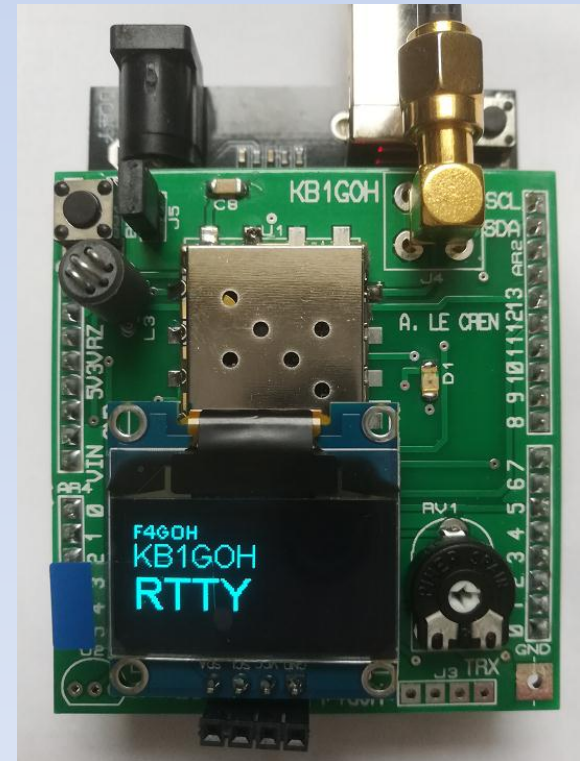
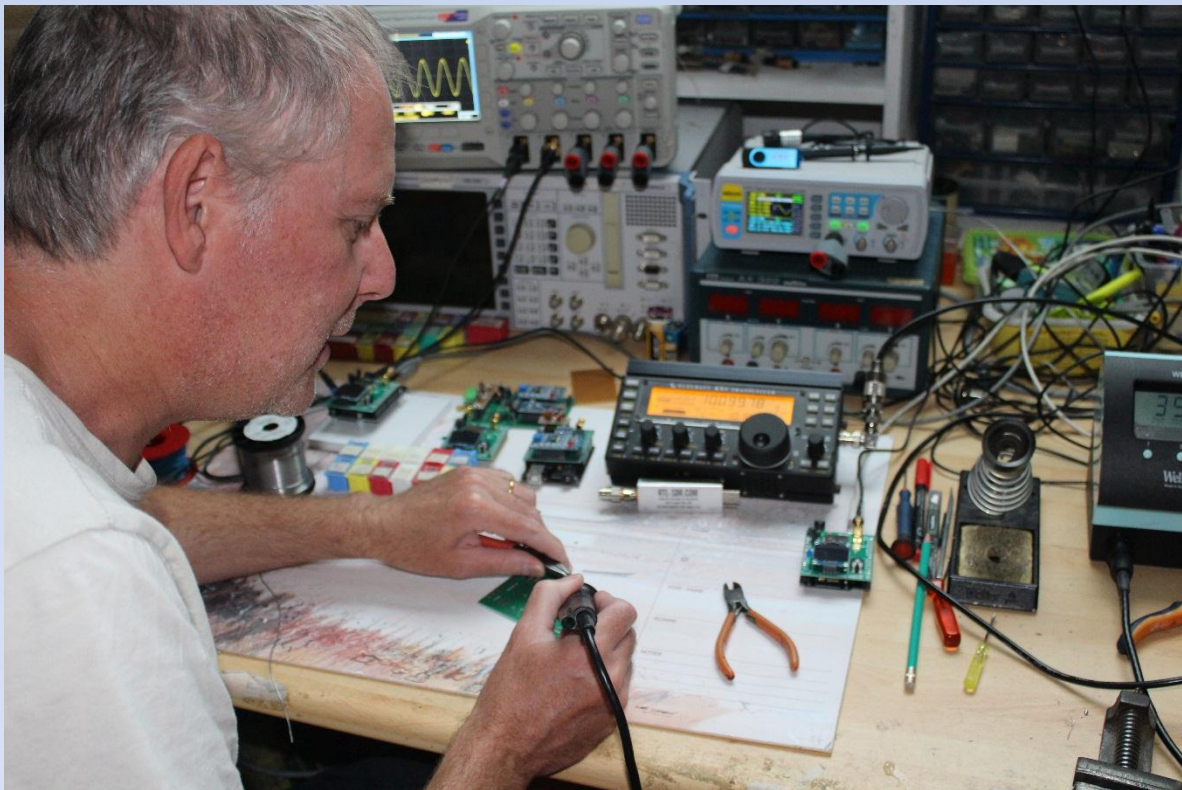


Digital signal processing: I2S in ESP32



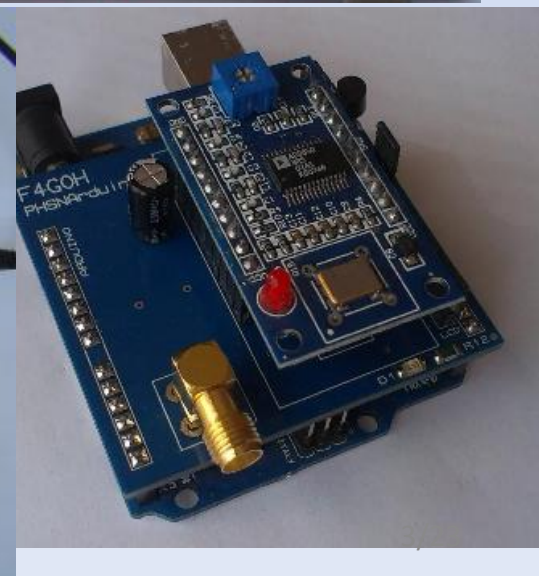
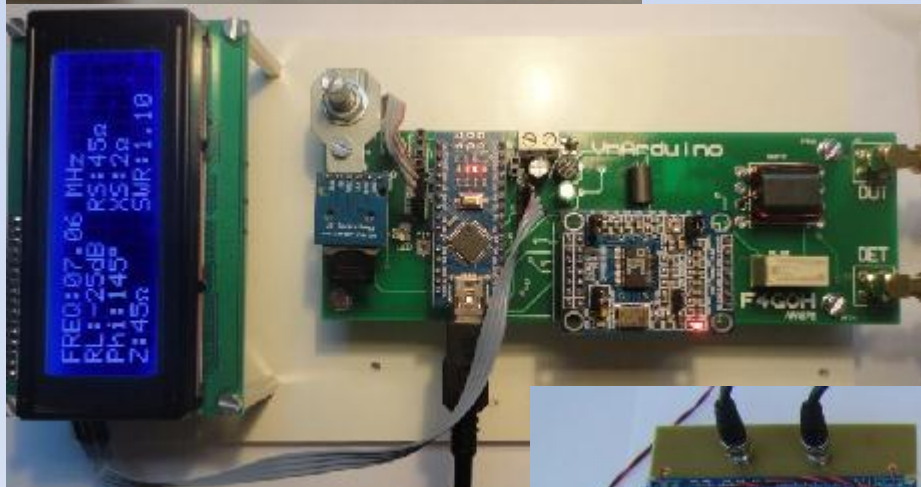
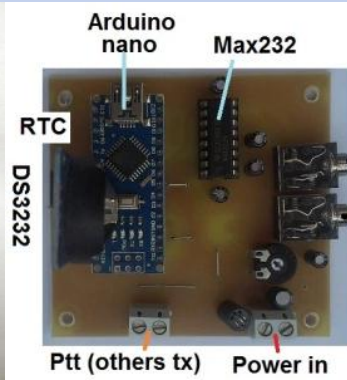
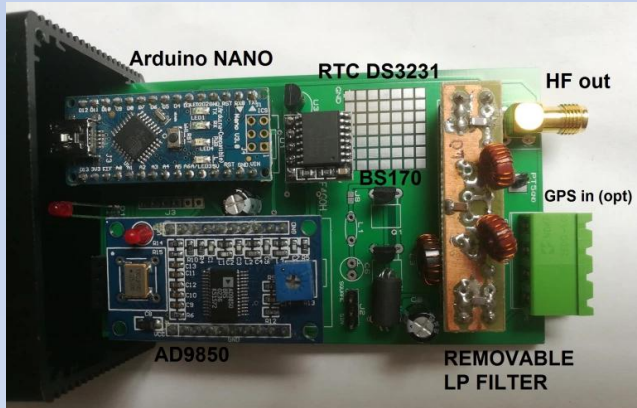
Anthony LE CREN, F4GOH – KF4GOH

(K)F4GOH, Anthony Le Cren



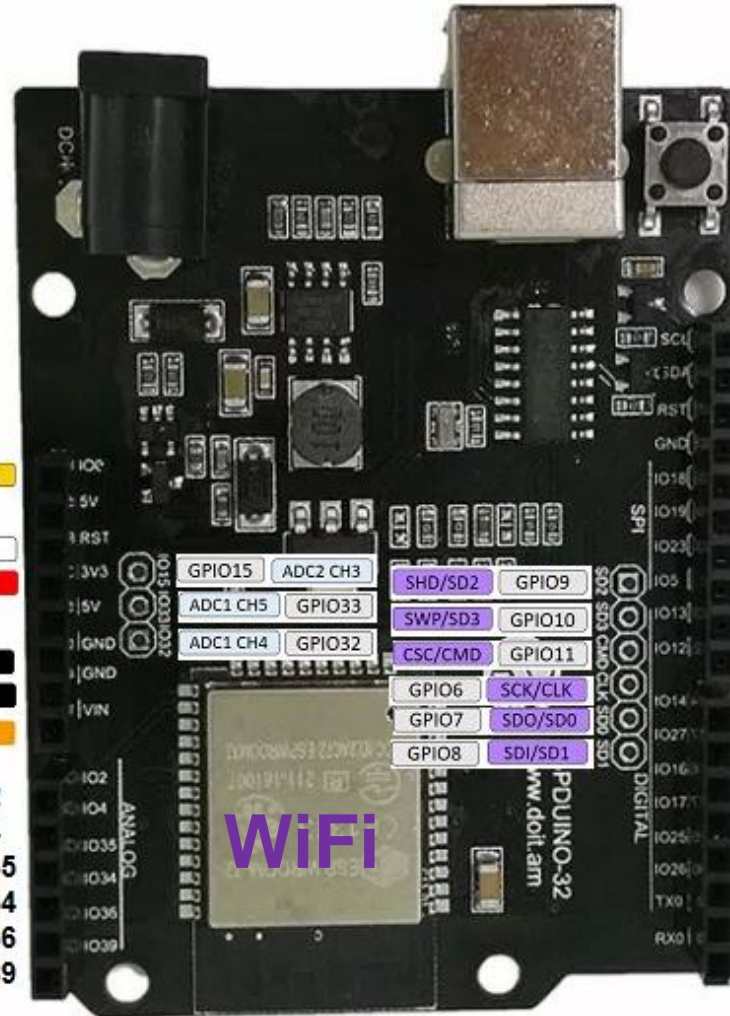
- Ham since 2010,
- Conception,
- Development,
- Not really active on air.

Professor of computer science at Gabriel Touchard – Washington High School. (Le Mans, France)



ESP32

Up to 240 Mhz



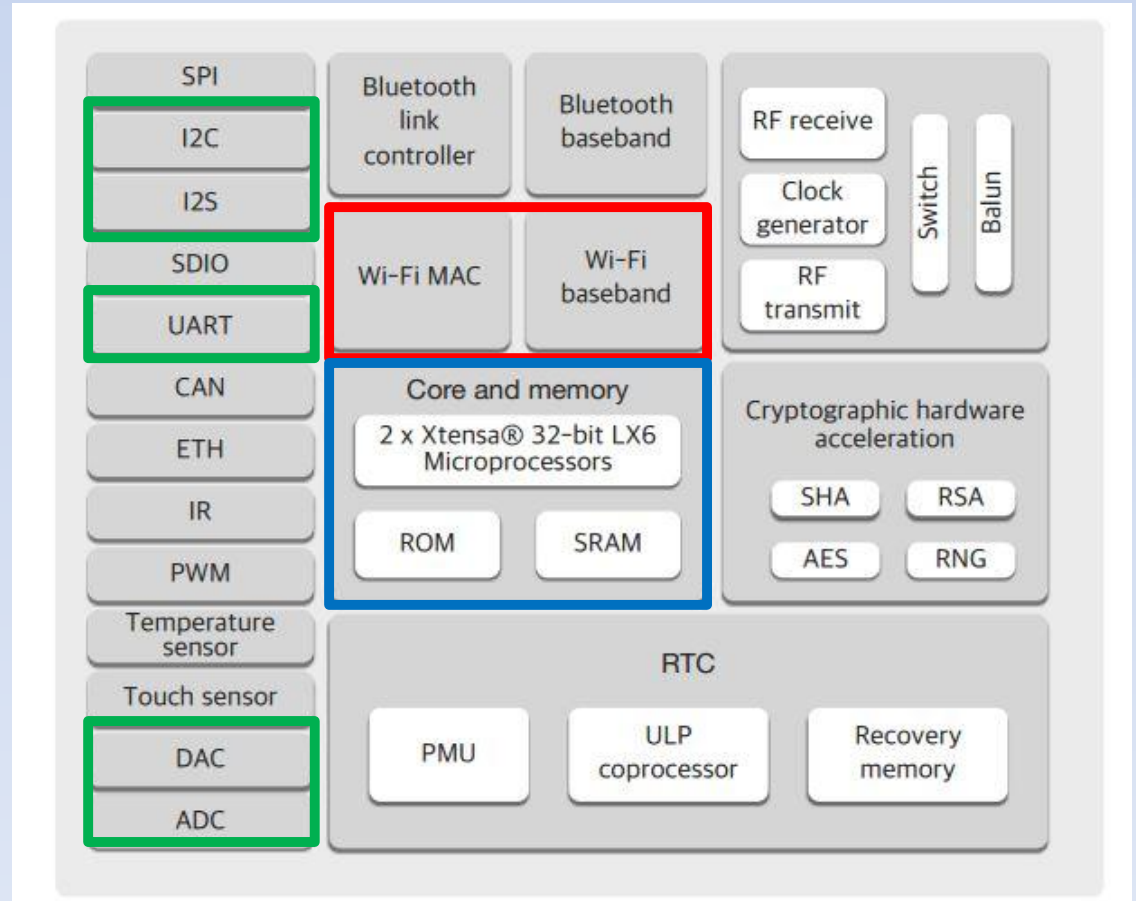
PGM Enable

GPIO0	ADC2 CH1	TOUCH1	RTC_GPIO11		
				EN	
				3V3	
				GND	
				GND	
				VIN	
GPIO2	ADC2 CH2	TOUCH2	RTC_GPIO12	2	
GPIO4	ADC2 CH0	TOUCH0	RTC_GPIO10	4	
Input only	RTC_GPIO5	ADC1 CH7	GPIO35	35	
Input only	RTC_GPIO4	ADC1 CH6	GPIO34	34	
Input only	RTC_GPIO0	Sensor VP	ADC1 CH0	GPIO36	36
Input only	RTC_GPIO3	Sensor VN	ADC1 CH3	GPIO39	39

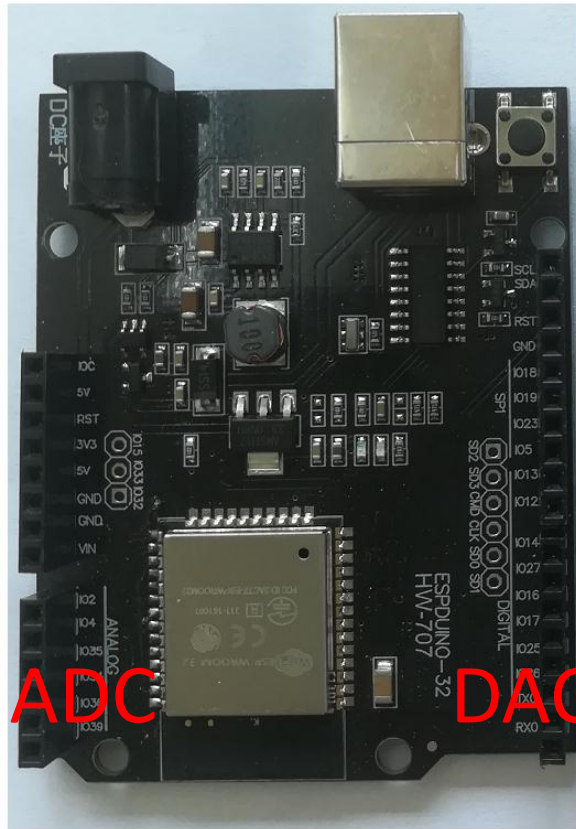
scl	GPIO22	I2C SCL			
sda	GPIO21	I2C SDA			
rst	EN				
gnd	GND				
18	GPIO18	VSPI CLK			
19	GPIO19	VSPI MISO			
23	GPIO23	VSPI MOSI			
5	GPIO5	VSPI CS0			
13	GPIO13	ADC2 CH4	TOUCH4	HSPI MOSI	RTC_GPIO14
12	GPIO12	ADC2 CH5	TOUCH5	HSPI MISO	RTC_GPIO15
14	GPIO14	ADC2 CH6	TOUCH6	HSPI CLK	RTC_GPIO16
27	GPIO27	ADC2 CH7	TOUCH7	RTC_GPIO17	
16	GPIO16	UART 2 RX			
17	GPIO17	UART 2 TX			
25	GPIO25	ADC2 CH8	DAC1	RTC_GPIO6	
26	GPIO26	ADC2 CH9	DAC2	RTC_GPIO7	
NC	GPIO1	UART 0 TX			
NC	GPIO3	UART 0 RX			

PGM Serial

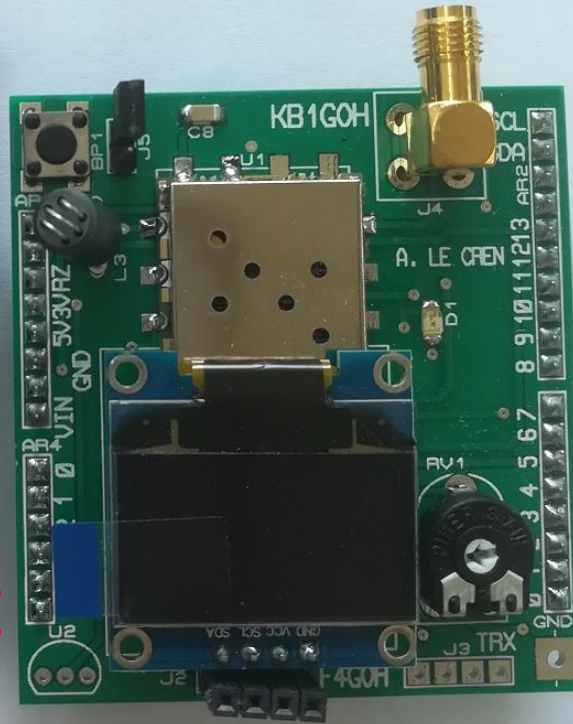
Inside ESP32



Boards description



ESP32

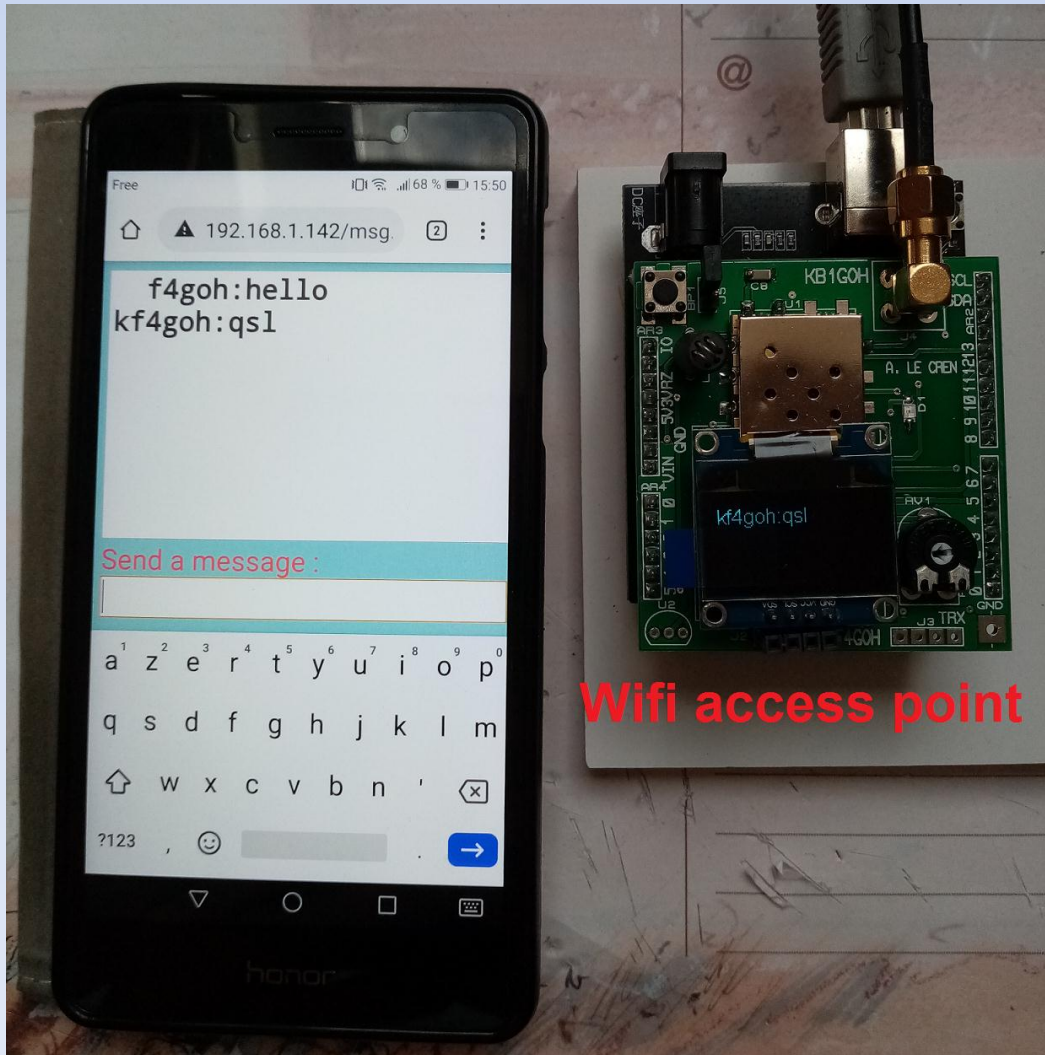


Shield (top)
DRA818+OLED



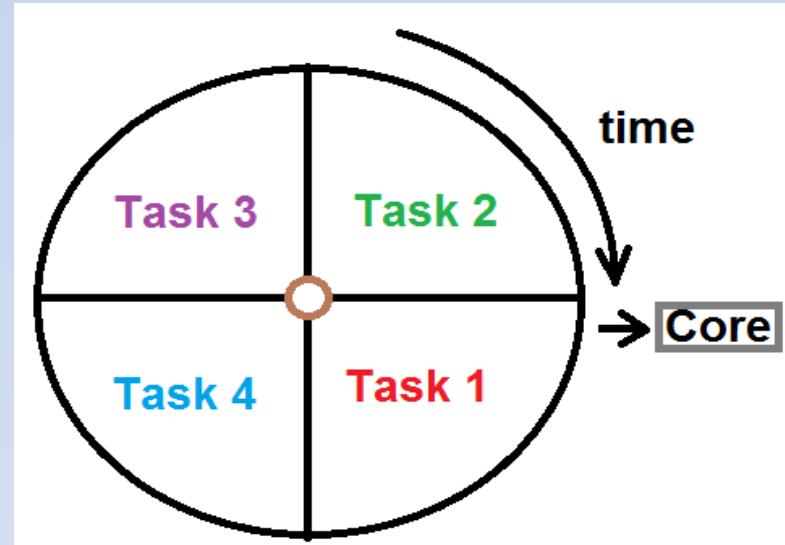
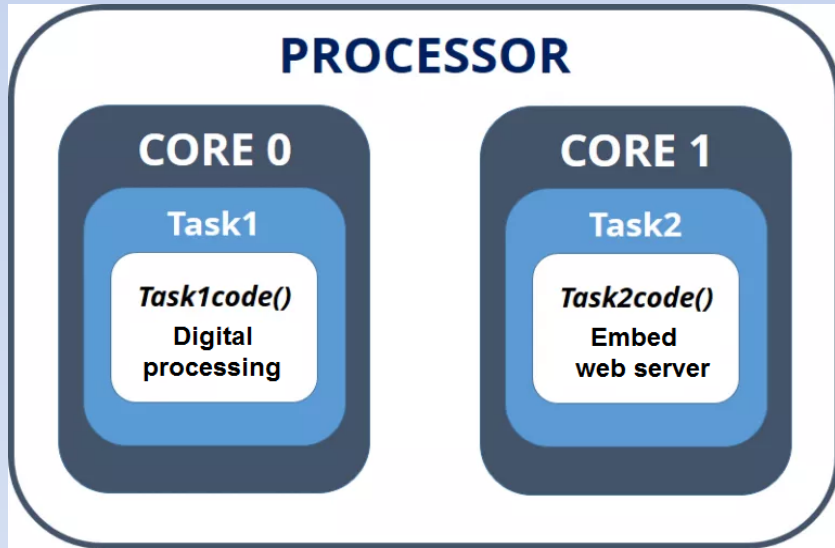
(below)
RC Filter+PTT

Smartphone and Wifi AP



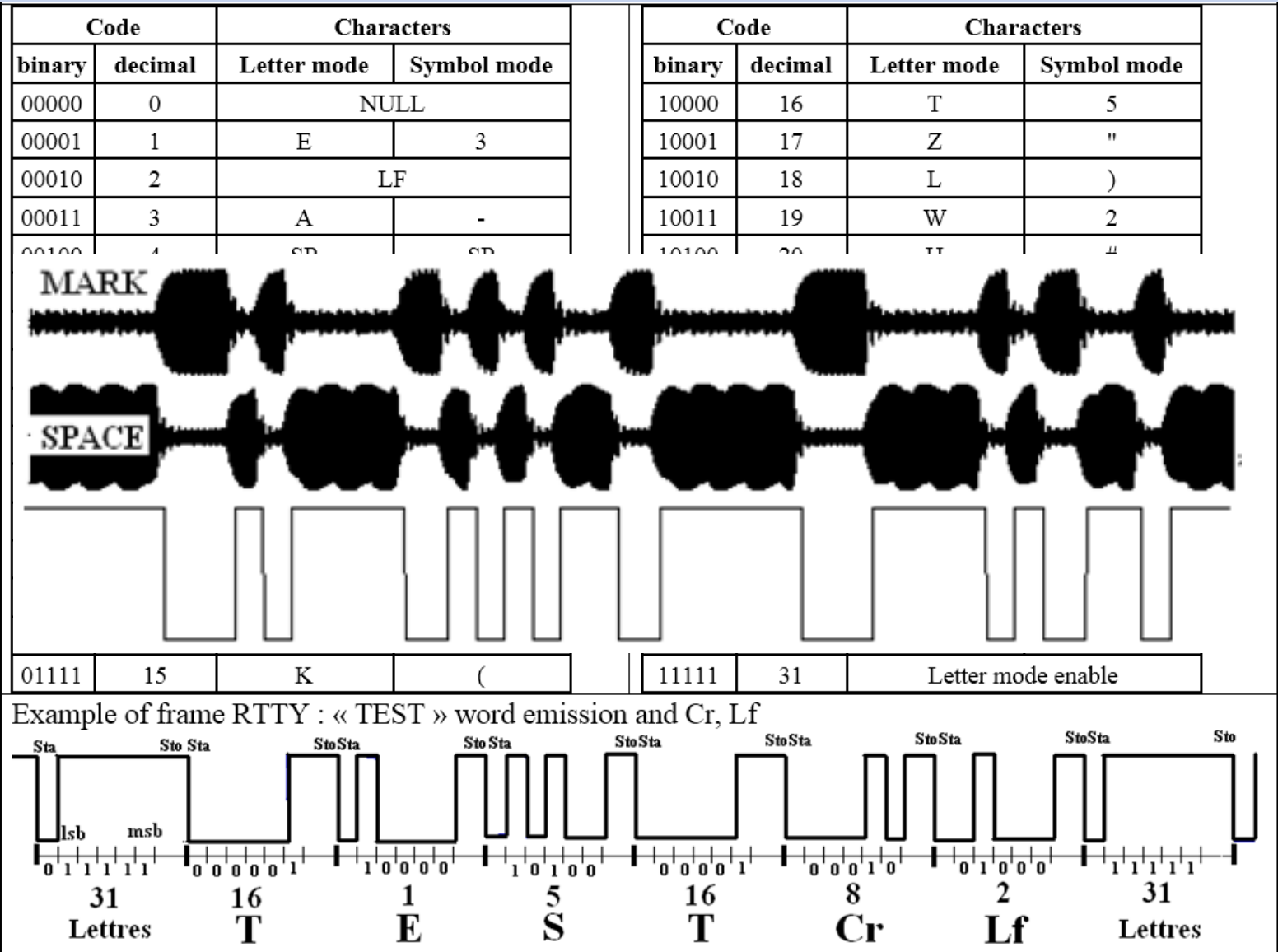
- Smartphone receive and send messages with a web browser
- No specific application in the smartphone
- ESP32 encode and decode audio signal from the DRA818

FreeRTOS

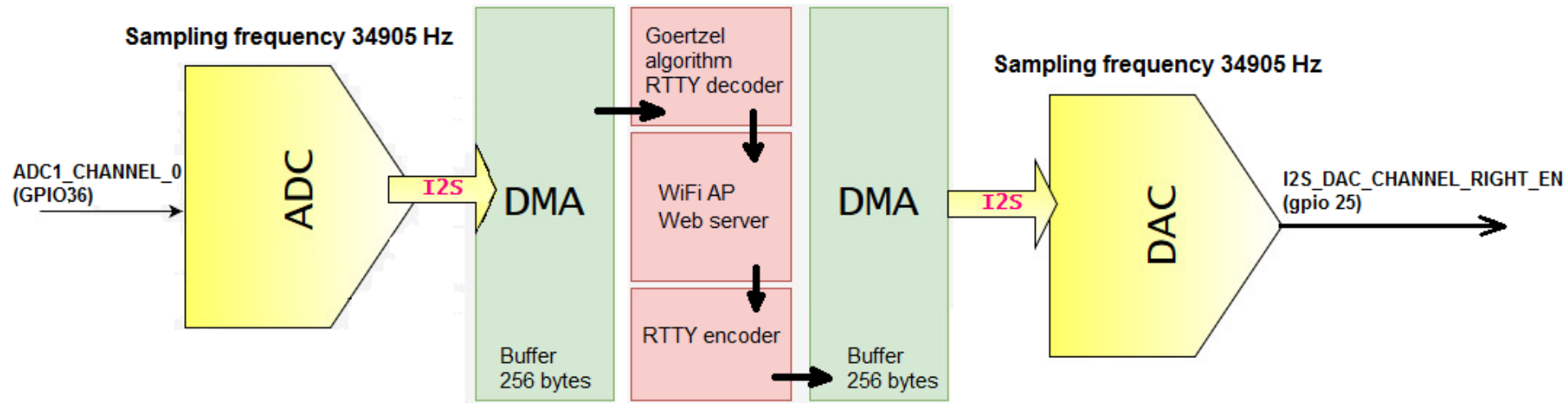


- Native for ESP32
- Handle multiple tasks in parallel
- Kind of turnstile

RTTY



RTTY decoding



- Goertzel algorithm and RTTY decoder
- Wifi Acces point
- Web server
- RTTY encoder

Main menu

Free 65% 16:13

192.168.1.142



F4GOH - KF4GOH (CC BY-NC-SA)

Configuration

Your name/callsign

kf4goh

DRA 818 configuration

DRA 818

Dra 818 enable

Mark (Hz)

818

Shift (Hz)

170

Center : 903 Hz

Configuration

DRA 818 model

DRA818U

Bandwidth selection

25KHz 12.5KHz

Frequency

435.0000

Levels

Volume 8

Squelch 4

Filters

Pre/de-emphasis

Highpass

Lowpass

Update

Send and receive messages

Free 65% 16:13

192.168.1.142/msg

f4goh:hello
kf4goh:qs1

Send a message :

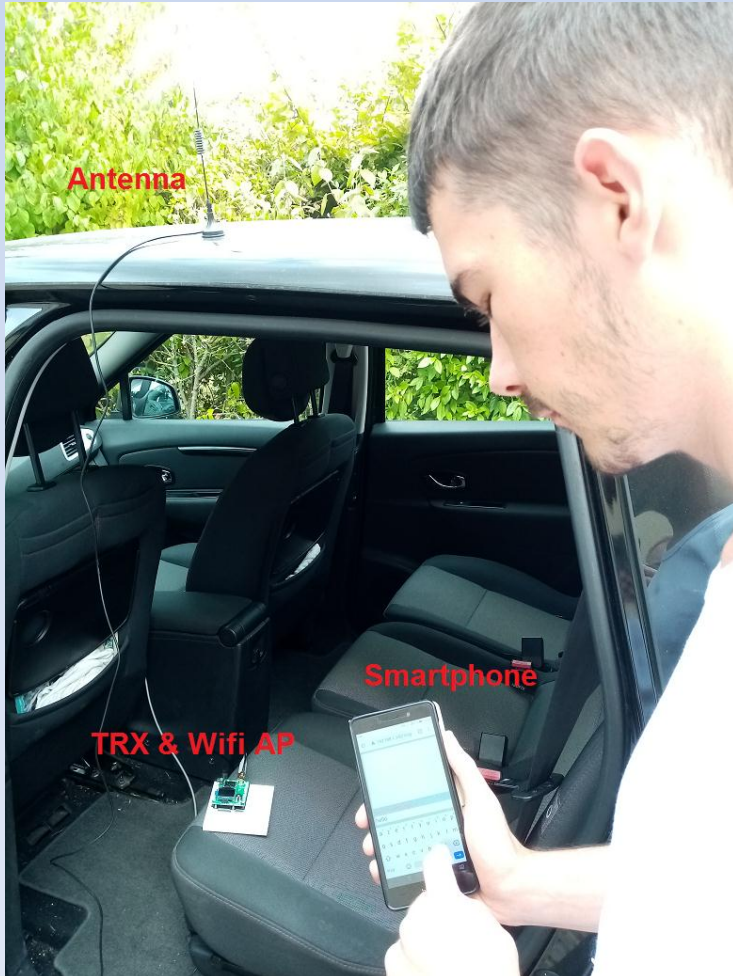
a z e r t y u i o p

q s d f g h j k l m

w x c v b n ' (x)

?123 , ☺ . →

Field exercise



Digital Master 780 - [RTTY-45]

File Edit View QSO Browser Logbook SSTV SuperSweeper World Map Tools Window Help

QSO SuperSweeper Radio Soundcard Waterfall HRD Logbook Program Options Full Screen 18:20:30

RTTY-45

Reverse Defaults Baud: 45.45 Shift: 170 Hz Bits: 5 Stop: 1.5 UoS LtOf Add CR to LF CR/LF

18:19:48 Main

KF4GOH:HELLO F4GOH HELLO F4GOH HELLO F4GOH HELLO F4GOH HELLO F4GOH

Send (F4) Auto (F2) Pause (F3) Stop (F5) Repeat

Call CQ Reply Info Closing Default

Enter text to be sent 889 Hz IMD: S/N: 0dB

Waterfall

Zoom: x1 Main: 889 Signal: AFC Decode Options

80m 40m 20m 15m 10m << >> Favcs Modes

100 300 500 700 900 1100 1300 1500 1700 1900 2100 2300 2500 2700 2900

Ready CPU: 5% Audio: 36% Overload HRD Logbook: Not Connected RSID OVR CAP NUM SCRL 18:20

The screenshot shows the Digital Master 780 software interface. The main window displays the RTTY-45 communication window with a red box highlighting the received text: 'KF4GOH:HELLO F4GOH HELLO F4GOH HELLO F4GOH HELLO F4GOH HELLO F4GOH'. Below this is a Waterfall display showing the frequency spectrum with a peak at 889 Hz. The interface includes various controls for baud rate, shift, bits, and stop time, as well as a menu for sending and receiving text.



Updates

- Add numeric pass band filter on reception.
- RTTY with 1,5 bit stop
- Record RTTY configuration.
- APRS decode and encode

Contact Information



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- <https://hamprojects.wordpress.com/>