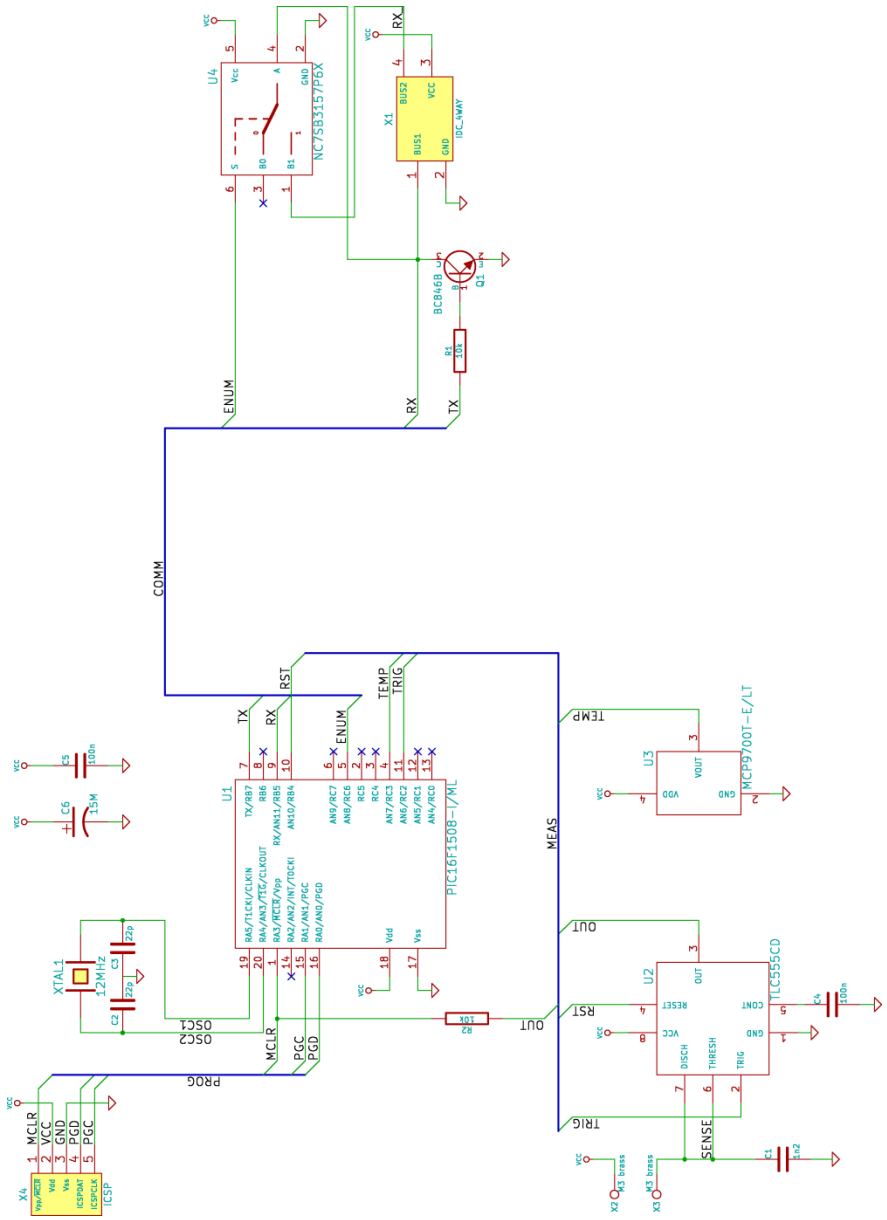
Appendix 1 - Contents of the attached CD

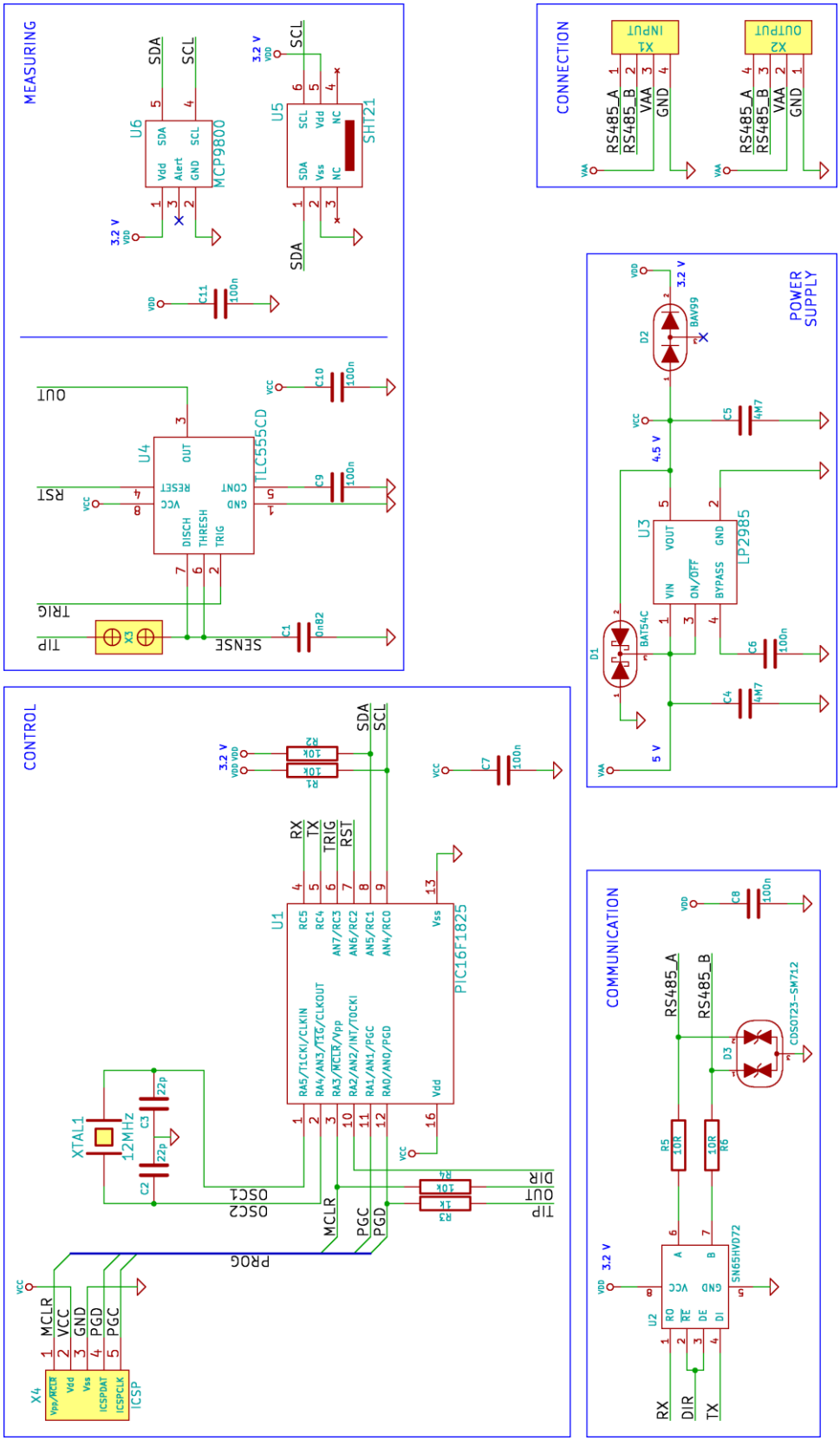
CD \		master's thesis document
CD \ Sensor unit\		documents related to the sensor units
	Prototype\	scheme, BOM, PCB, source code
	Final version\	scheme, BOM, PCB, source code
CD \ Control unit\		documents related to the master units
	Prototype 1\	scheme, source code
	Prototype 2\	scheme, source code
	Final version\	scheme, BOM, PCB, source code, drivers
CD \ Experiment 1\		data from experiment 1
CD \ Experiment 2\		data from experiment 2, processing scripts
CD \ Experiment 3\		logged file and data from experiment 3
CD \ Photos\		pictures of sensor, control unit and from experiments

Notes:	*Source code*	*IDE: Microchip MPLAB X; Compiler: Microchip XC8*
	PCB	*KiCAD*

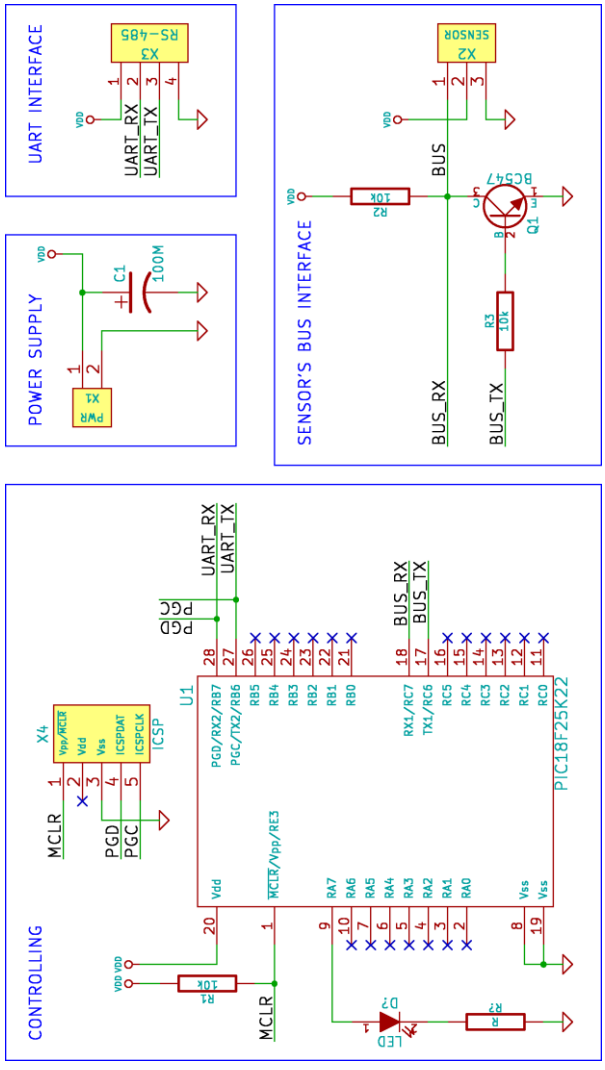
Appendix 2 - Scheme of prototype version of sensor unit



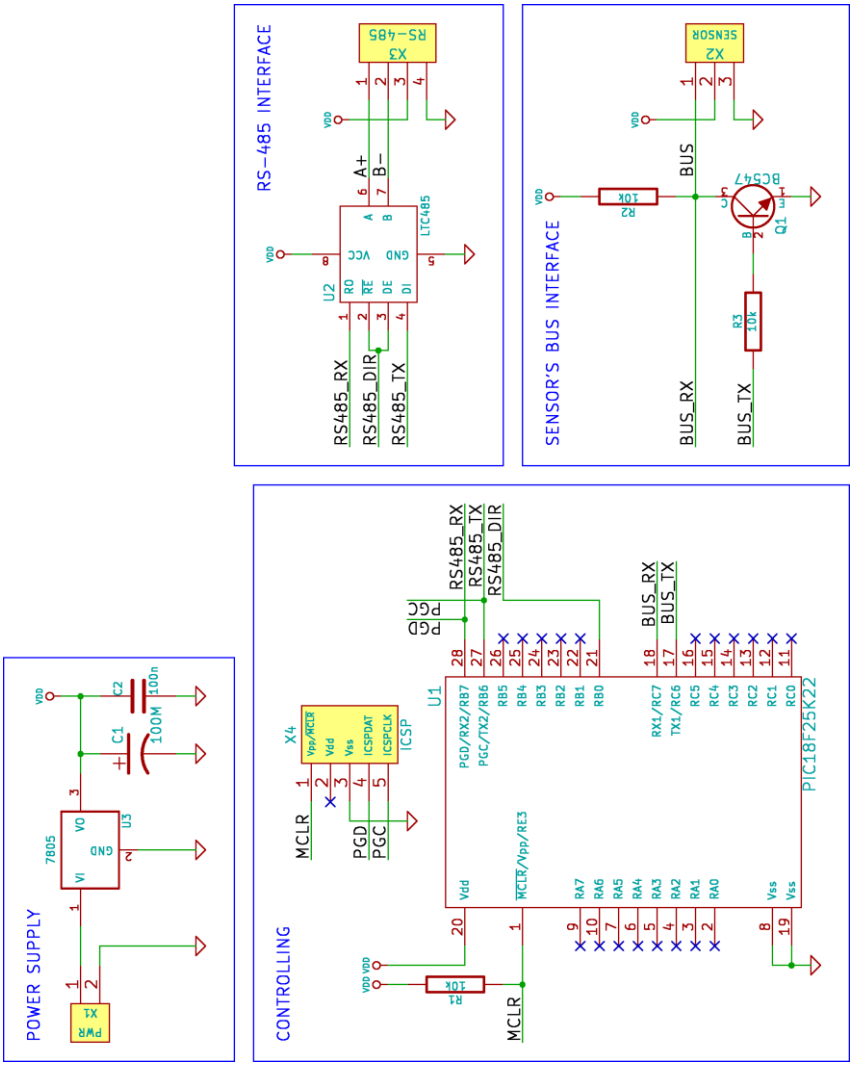
Appendix 3 - Scheme of final version of sensor unit



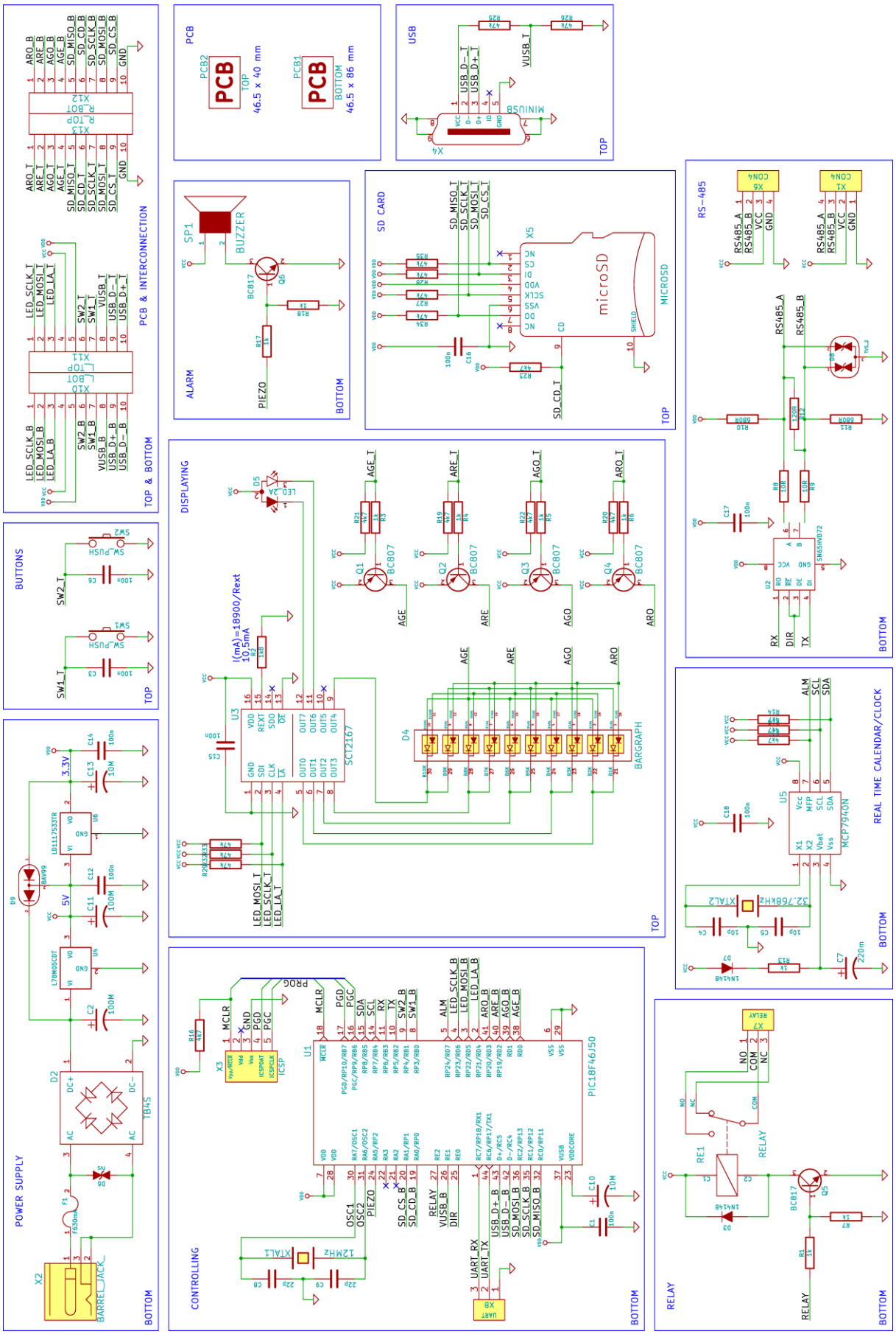
Appendix 4 - Scheme of prototype version 1 of master unit



Appendix 5 - Scheme of prototype version 2 of master unit

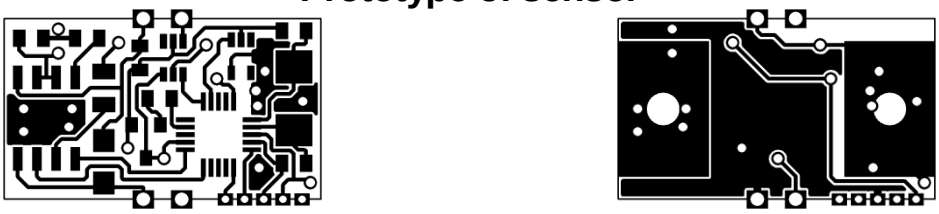


Appendix 6 - Scheme of final version of master unit



Appendix 7 - Sensor's PCB designs

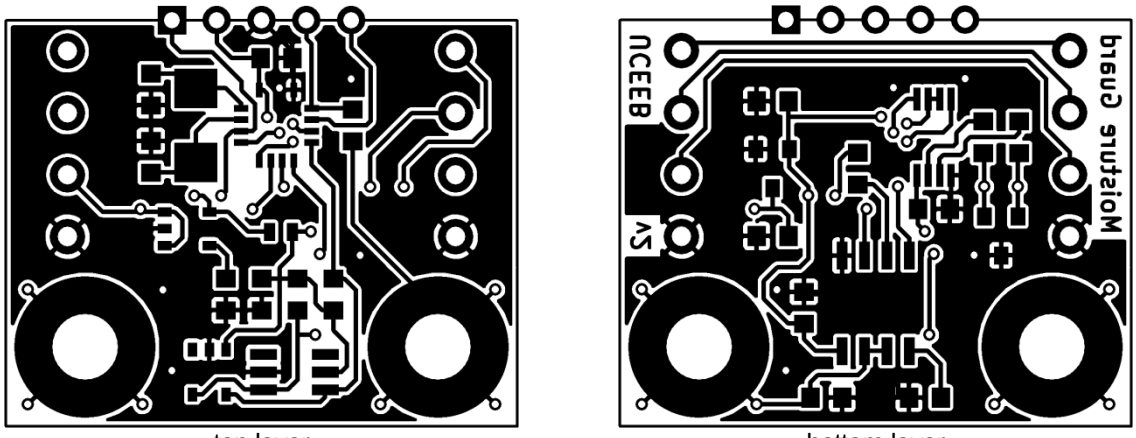
Prototype of sensor



top layer bottom layer

size 21 x 12 mm (scale 2:1)

Final version of sensor



top layer bottom layer

size 29 x 23 mm (scale 2:1)

Appendix 8 - Prototype version sensor's bill of material

Reference	Value	Package	Availability
C1	1n2	0603	Farnell
C2	22p	0603	TME
C3	22p	0603	TME
C4	100n	0603	TME
C5	100n	0603	TME
C6	15M	A	TME
D1	MCL4148	micromelf	TME
Q1	BC846BW	SOT323	TME
R1	10k	0603	TME
U1	PIC16F1508-I/ML	QFN20	TME
U2	TLC555CD	SOIC8	TME
U3	MCP9700T-E/LT	SC70-5	TME
U4	NC7SB3157P6X	SC70-6	TME
X1	IDC_4WAY	DIL4	GME
X2	M3 brass	M3	SM
X3	M3 brass	M3	SM
X4	ICSP	-	-
XTAL1	12MHz	5.0x3.2	Farnell
electrodes	-	-	Voltcraft
enclosure	Z-63	26x17x14	TME

Farnell	http://www.farnel.com/
TME	http://www.tme.eu/
GME	http://www.gme.cz/
SM	http://www.spojovaci-material.net/
Voltcraft	http://www.voltcraft.cz/

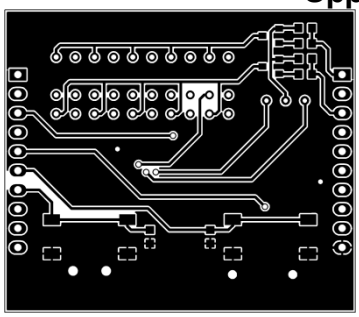
Appendix 9 - Final version sensor's bill of material

Reference	Value	Package	Availability
C1	0n82	0603	Farnell
C2	22p	0603	Farnell
C3	22p	0603	Farnell
C4	4M7	0603	TME
C5	4M7	0603	TME
C6	100n	0603	TME
C7	100n	0603	TME
C8	100n	0603	TME
C9	100n	0603	TME
C10	100n	0603	TME
C11	100n	0603	TME
D1	BAT54C	SOT23	TME
D2	BAV99	SOT23	TME
D3	CDSOT23-SM712	SOT23	Farnell
R1	10k	0603	TME
R2	10k	0603	TME
R3	1k	0603	Farnell
R4	10k	0603	TME
R5	10R	0603	TME
R6	10R	0603	TME
U1	PIC16F1825	QFN16	TME
U2	SN65HVD72	MSOP8	Farnell
U3	LP2985	SOT23-5	Farnell
U4	TLC555CD	SO8	TME
U5	*SHT21*	*DFN 3x3mm*	*Farnell*
U6	*MCP9800*	*SOT23-5*	*TME*
X1	INPUT	RM3.5	TME
X2	OUTPUT	RM3.5	TME
X3	ELECTRODES	3.5x30 PZ2	Fabory
X4	ICSP	-	-
XTAL1	12MHz	5.0x3.2mm	Farnell
enclosure	custom	42x31x18mm	UCEEB

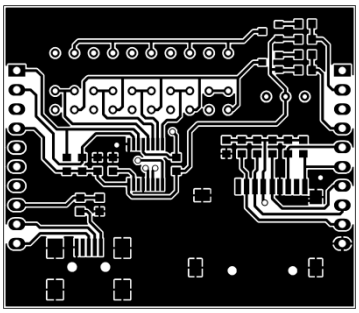
Farnell	http://www.farnel.com/
TME	http://www.tme.eu/
Fabory	http://www.fabory.cz/
UCEEB	http://www.uceeb.cz/

Appendix 10 - Control unit's PCB design

Upper part of control unit



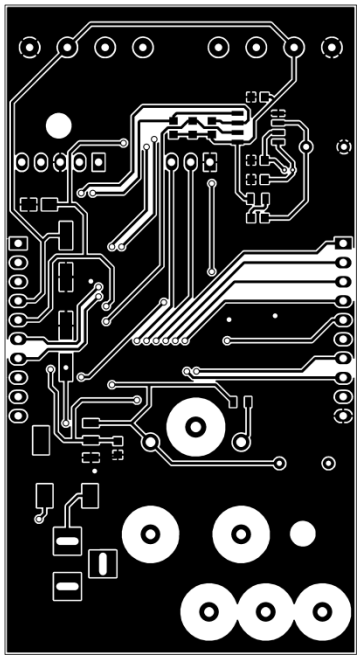
top layer



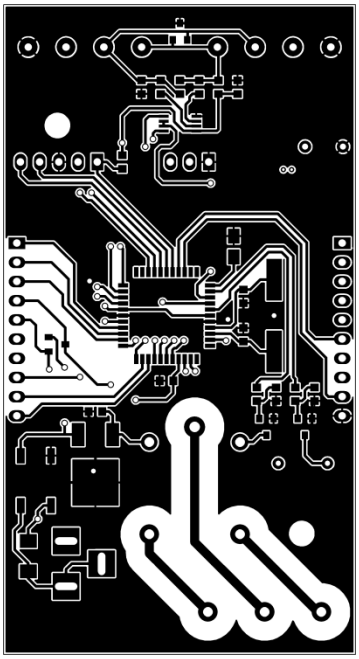
bottom layer

size 46.5 x 40 mm (scale 1:1)

Lower part of control unit



top layer



bottom layer

size 46.5 x 86 mm (scale 1:1)

Appendix 11 - Control unit's bill of material

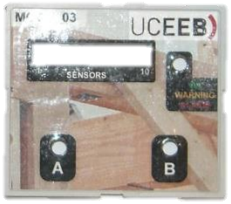
Ref.	Value	Package	Availa-bility
C1, C3, C6, C12, C14-C18	100n	0603	TME
C2, C11	100M	6.3x7.7	TME
C4, C5	10p	0603	TME
C7	220m	10.5x5.0	TME
C8, C9	22p	0603	TME
C10, C13	10M	A	TME
D2	TB4S	TBS	TME
D3, D7	1N4148	0805	TME
D4	DC-10EGWA	25x10	TME
D5	L-115WEGW-CA	3mm	TME
D6	CDSOT23-SM712	SOT23	TME
D8	P6SMBJ20CA	DO214A	TME
D9	BAV99	SOT23	TME
Q1-Q4	BC807	SOT23	TME
Q5, Q6	BC817	SOT23	TME
R1, R3-R7, R13, R17, R18	1k	0603	TME
R2	1k8	0603	TME
R8, R9	10R	0603	TME
R10, R11	680R	0603	TME
R12	120R	0603	TME
R14-R16, R19-R24	4k7	0603	TME
R25-R29, R32-R35	47k	0603	TME

Ref.	Value	Package	Availa-bility
RE1	LEG-5	19.5 x 15.8 x 15	TME
SP1	BUZZER	12x9.5	TME
SW1, SW2	microswitch	6x6x9.5	TME
F1	F630mA	1206	TME
U1	PIC18F46J50	TQFP44	TME
U2	SN65HVD72	MSOP8	TME
U3	SCT2167	SSOP16	TME
U4	L78M05CDT	DPAK	TME
U5	MCP7940N	SOIC8	TME
U6	LD1117S33TR	SOT223	TME
X1	terminal 4way	RM5	TME
X2	BARREL_JACK	5.5x2.1	TME
X3	header 5x1	M	TME
X4	MINIUSB	USB B	TME
X5	MICROSD	SD micro	TME
X6	terminal 4way	RM5	TME
X7	terminal 3way	RM7.5	TME
X8	header 3x1	M	TME
X10, X12	header 10x1	F	TME
X11, X13	header 10x1	M45mm	GME
XTAL1	12MHz	HC49SM	TME
XTAL2	32.768kHz	TC38	TME
enclosure	Z-107	90 x 52.5 x 65	TME

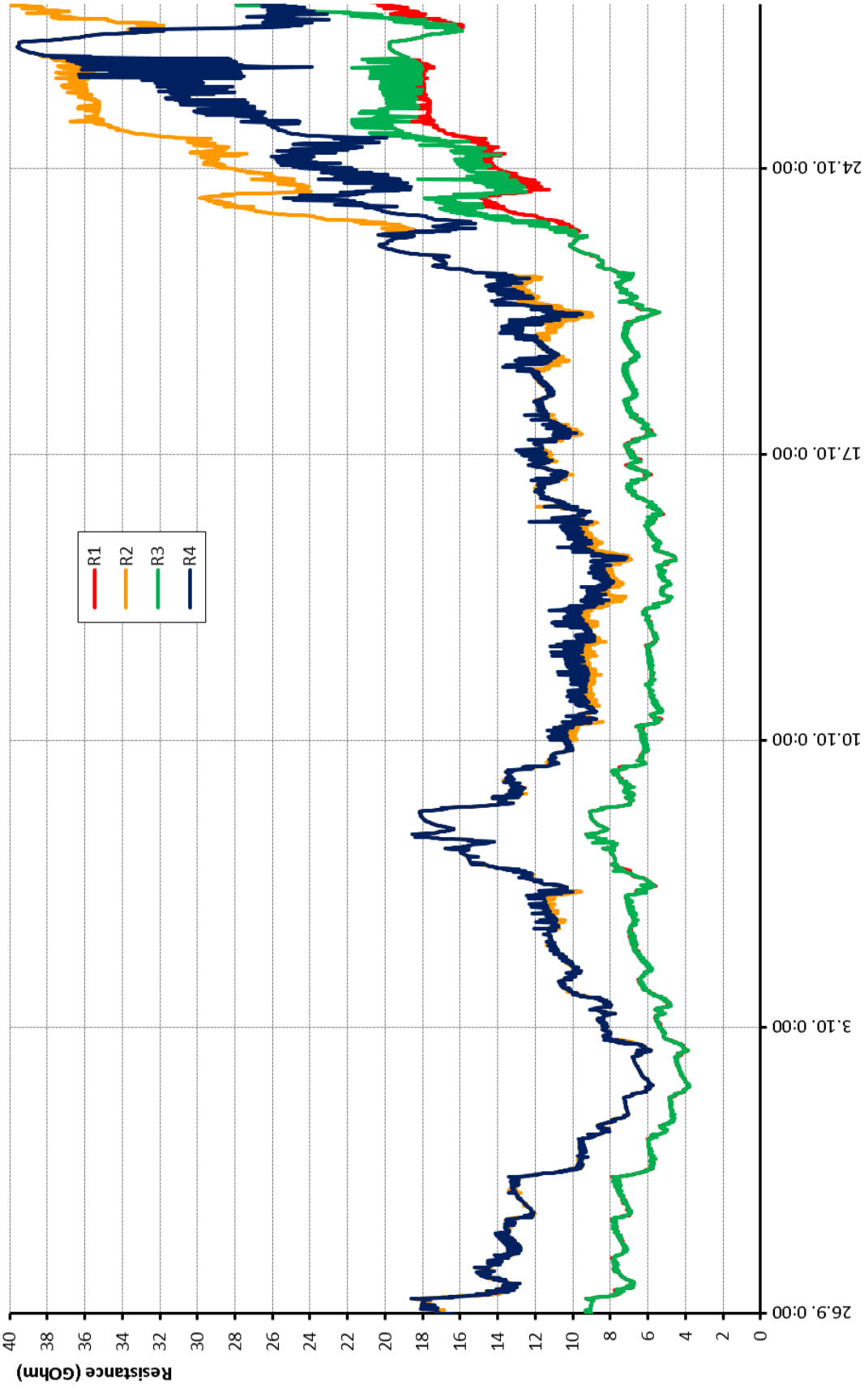
Farnell http://www.farnel.com/
TME http://www.tme.eu/
GME http://www.gme.cz/

Appendix 12 - Labels of final version of control unit

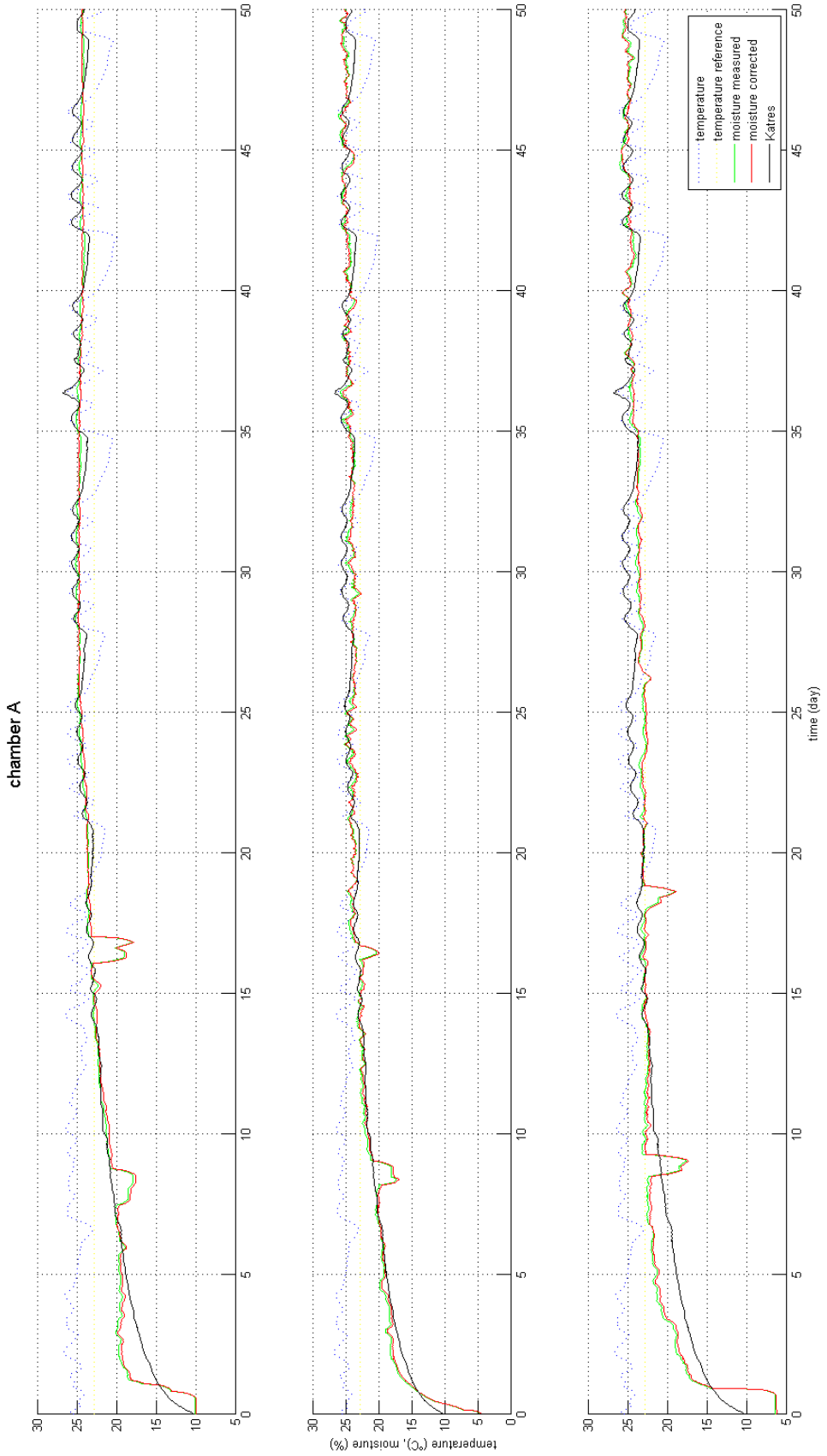
Appendix 13 - Photos of final version of control unit



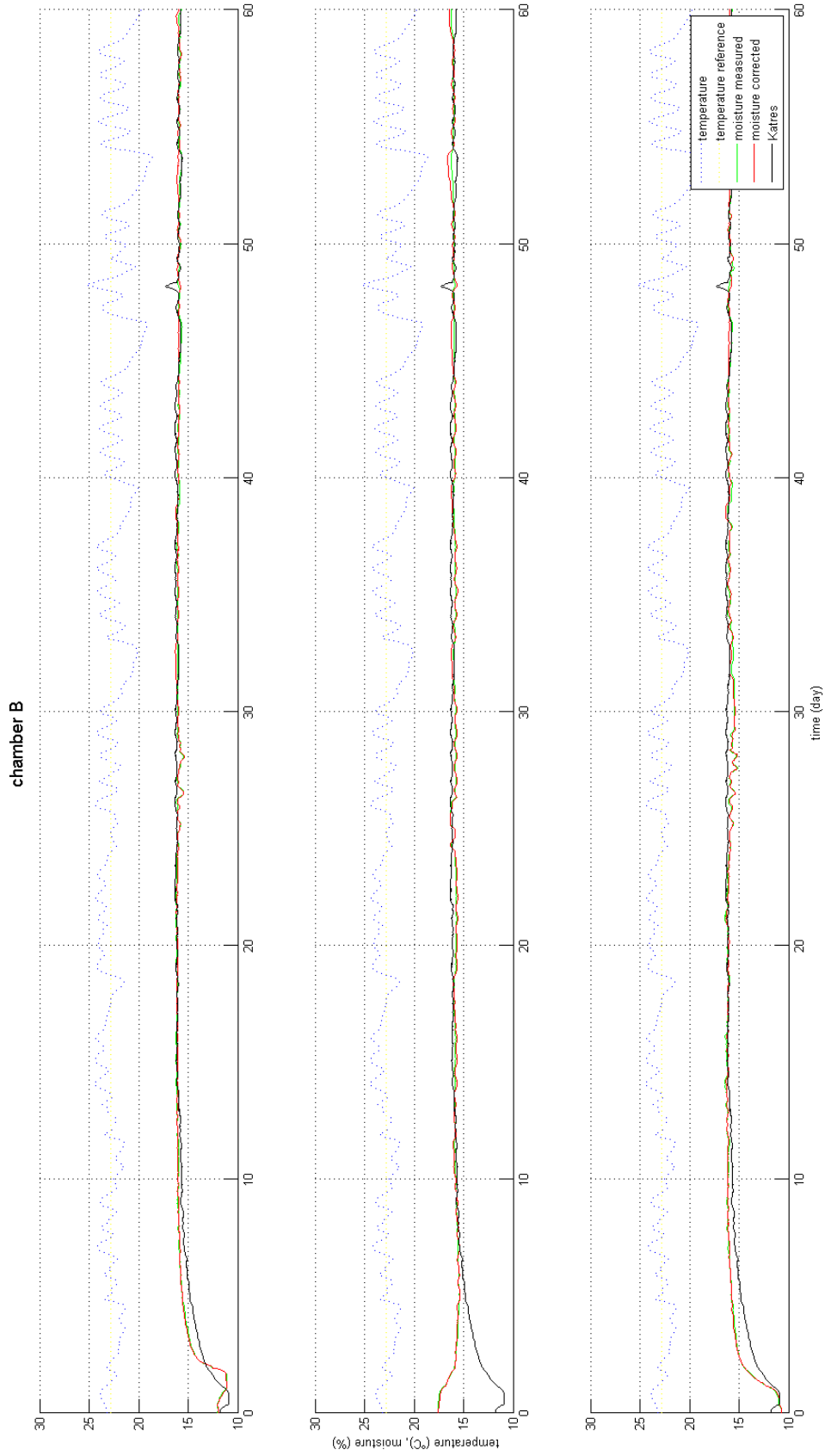
Appendix 14 - Data from experiment 1



Appendix 15 - Processed data from experiment 2 - chamber A



Appendix 16 - Processed data from experiment 2 - chamber B



Appendix 17 - Data from experiment 3