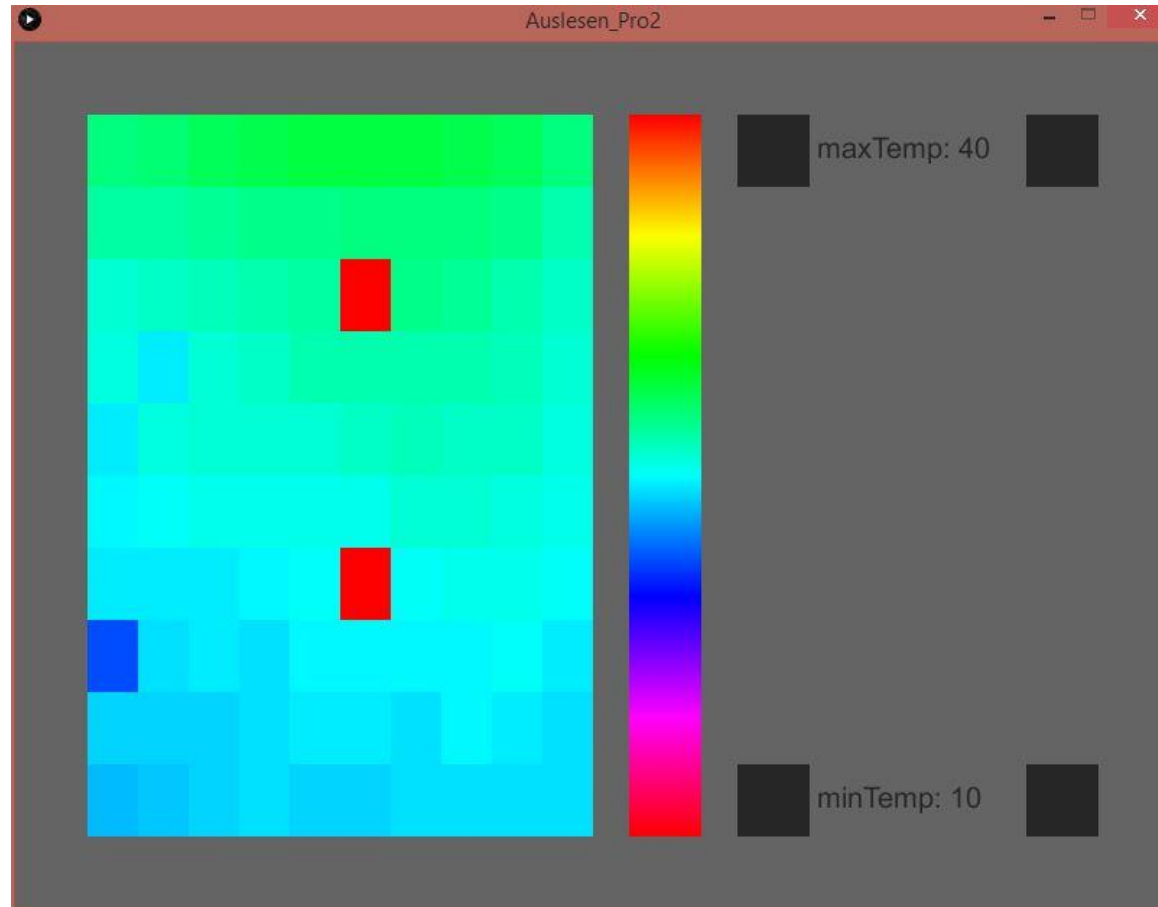


# Experiments

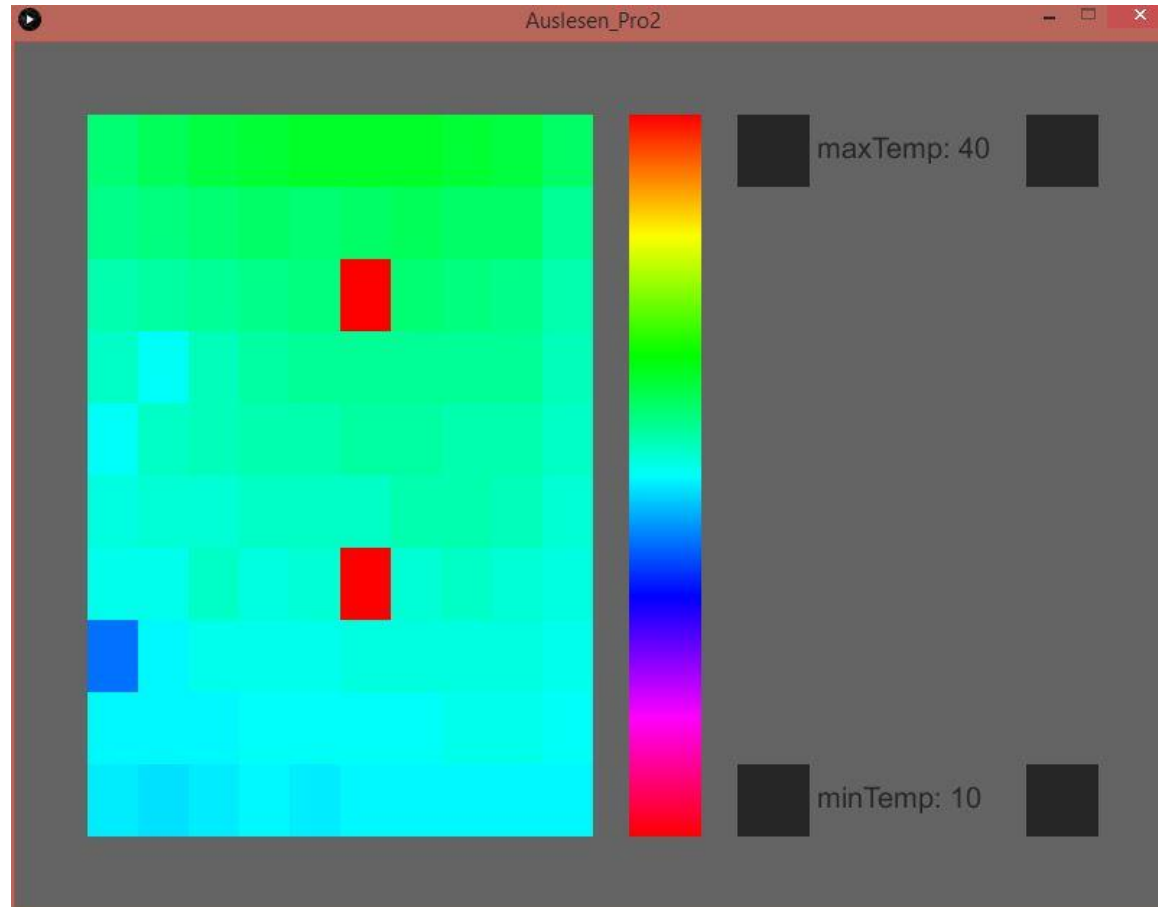




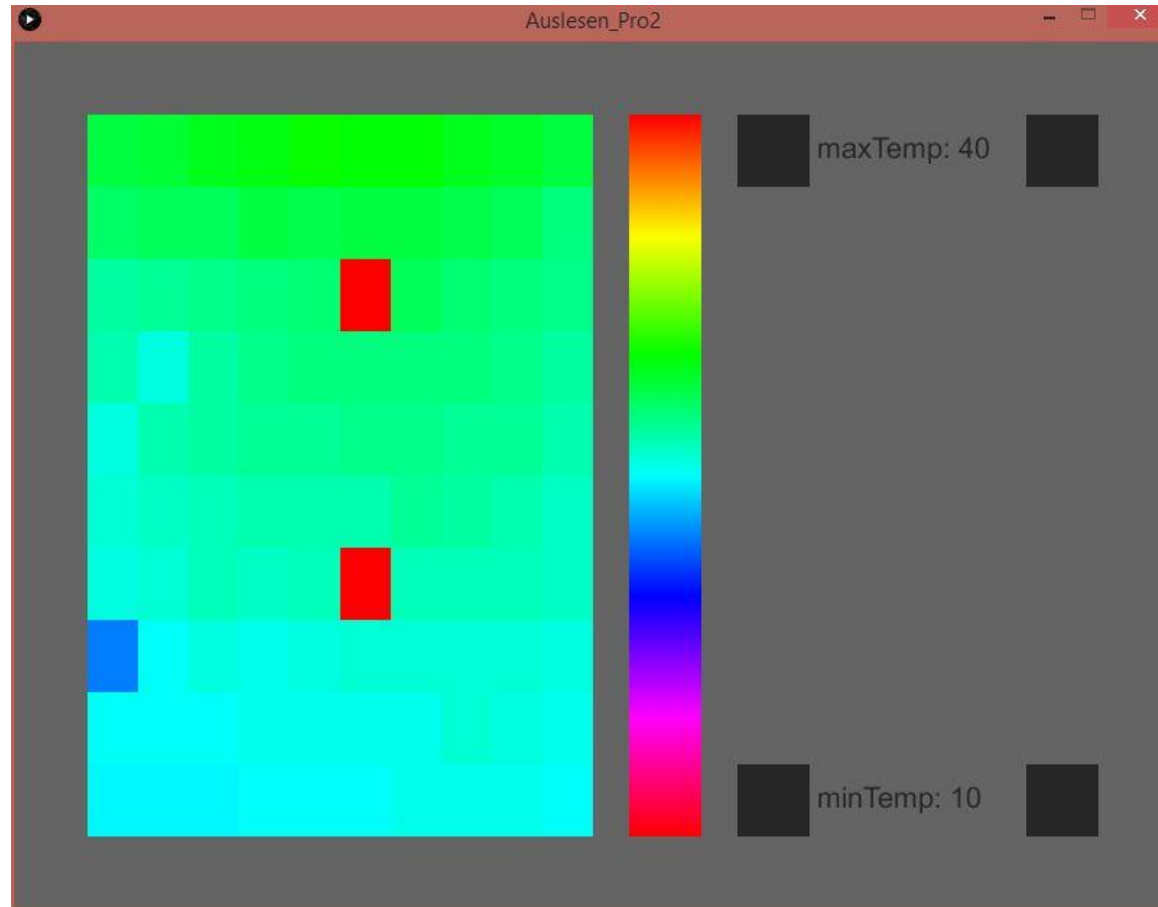
# Experiments



# Experiments



# Experiments



# Next Steps

- plot data

# Next Steps

- plot data
- write dokumentation

# Next Steps

- plot data
- write dokumentation
- optimize programms

**Thank you!**