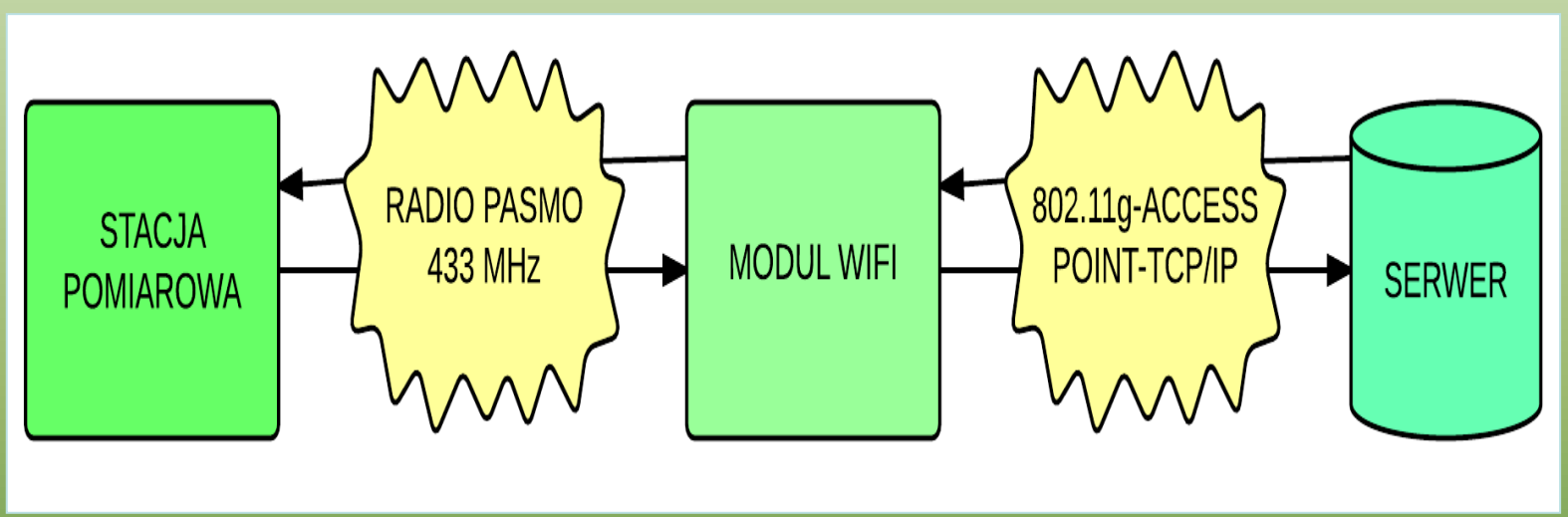
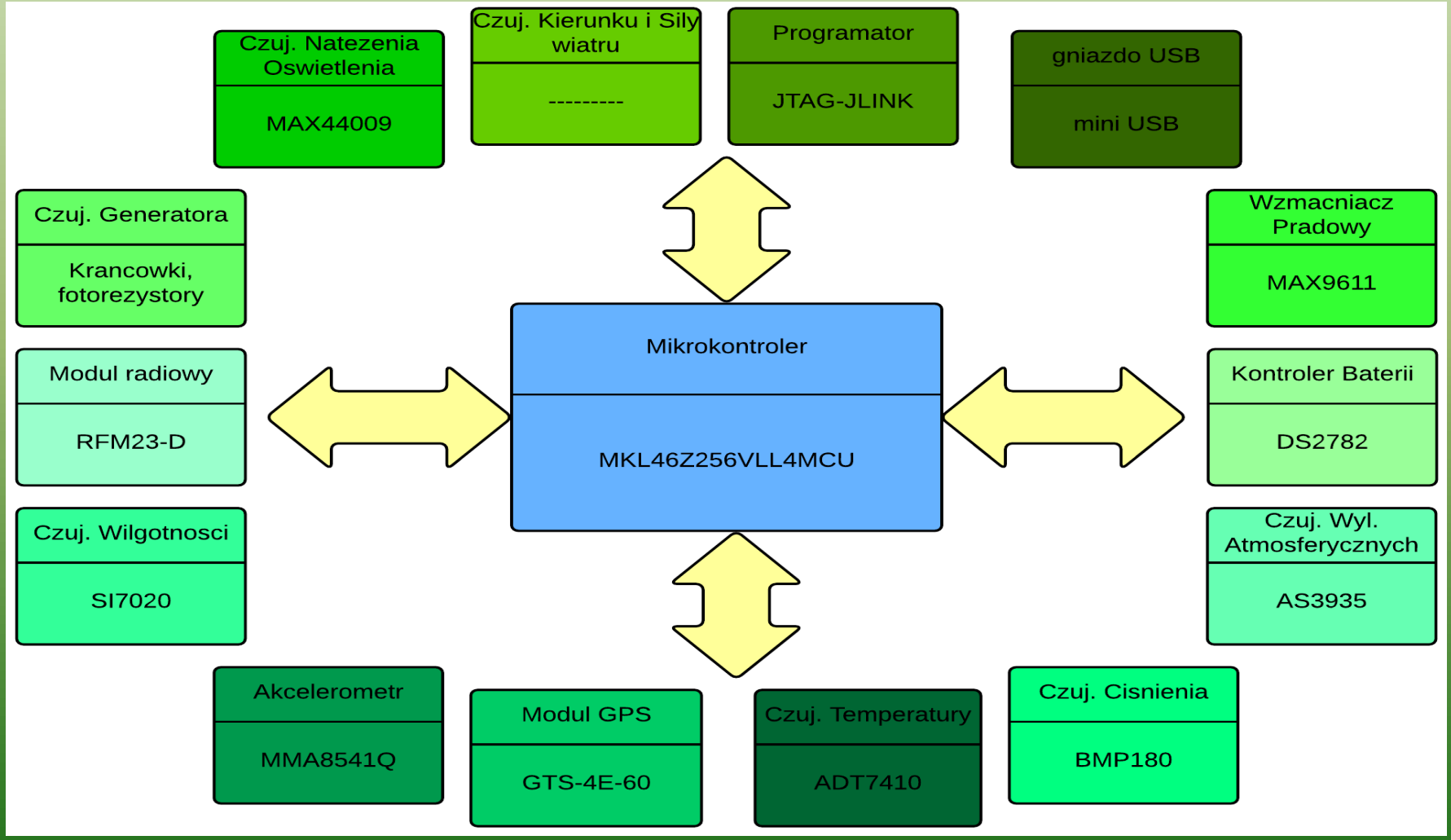
Projects

Author: Łukasz Uszko

1. Rozproszony system stacji pomiarowych



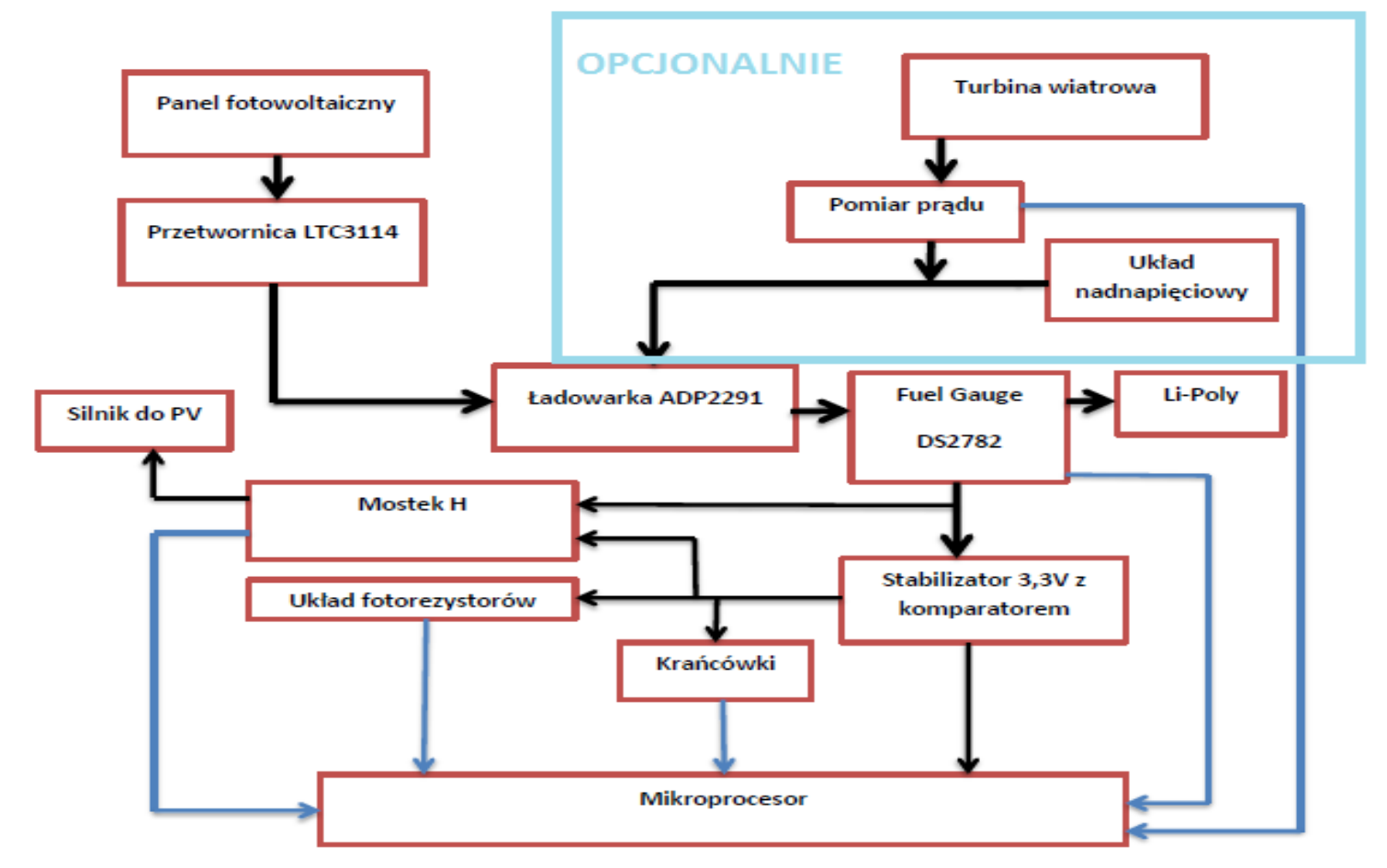
Budowa modułu stacji pomiarowej



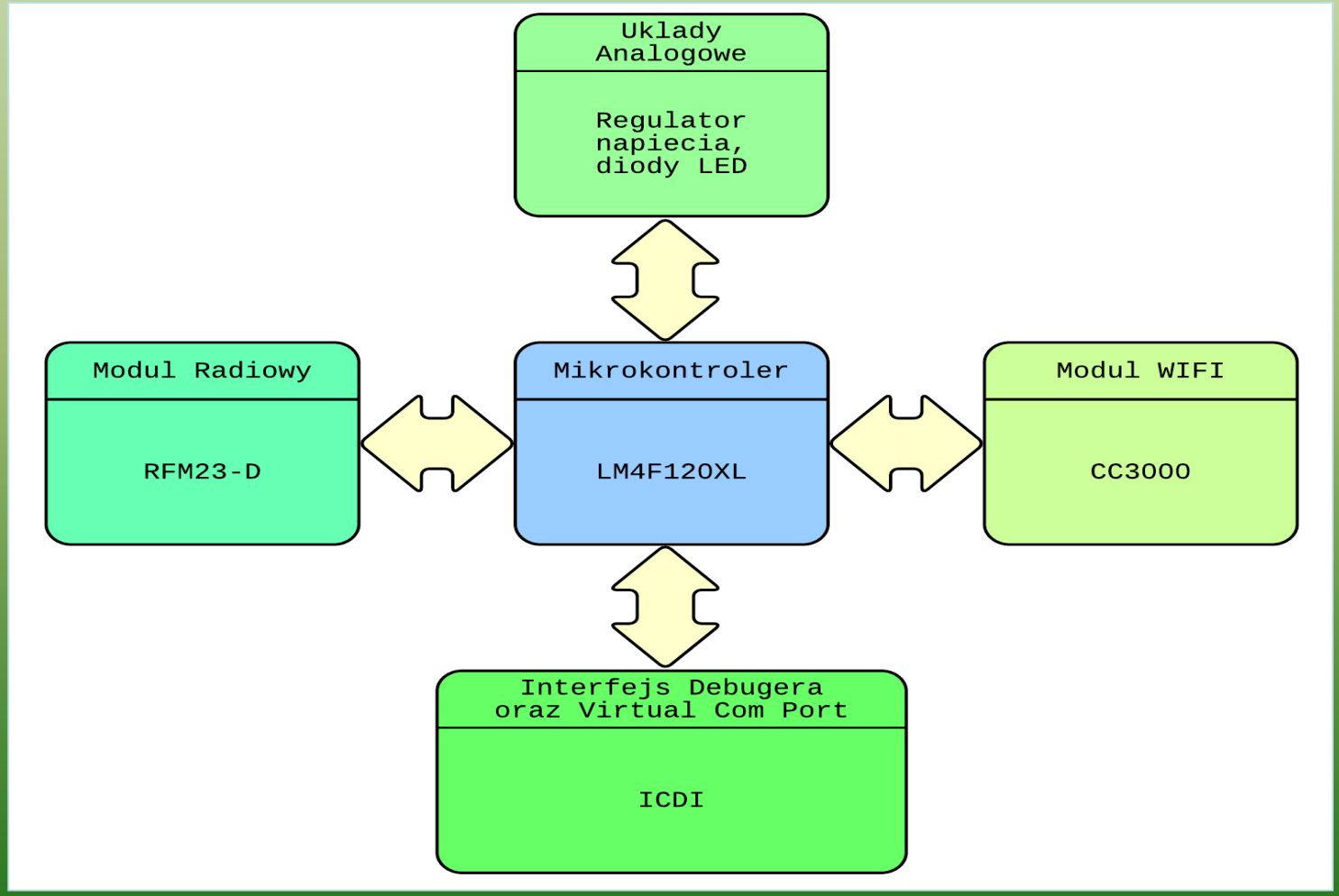
Część analogowa modułu stacji

- **Ogniwo fotowoltaiczne,**
- **Układ podążania panelu za słońcem,**
- **Przetwornica LTC3114,**
- **Układ ładowania baterii Li-Poly,**
- **Stabilizatory napięć,**

Układ analogowy modułu stacji – schemat blokowy



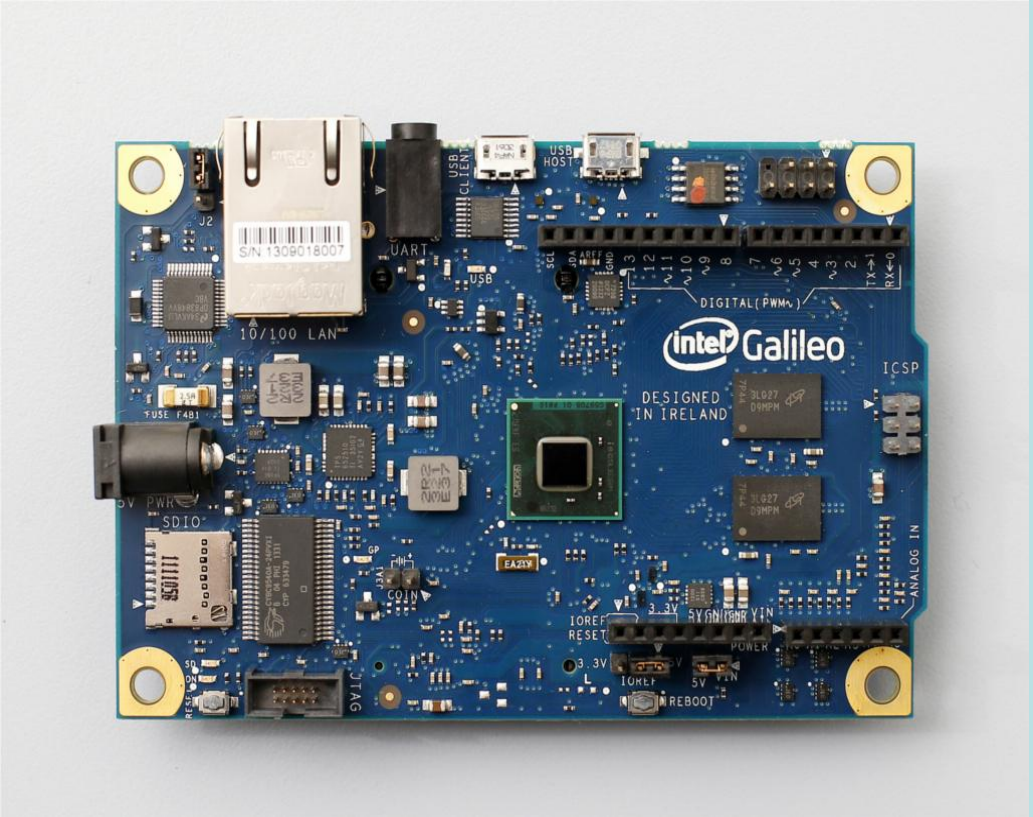
Budowa modułu zdalnej komunikacji



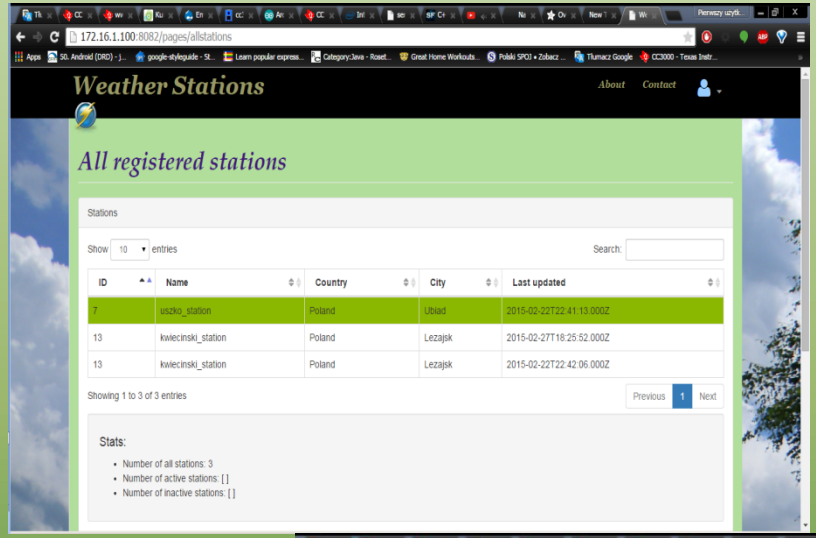
Część sprzętowa Serwera

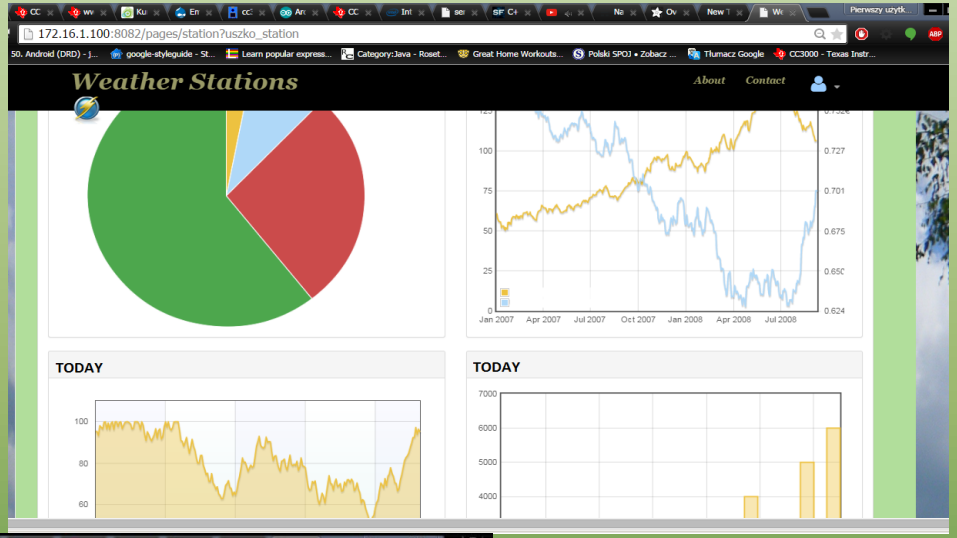
Intel Galileo

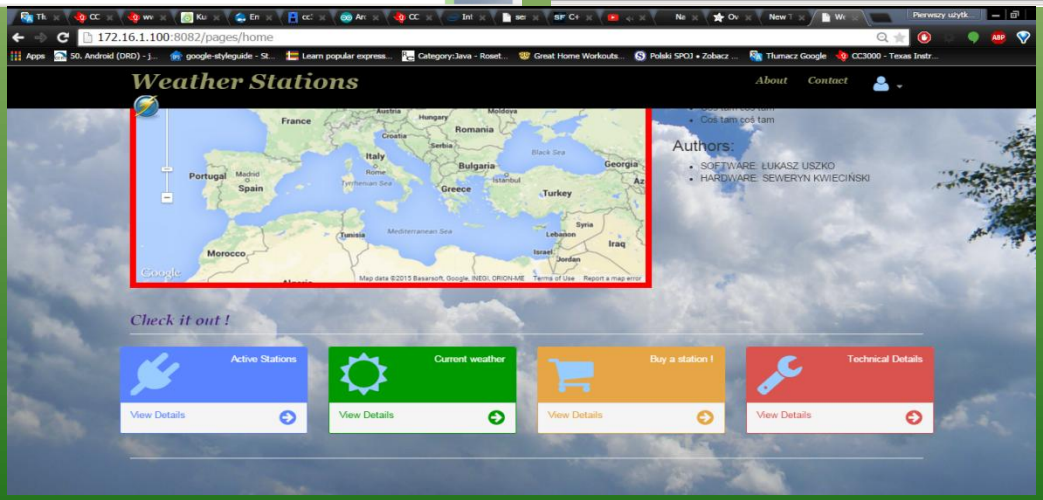
- Procesor Intel Quark Soc X1000 32 bit - 400MHz
- 512KB SRAM oraz 256 MB RAM DDR3, 16 KB L1 Cache
- Zegar RTC
- PCI Express Slot, 100Mb Ethernet port, Micro-SD Slot, RS232 Port, USB Host oraz Klient port oraz 8 Mb pamieci Flash typu NOR.
- Wyprowadzone GPIO, kompatybilene ze standardem Arduino.
- Dostępne magistrale I2C, SPI, SDIO, UART, wejścia ADC,
- Preprogramowana dystrybucja Linuxa (Yocto versja 1.4.0)



Oprogramowanie – Aplikacja webowa

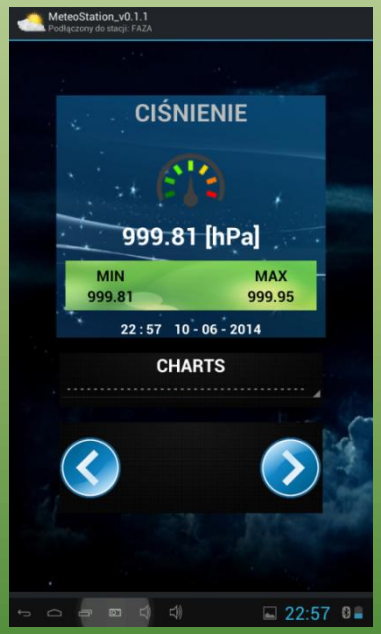


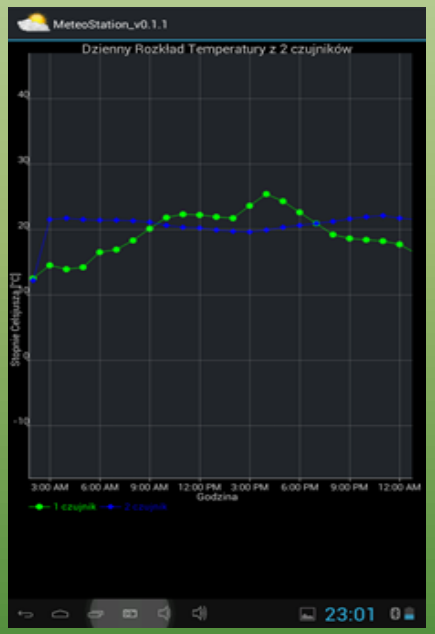




Oprogramowanie – Aplikacje Android, Windows Phone 8, Tizen

Zdjęcia:

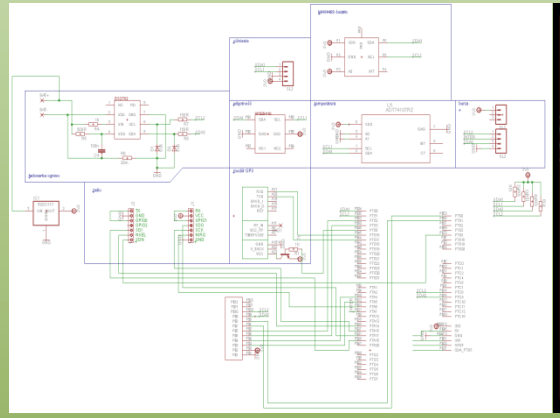


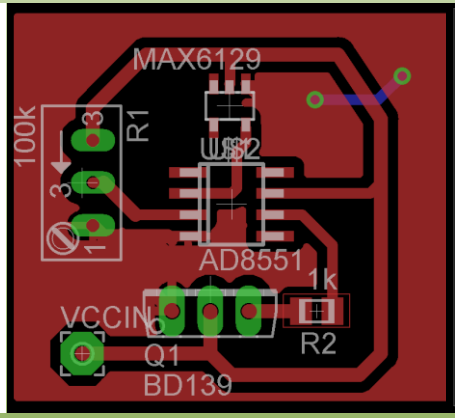


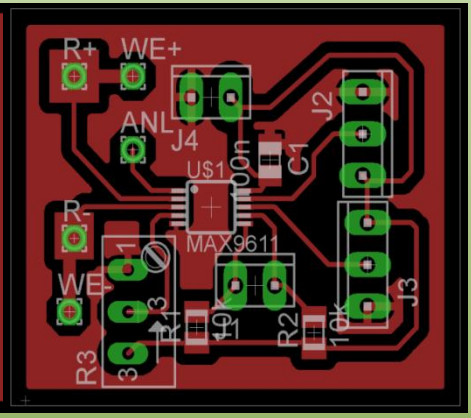
Specification

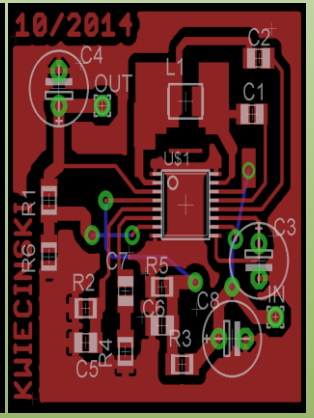
Power	110 [mW] station , 250 [mW] – Wifi module
Comunication interfaces	ISM 433 MHz , WIFI 802.11g
Serwer	Node.js , mysql database
Software	Web application
Software	Android and WP8 aplication “CurrentMeterV1.0”
Power supply	1x 3.6 V LI-Poly accumulator – station , usb – wifi module
Weight	145 [g] – station , 80 [g] – wifi module

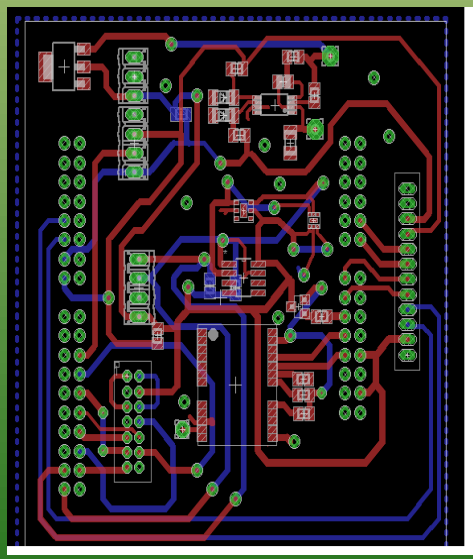
PCB Schematics

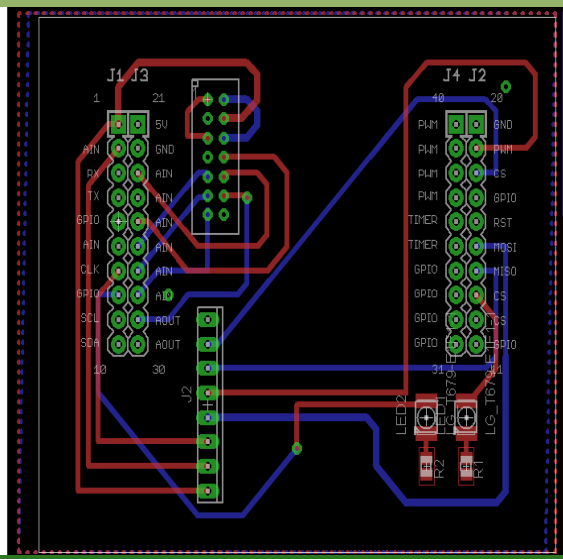


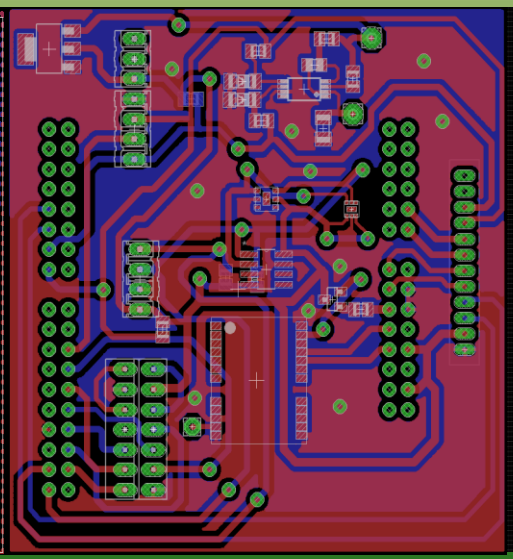


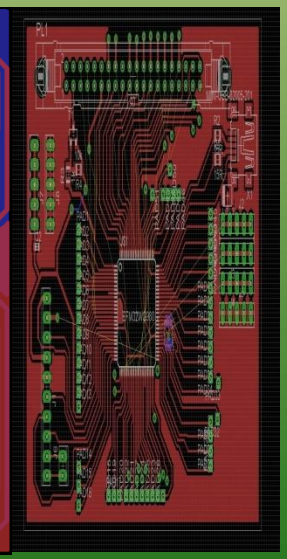




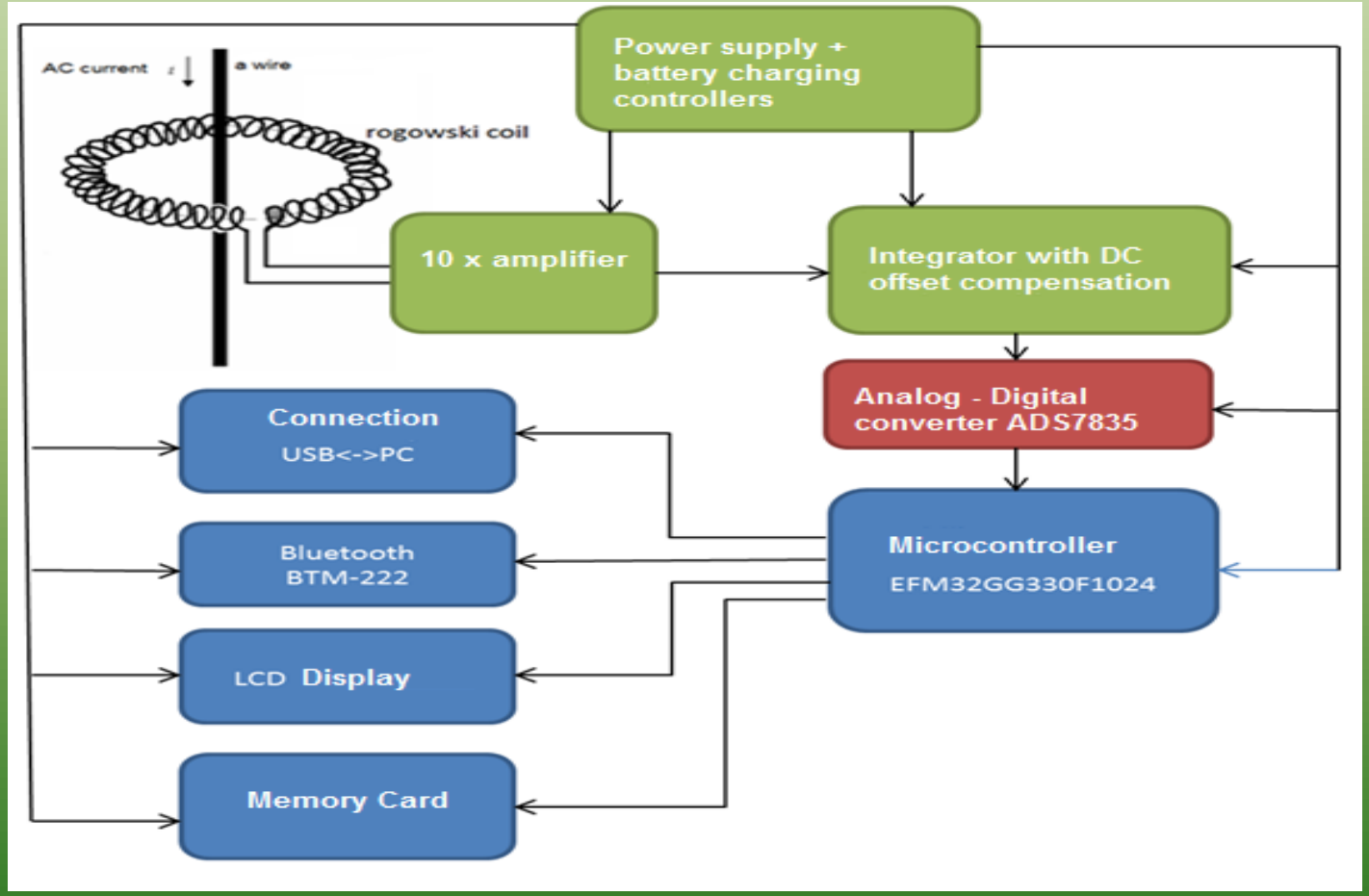


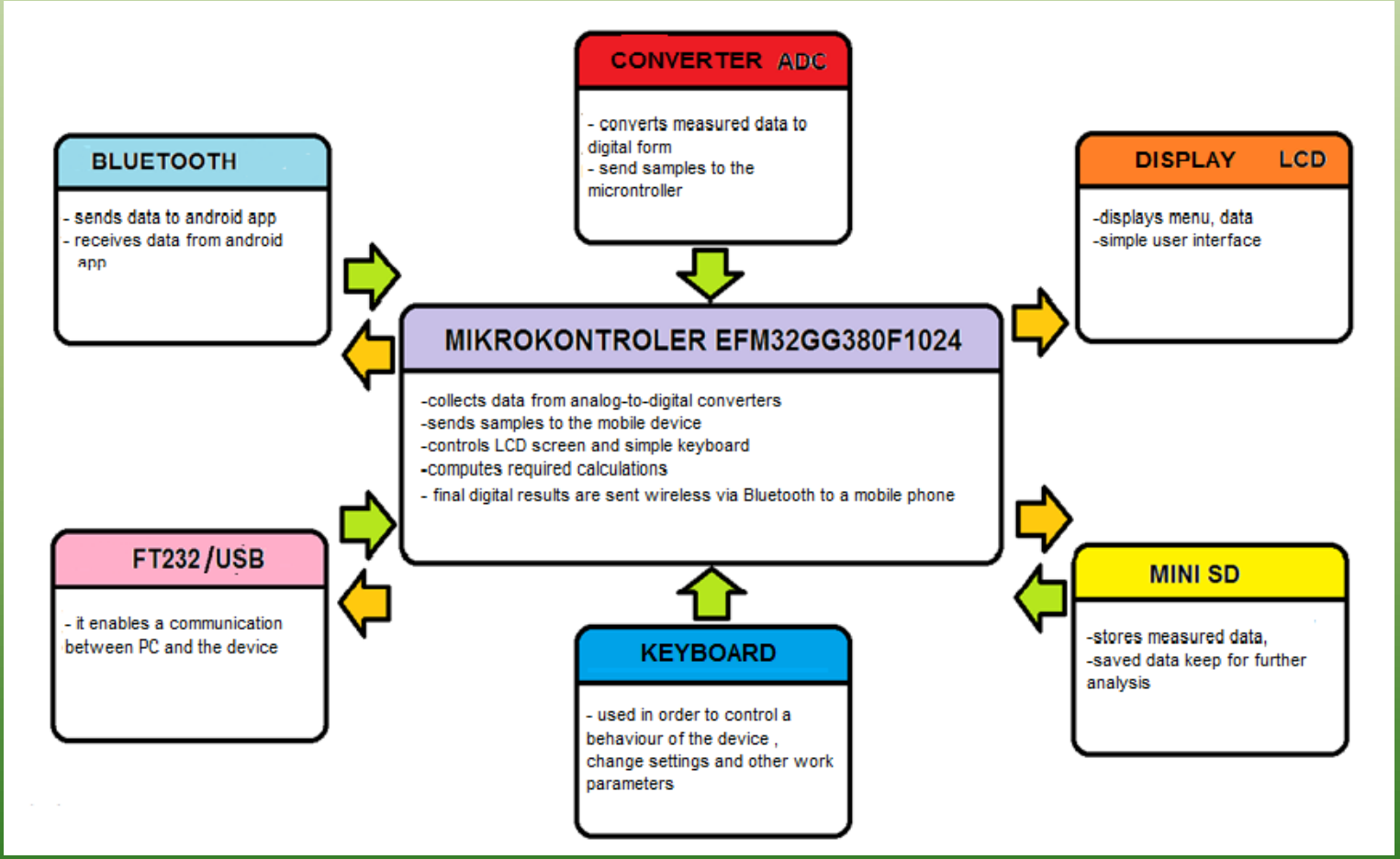




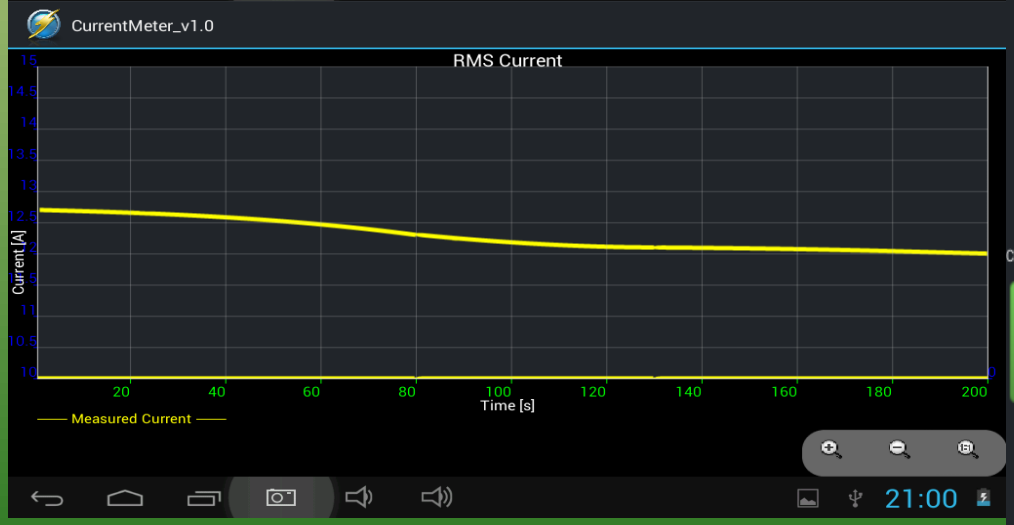


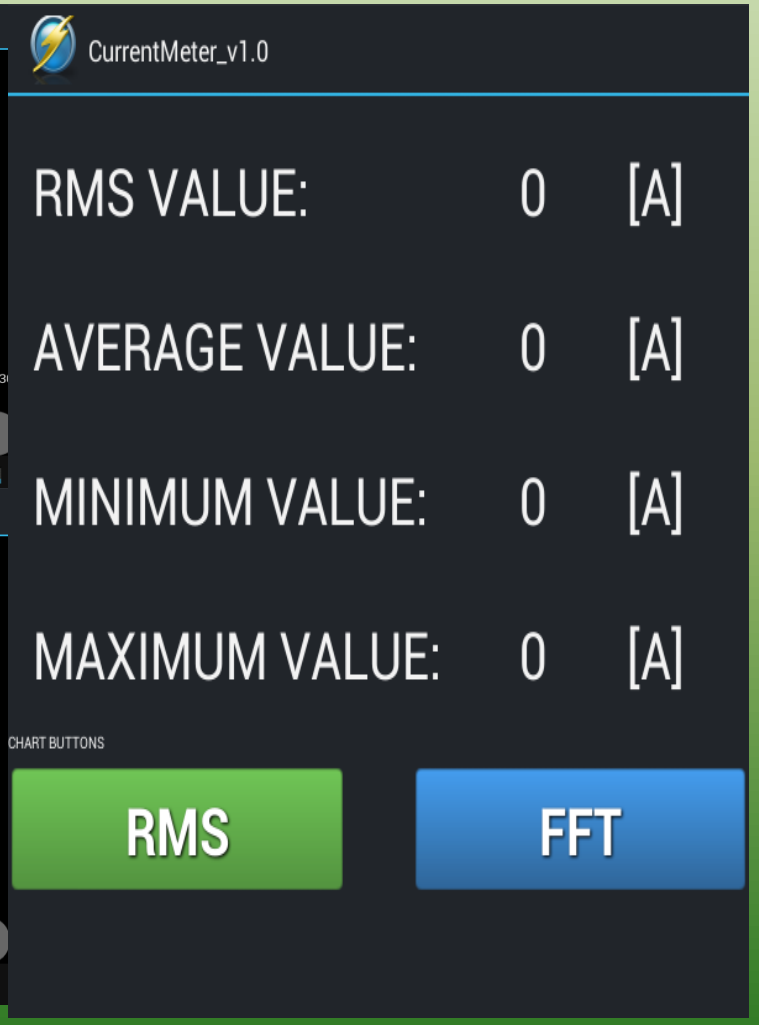
2. Bezdotykowy pomiar prądu za pomocą cewki rogowskiego




CONVERTER ADC
- converts measured data to digital form
- send samples to the microntroller
BLUETOOTH
- sends data to android app
- receives data from android app
DISPLAY LCD
-displays menu, data
-simple user interface
MIKROKONTROLER EFM32GG380F1024
-collects data from analog-to-digital converters
-sends samples to the mobile device
-controls LCD screen and simple keyboard
-computes required calculations
- final digital results are sent wireless via Bluetooth to a mobile phone
FT232/USB
- it enables a communication between PC and the device
MINI SD
-stores measured data,
-saved data keep for further analysis
KEYBOARD
- used in order to control a behaviour of the device , change settings and other work parameters


CurrentMeter_v1.0
FFT
Signal amplitude
Number of harmonics
Data
First harmonic of the signal : 50 [Hz]
20:42


CurrentMeter_v1.0
RMS Current
Current [A]
Time [s]
Measured Current
21:00

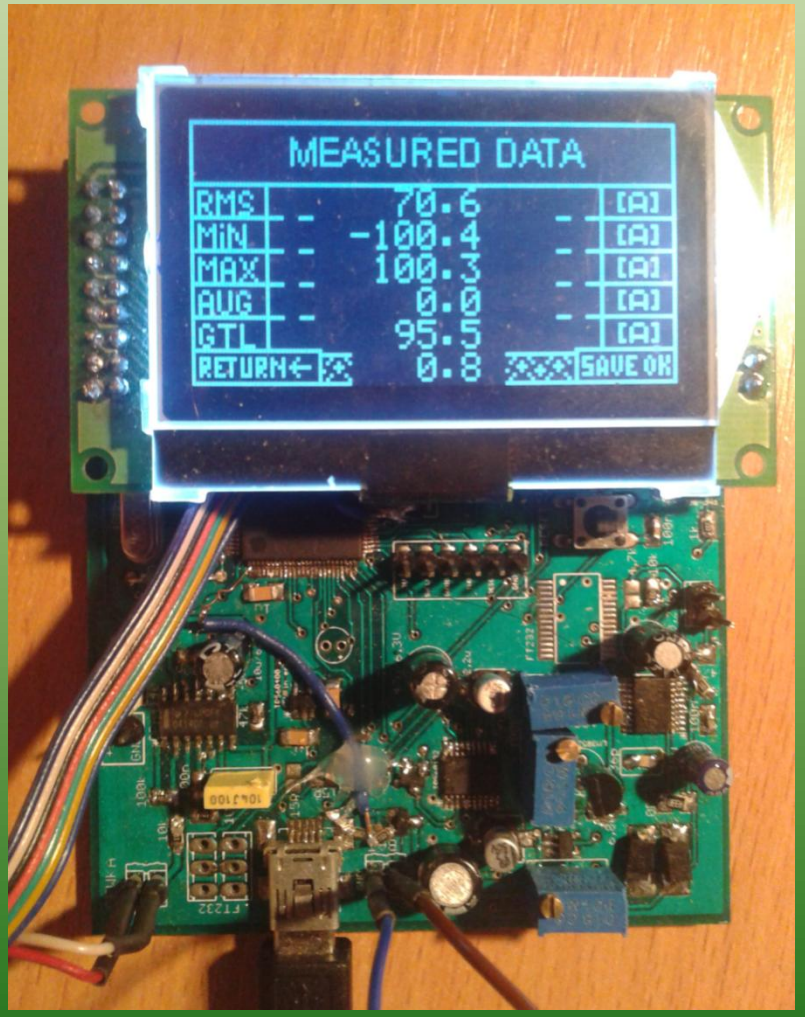

CurrentMeter_v1.0
RMS VALUE: 0 [A]
AVERAGE VALUE: 0 [A]
MINIMUM VALUE: 0 [A]
MAXIMUM VALUE: 0 [A]
CHART BUTTONS
RMS
FFT

Parameters measured by the device

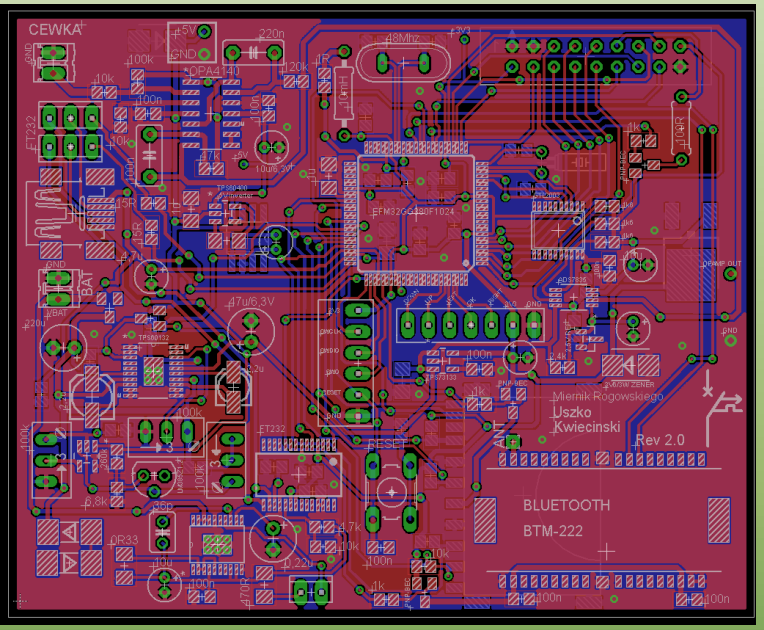
- True RMS (root mean square)
- Max and Min level of a signal
- Average value
- 512- point FFT
- Amplitude spectrum of a measured signal for 50 Hz frequency - (using Goertzel's algorithm)
- THD (total harmonic distortion of the signal)

Photos


CurrentMeter_v1.0
RMS VALUE: 71.3 [A]
AVERAGE VALUE: 0.0 [A]
MINIMUM VALUE: -100.3 [A]
MAXIMUM VALUE: 100.2 [A]
RMS
FFT
23:19
MEASURED DATA


MEASURED DATA
RMS 70.6 [A]
MIN -100.4 [A]
MAX 100.3 [A]
AVG 0.0 [A]
GTL 95.5 [A]
RETURN 0.8 SAVE OK

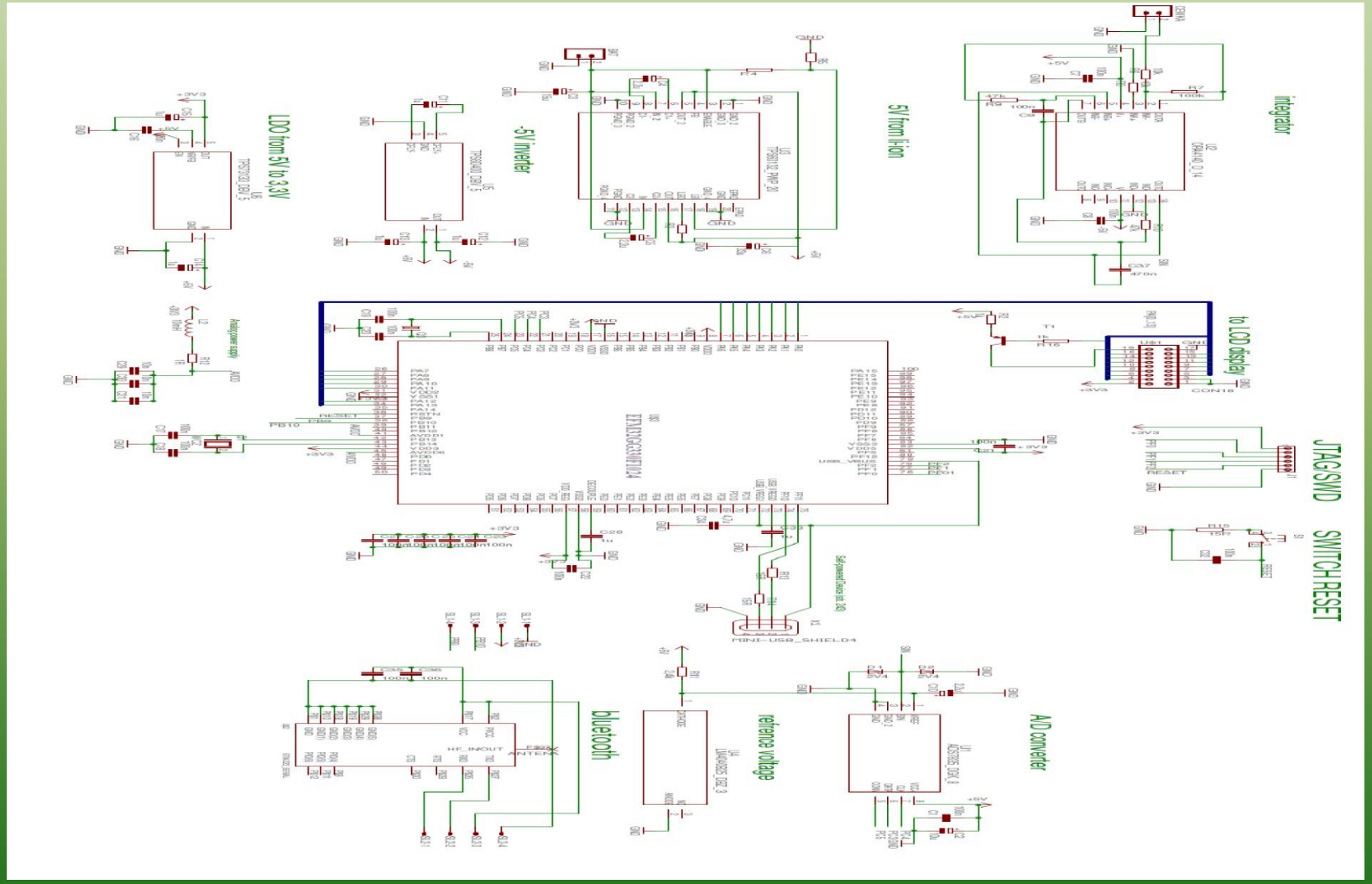
Photos


CEWKA
BLUETOOTH
BTM-222
Miernik Rogowskiego
Uszko
Kwiecinski
Rev 2.0

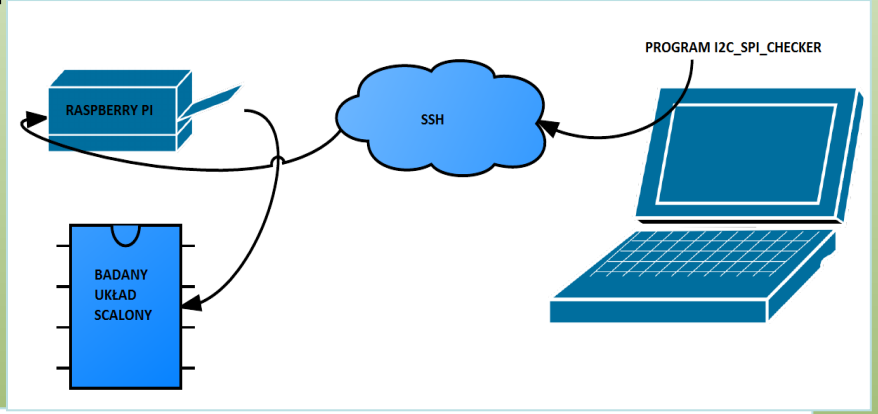
Specification

Power	110 [mW] (during acquisition) , 0.1 mW (sleep mode)
Resolution	100 [mA]
Maximum sample rate	10 [K/s]
AC Current (Primary nominal current RMS)	1 [kA]
Coil inductance (+/- 2%)	16 [mH]
Coil resistance T_A=20 C typical	1680 [Ω]
Output Voltage (sinusoidal wave)	1[A] -> 2[mV]
Math functions	Min, Max, Avg, RMS, FFT
USB Interface	USB Host – not available yet
Other Interfaces	Bluetooth
Display	132×64 pixels LCD Display to support multi-display, menu
Software	Android Aplication “CurrentMeterV1.0”
Power supply	1x 3.6 V LI-On accumulator / USB
Weight	100 [g]

Scheme of the device



3. I2C_SPI_Checker



Rejestry układu ADT7410

Wybrany rejestr z zaznaczonym polem dostępu

Maski Bitowe danego rejestru

I2C_SPI_CHECKER

Device name: ADT7410 7 bit Address: 0x48

Registers:

	Name	Address
1	TEMP_MSB	0x00
2	TEMP_LSB	0x01
3	STATUS	0x02
4	CONF_REG	0x03
5	T_HIGH_MSB	0x04
6	T_HIGH_LSB	0x05
7	T_LOW_MSB	0x06
8	T_LOW_LSB	0x07

Bitmasks:

REG: CONF_REG

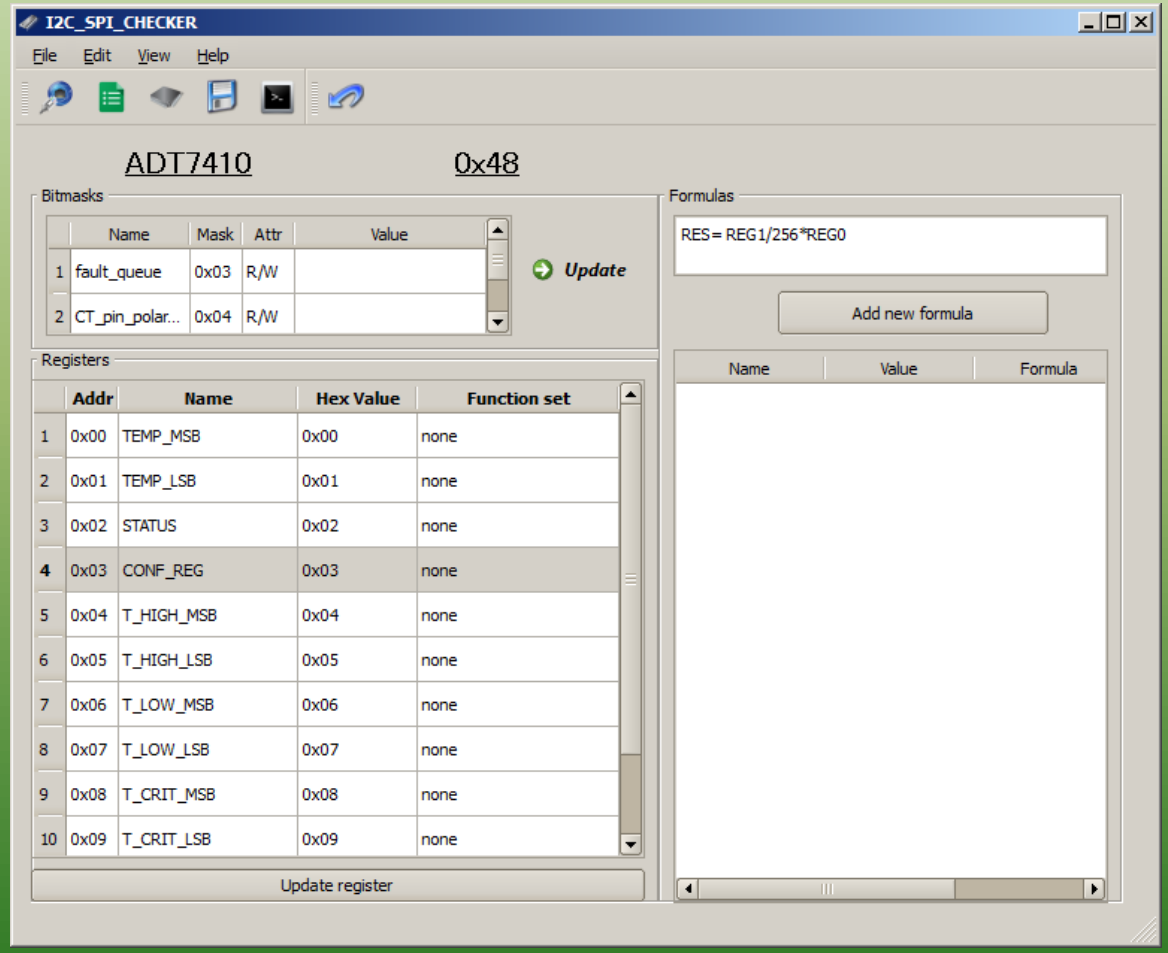
R/W R/W R/W R/W R/W R/W R/W R/W

Reg Value: 0x00 Create_Bitmask

fault_queue 0x03 R/W
CT_pin_polarity 0x04 R/W
INT_pin_polarity 0x08 R/W
INT/CT_mode 0x10 R/W

Add Register Load File Save Cancel

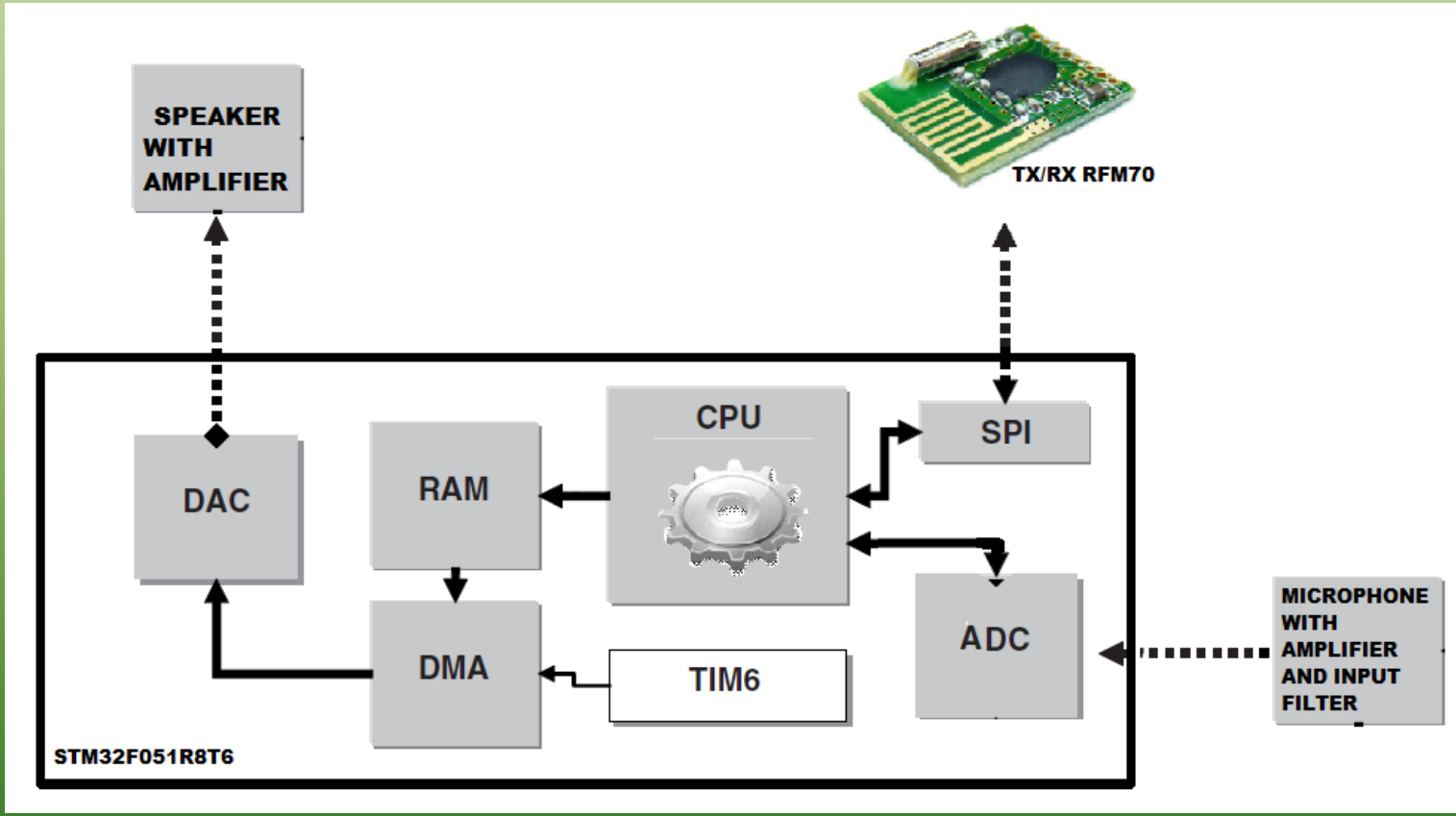
I2C_SPI_Checker

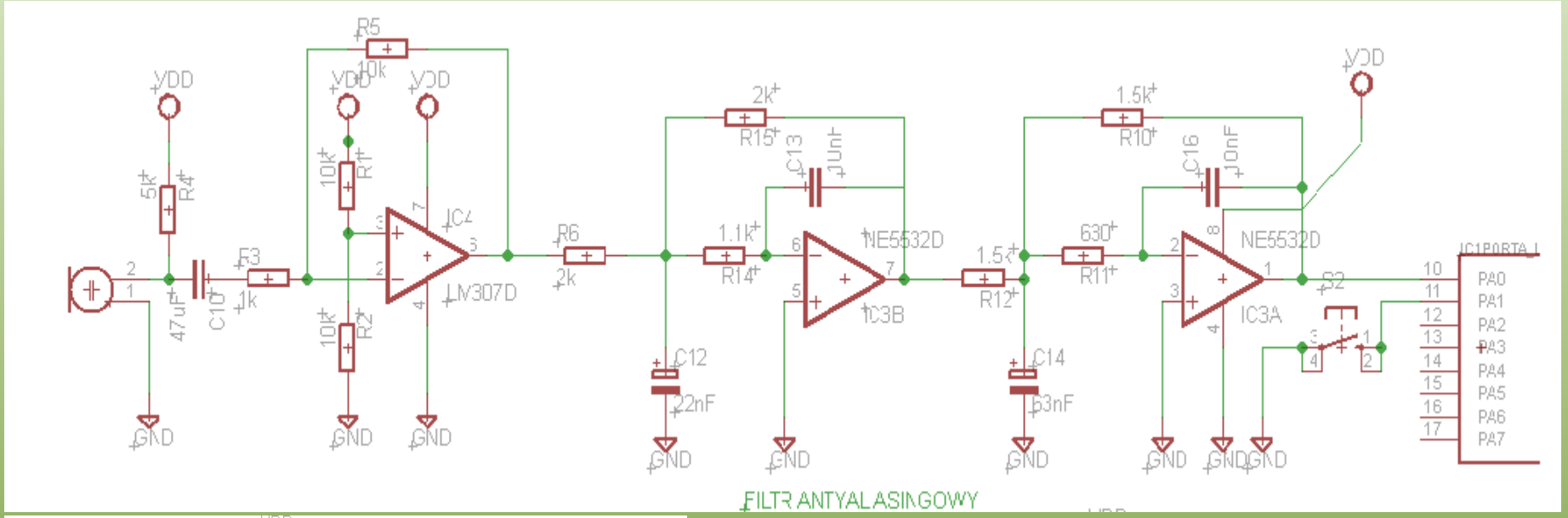


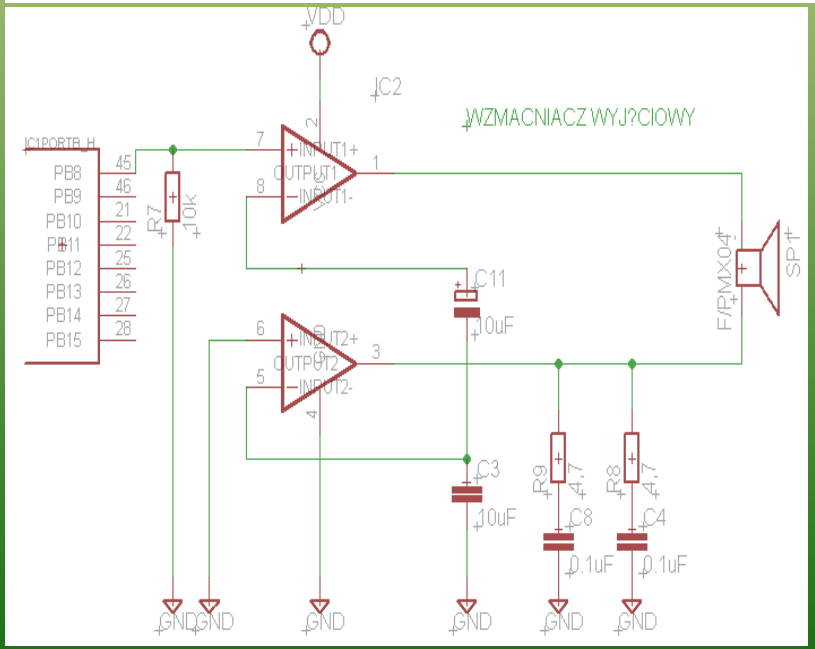
4. Inne

- Generator sygnałów arbitralnych na kostce AD9106
- Zamek kodowy
- Dekoder protokołów IrDA
- i inne do znalezienia na https://github.com/igbt6

Domofon bezprzewodowy




R5
10k
VDD
VDD
VDD
5k
R4
10k
R1
IC4
LM307D
10k
R2
C10
47uF
F3
1k
GND
GND
GND
R6
2k
2k
R15
C13
1uF
1.1k
R14
NE5532D
IC3B
C12
22nF
GND
GND
1.5k
R10
C16
10nF
VDD
1.5k
R12
630
R11
NE5532D
IC3A
C14
33nF
GND
GND
GND
GND
P2
IC1PORTA_L
10
11
12
13
14
15
16
17
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
FILTR ANTYALASINGOWY


VDD
IC2
WZMACNIACZ WYJ?CIOWY
IC1PORTB_H
PB8
PB9
PB10
PB11
PB12
PB13
PB14
PB15
45
46
21
22
25
26
27
28
R7
10k
C11
10uF
C3
10uF
R9
4,7
C8
0,1uF
R8
4,7
C4
0,1uF
F/PMX04
SP1
GND
GND
GND
GND
GND
GND