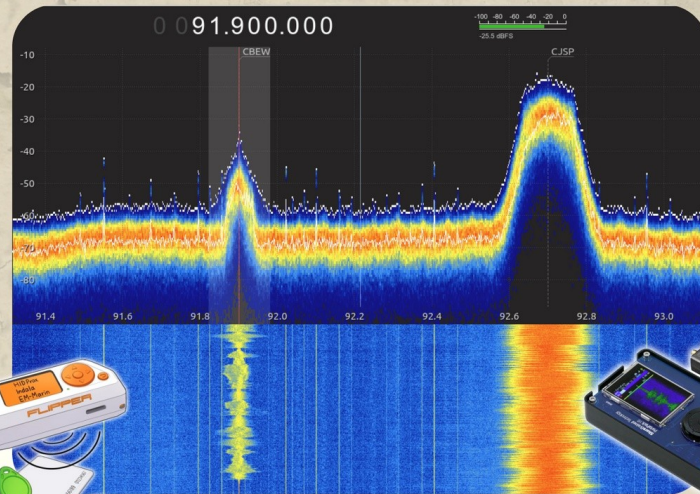


Charla/Taller de radiocomunicaciones básicas

08 de mayo 19:00h

Oday, el Hacklab de Karabanchel
<https://oday.lol>



Espacio okupado y transfeminista. Frente a la gentrificación, lucha y autogestión.



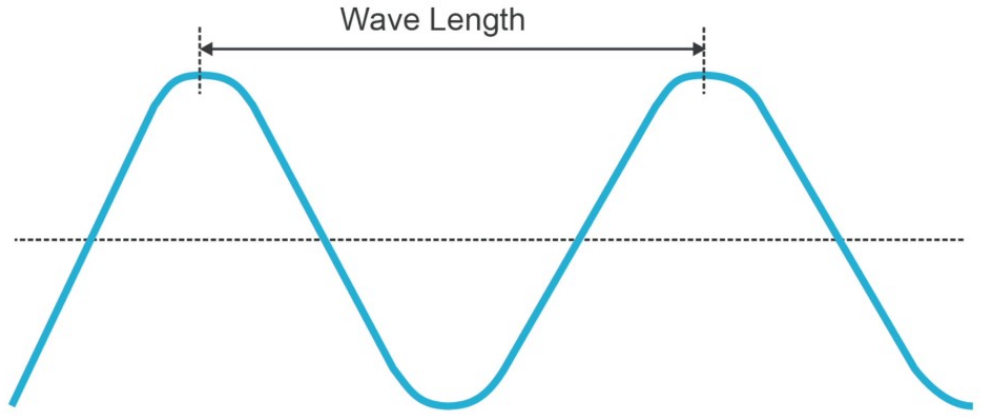
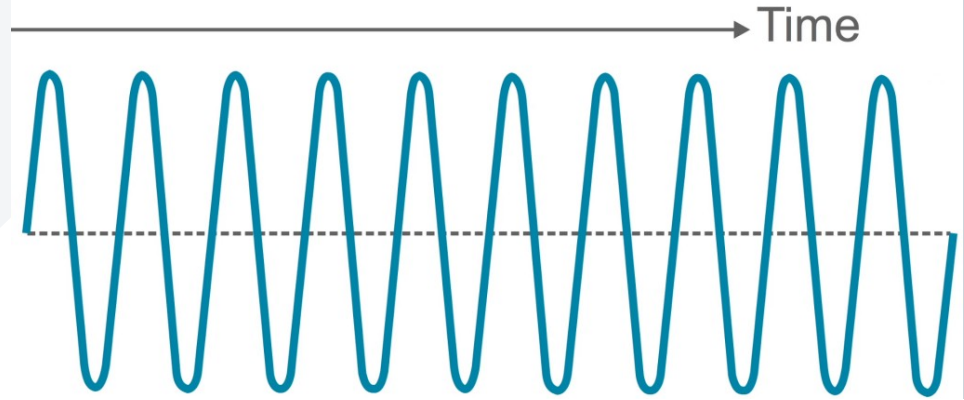
Sala ChillOut, a pie de calle
C/ Ánade nº 10
<M> Oporto
Bus 34, 35, 118 y 119

The background of the slide features several diagonal grey bars of varying lengths and shades, creating a modern, geometric pattern. The bars are positioned in the corners and along the sides, leaving a large white central area for the text.

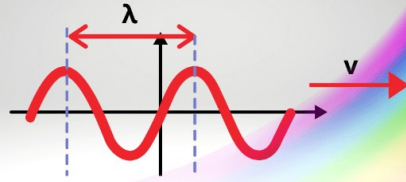
DISCLAIMER

ONDAS Y ANTENAS

Ondas



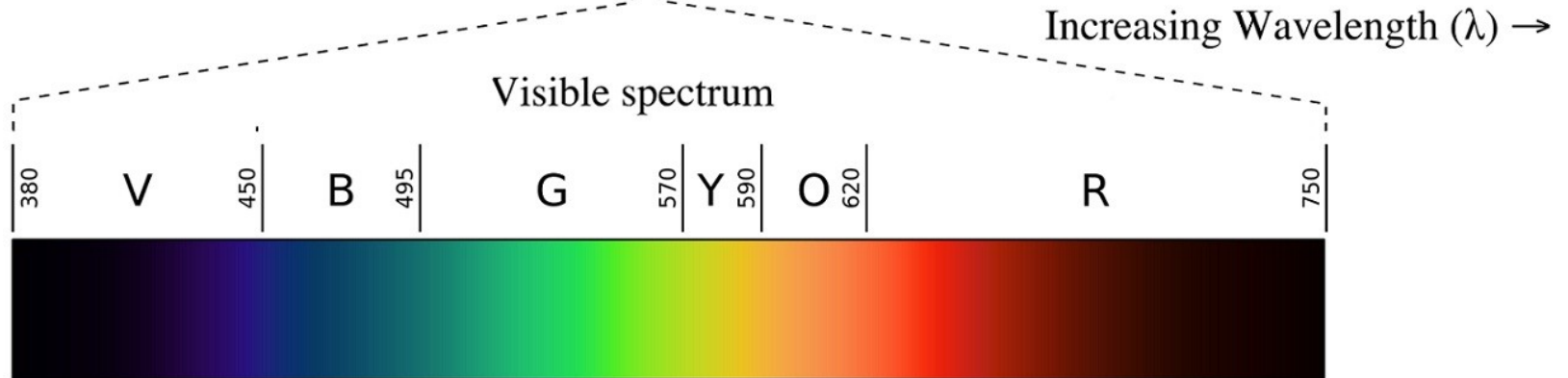
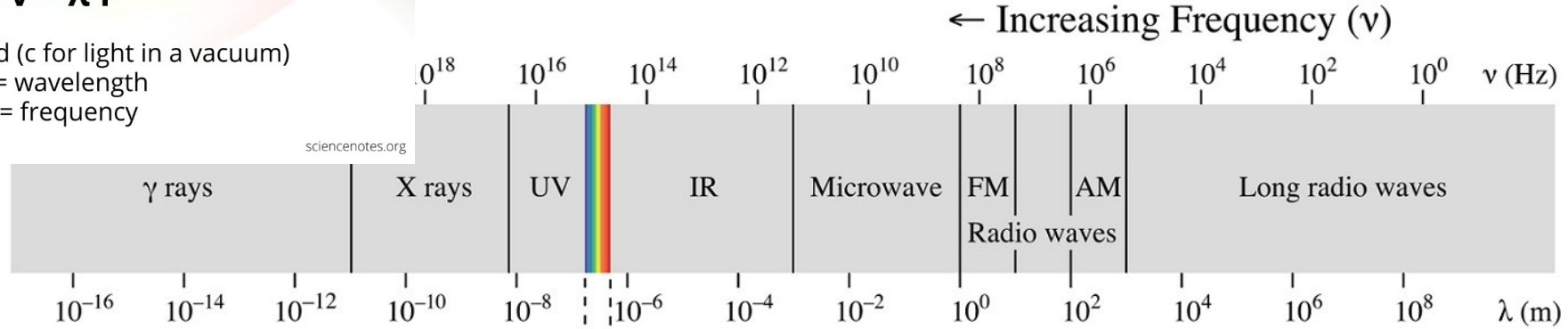
Wavelength to Frequency



$$v = \lambda f$$

v = wave speed (c for light in a vacuum)
 λ = wavelength
 f = frequency

Espectro



Espectro de radio (ITU)



maritime radio,
navigation

VLF

100 km



maritime radio,
navigation

LF

10 km



AM radio,
aviation radio
navigation

MF

1 km

shortwave
radio

HF

100 m



VHF television,
FM radio

VHF

10 m



UHF television,
mobile phones,
GPS, Wi-Fi, 4G

UHF

10 cm



satellite
communi-
cations, Wi-Fi

SHF

1 cm



radio,
astronomy,
satellite, com-
munications

EHF

1 mm

← increasing wavelength

increasing frequency →

3 kHz

30 kHz

300 kHz

3 MHz

30 MHz

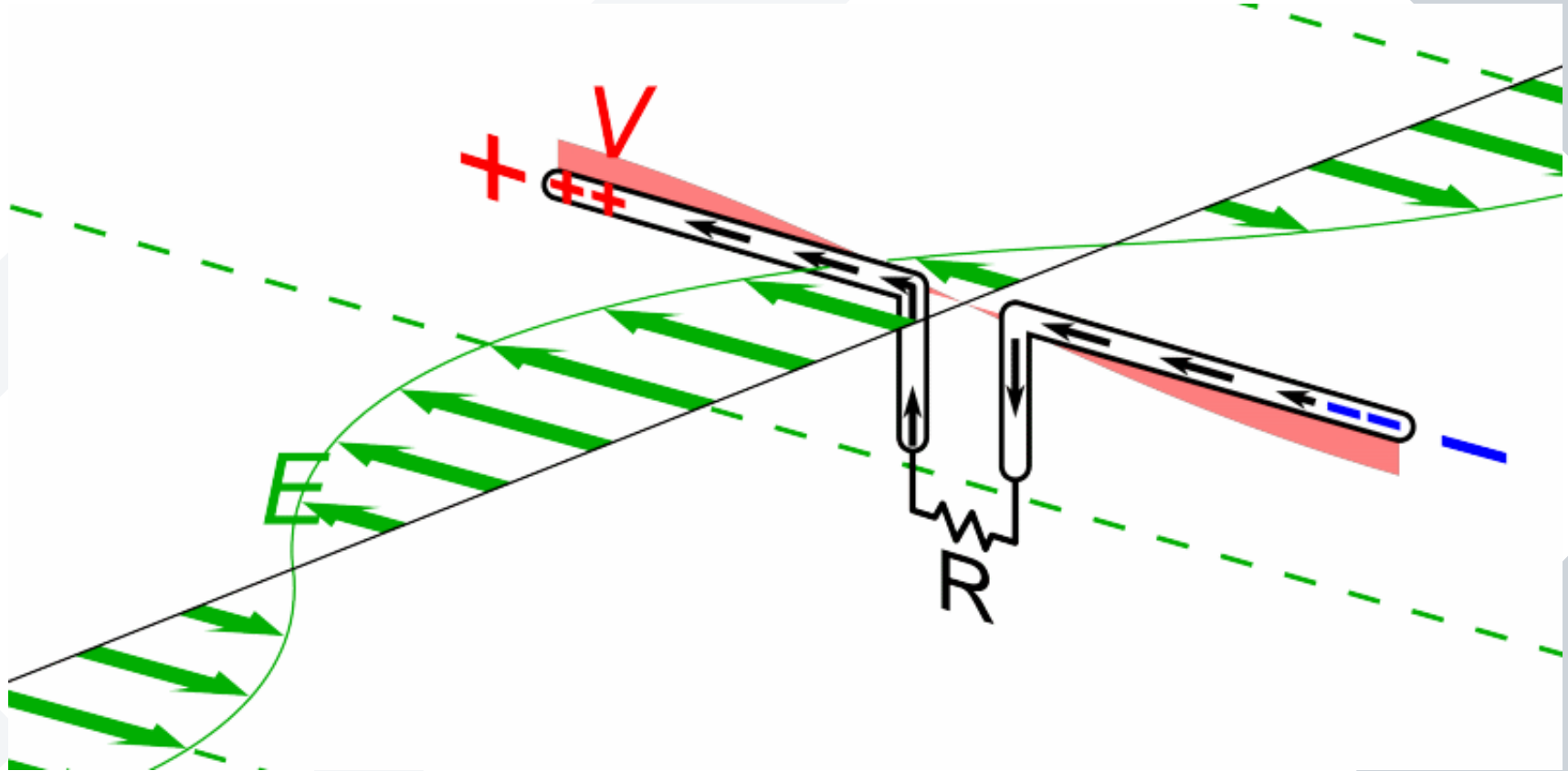
300 MHz

3 GHz

30 GHz

300 GHz

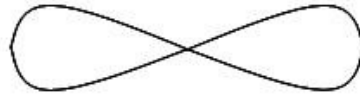
Dipolo



Radiación



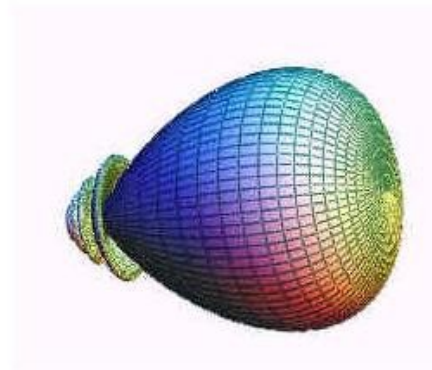
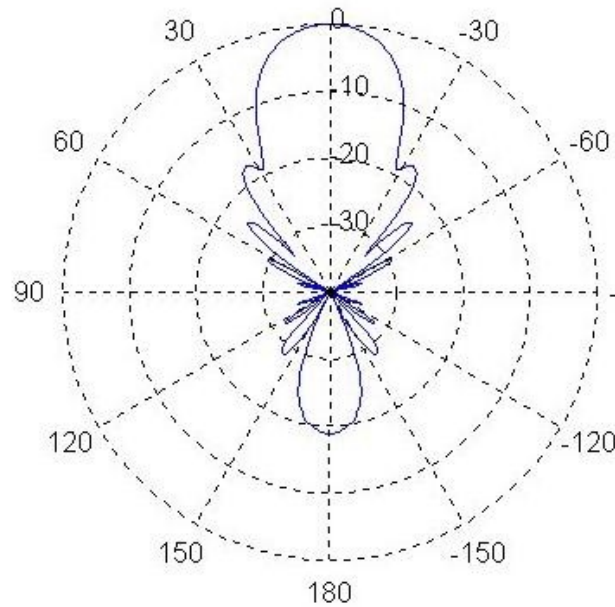
Antena omnidireccional



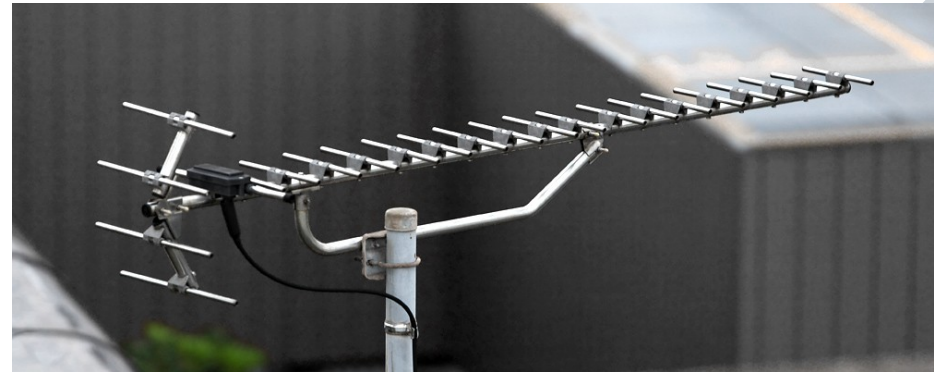
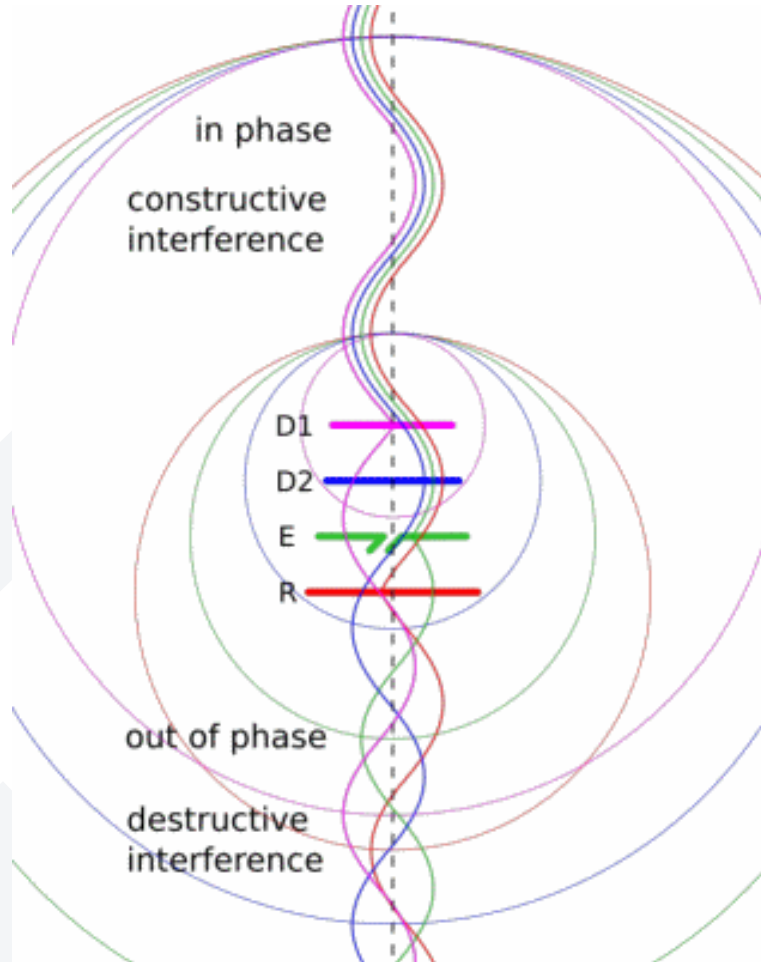
Antena bidireccional



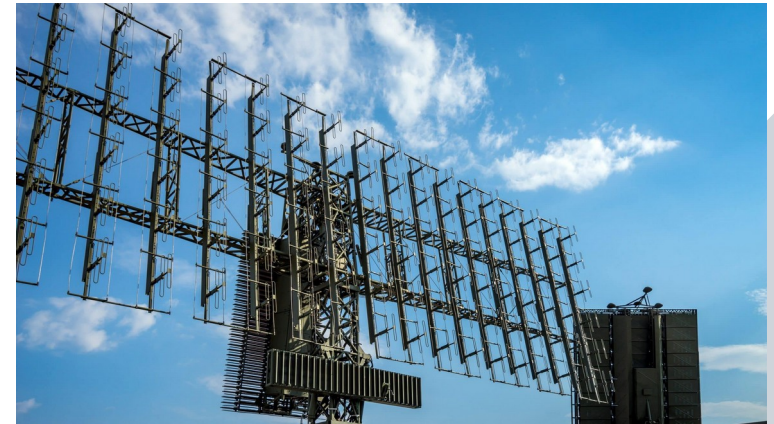
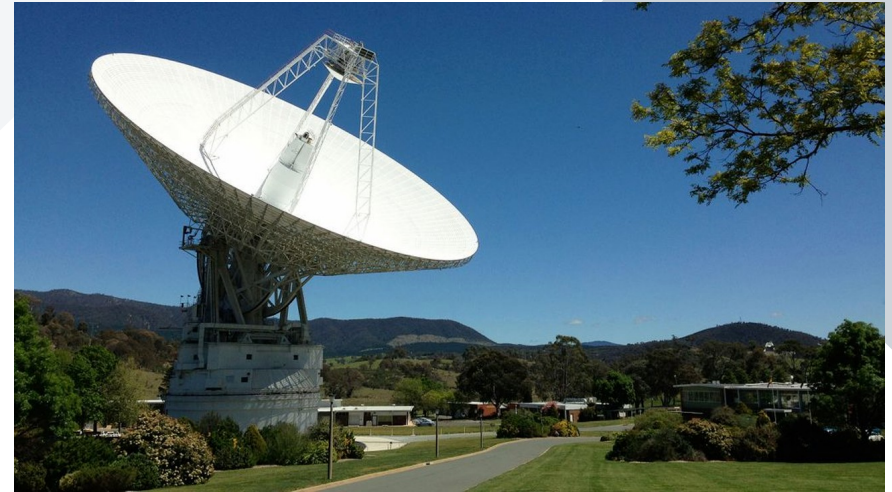
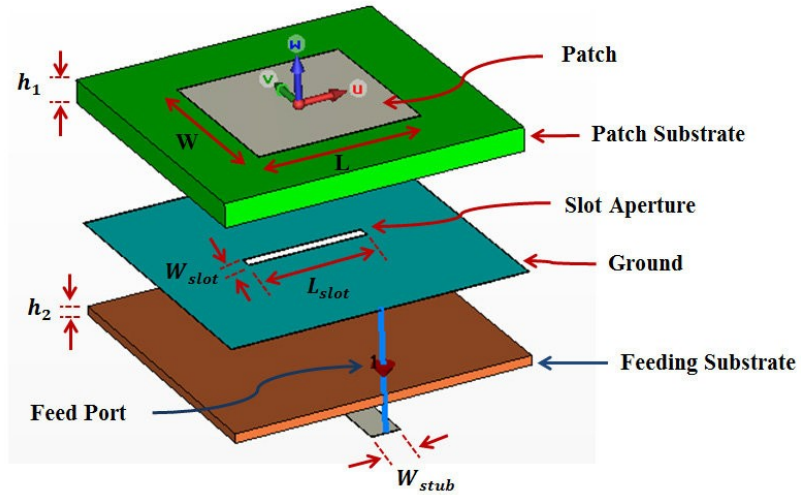
Antena direccional



Antena Yagi

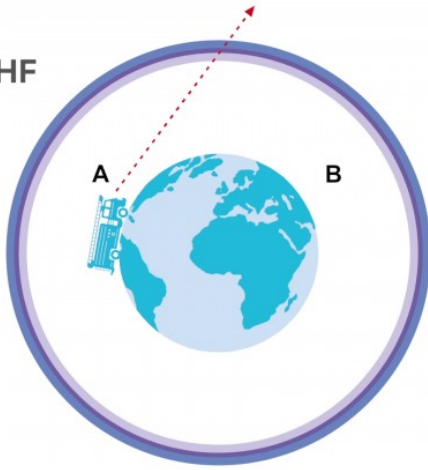


Más tipos de antenas

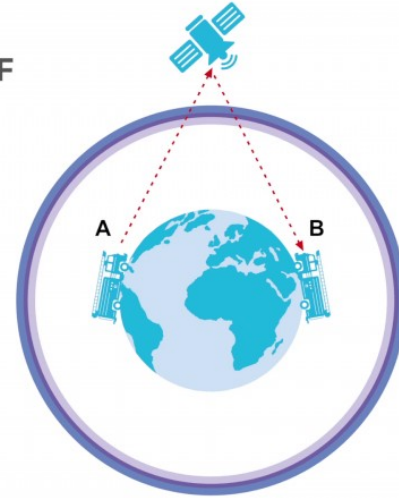


Propagación

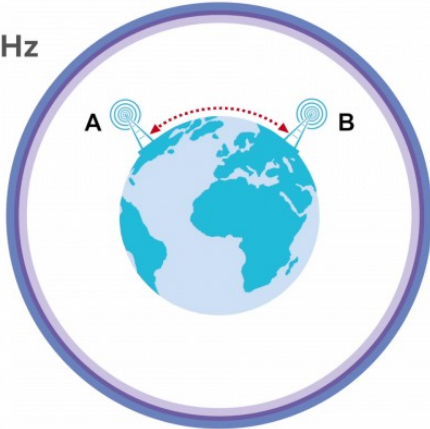
VHF and UHF



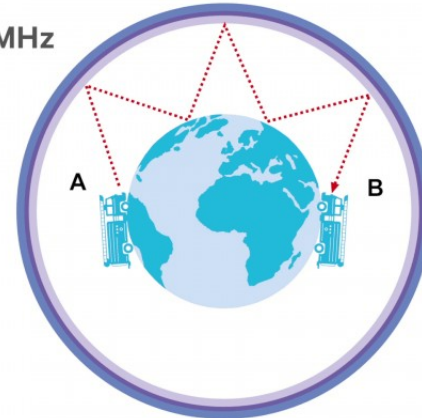
VHF and UHF



300kHz - 3MHz

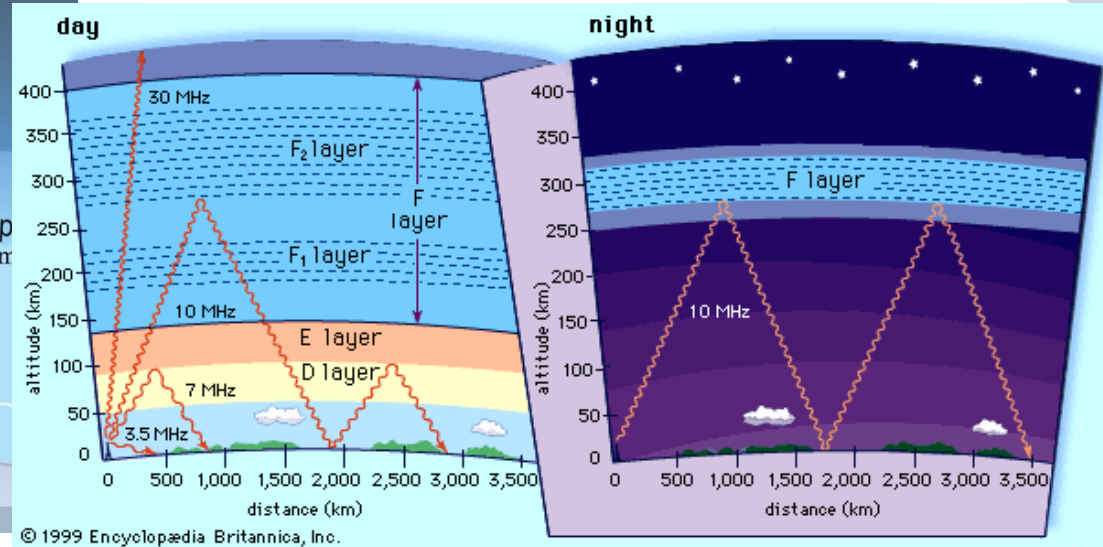
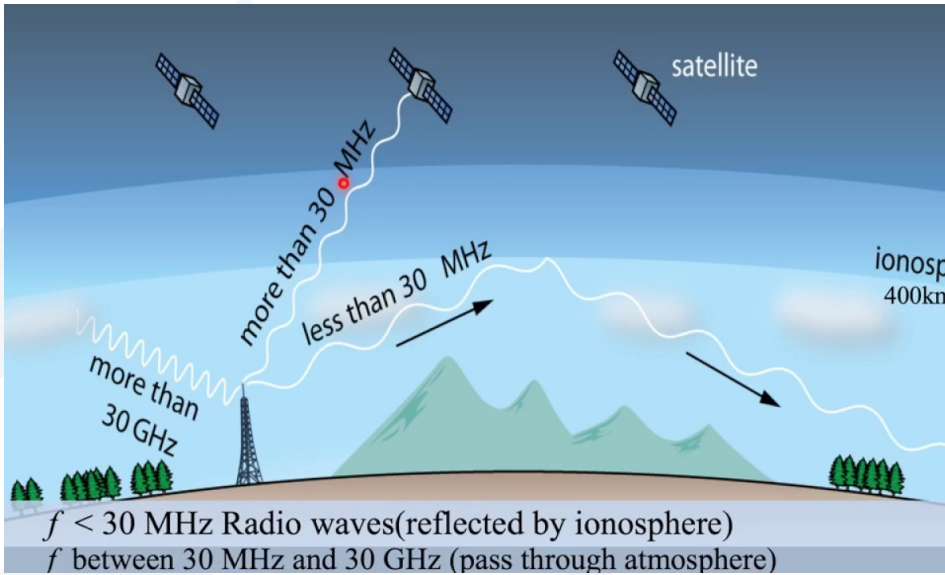


3MHz - 30 MHz



Onda corta

<https://www.short-wave.info/>

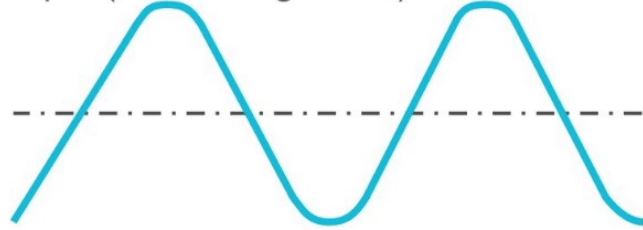


MODULACIONES

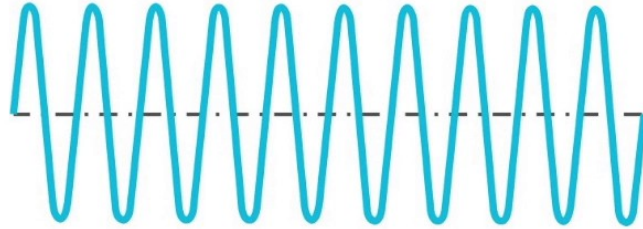
Modulaciones

Amplitude Modulation (AM)

Input (Modulating Wave)



Carrier

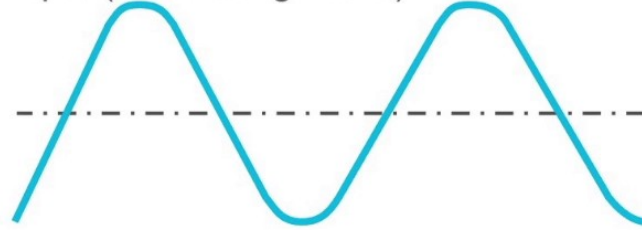


Modulated Result

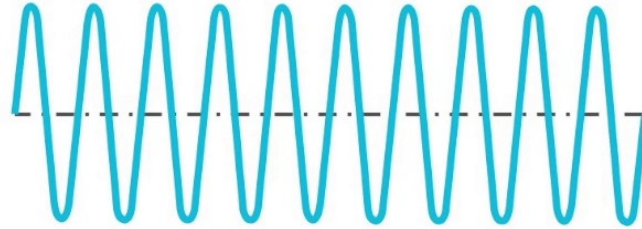


Frequency Modulation (FM)

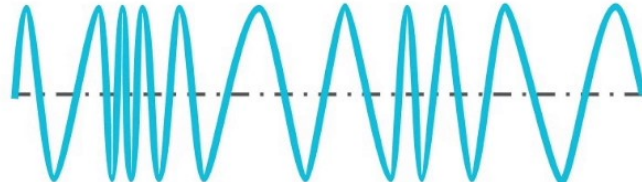
Input (Modulating Wave)



Carrier

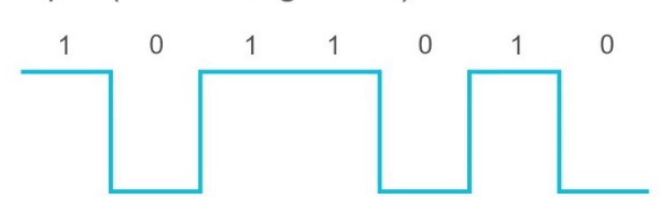


Modulated Result

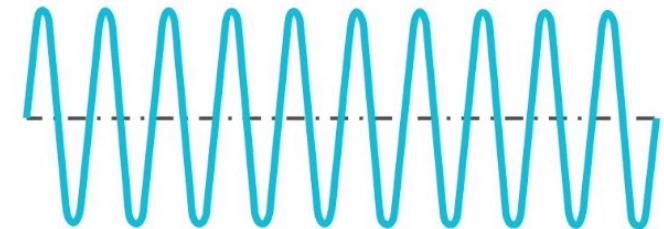


Digital Modulation

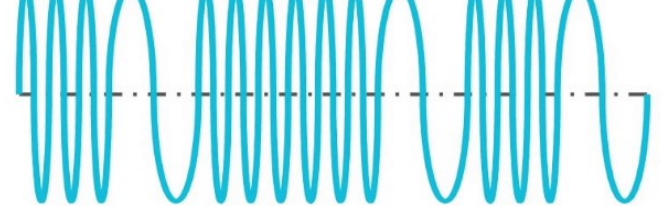
Input (Modulating Wave)



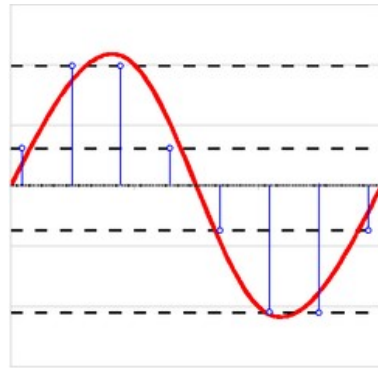
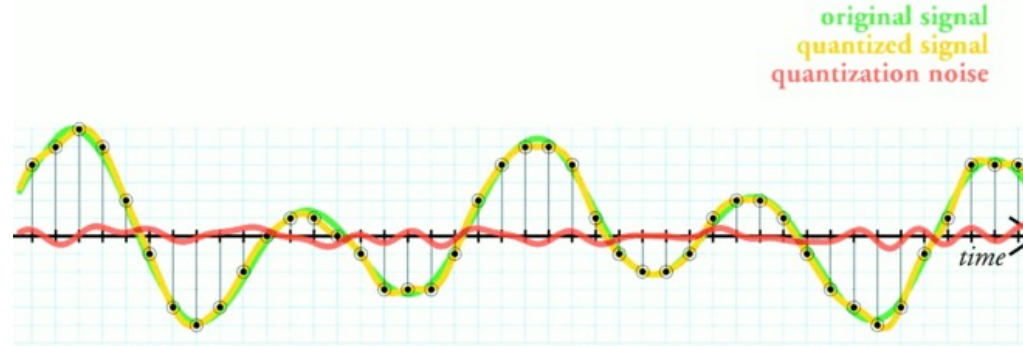
Carrier



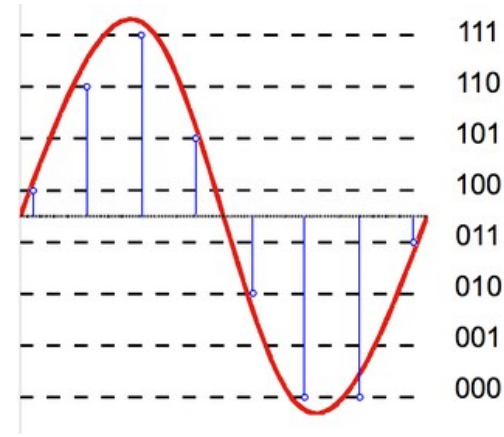
Modulated Result



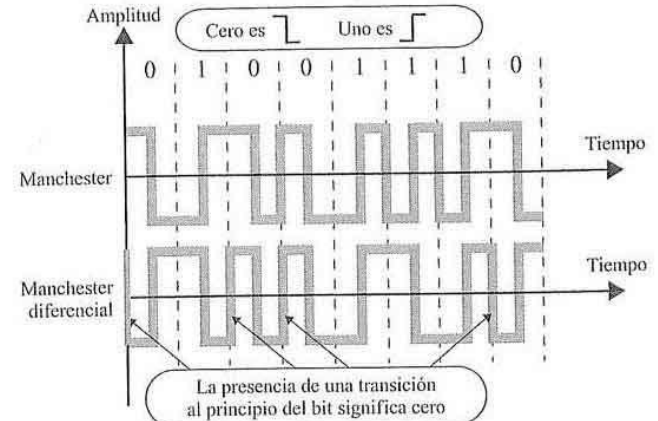
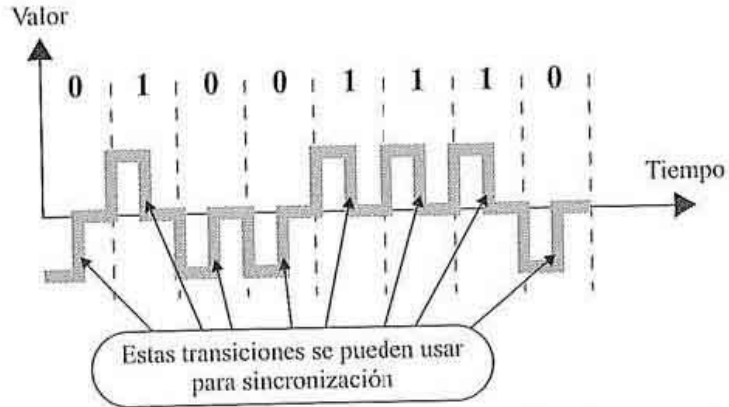
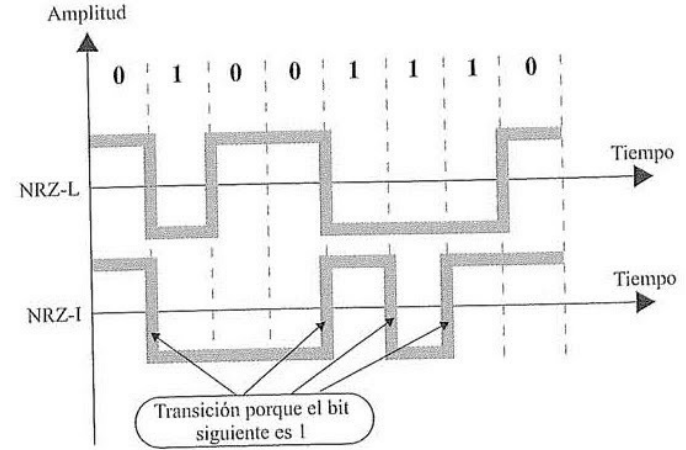
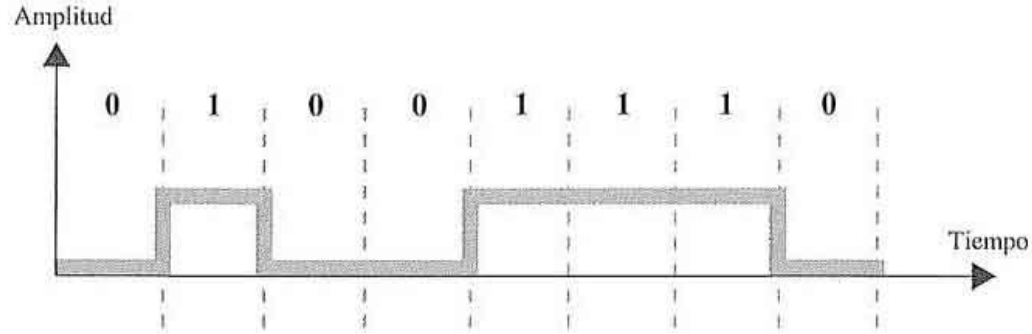
Muestreo y cuantización (Analógica → Digital)



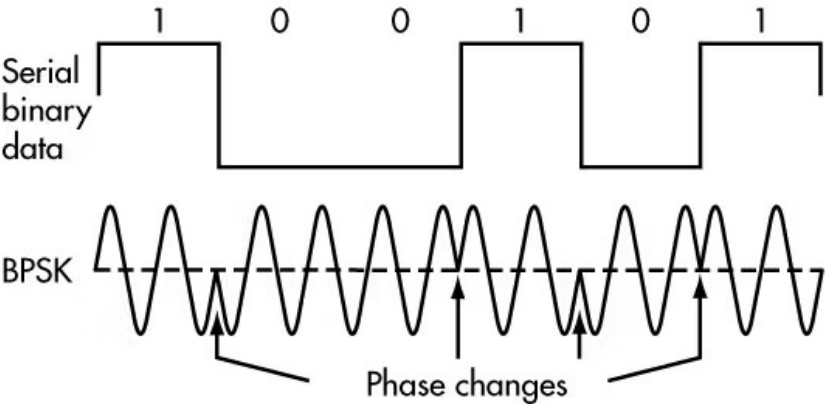
11
10
01
00



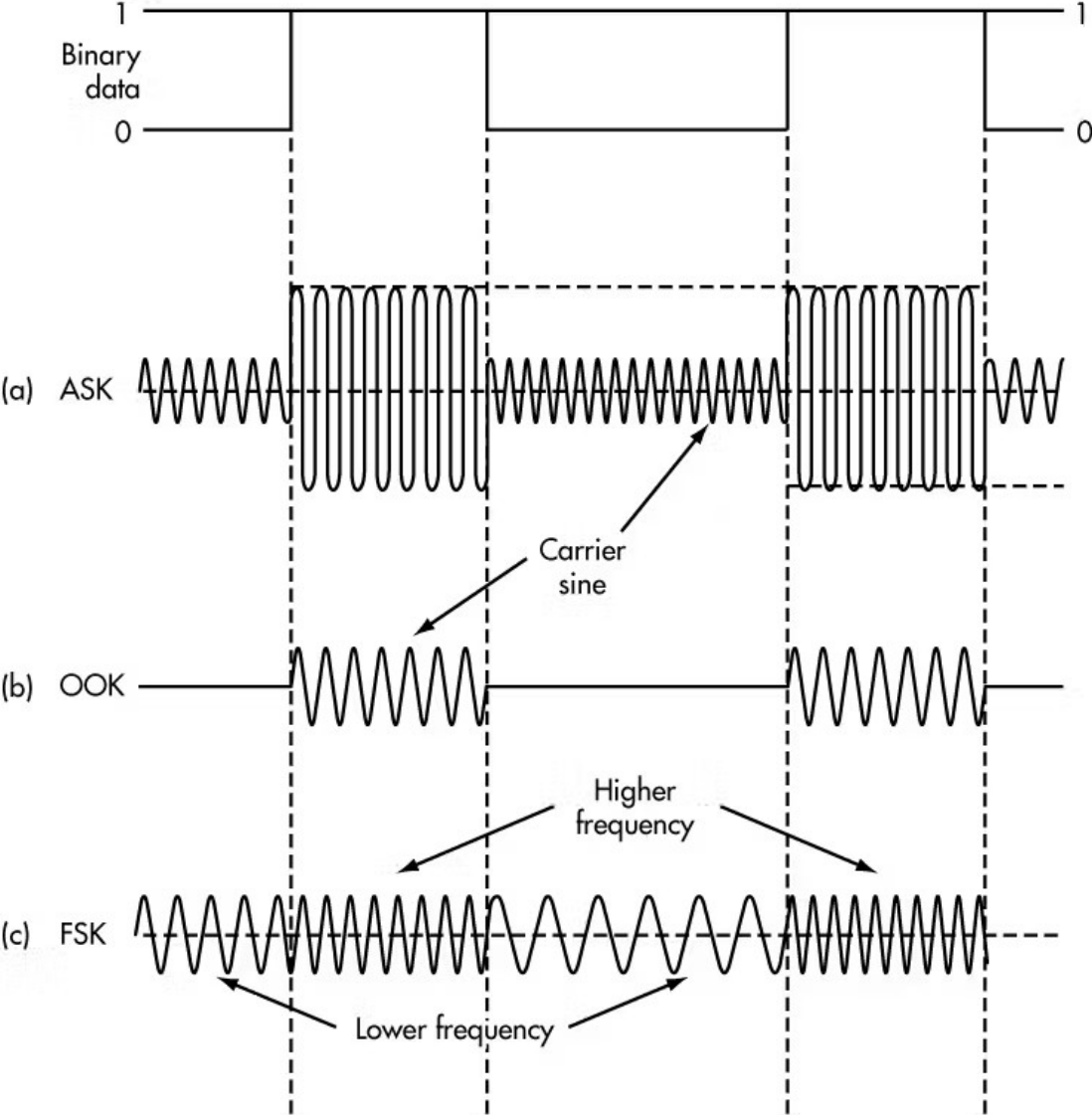
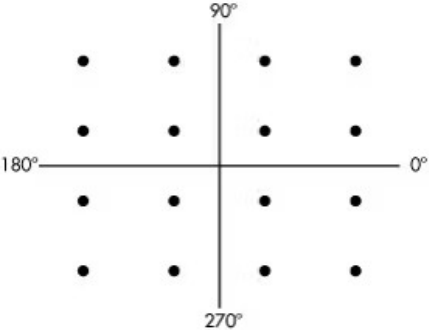
Codificación



Modulaciones digitales



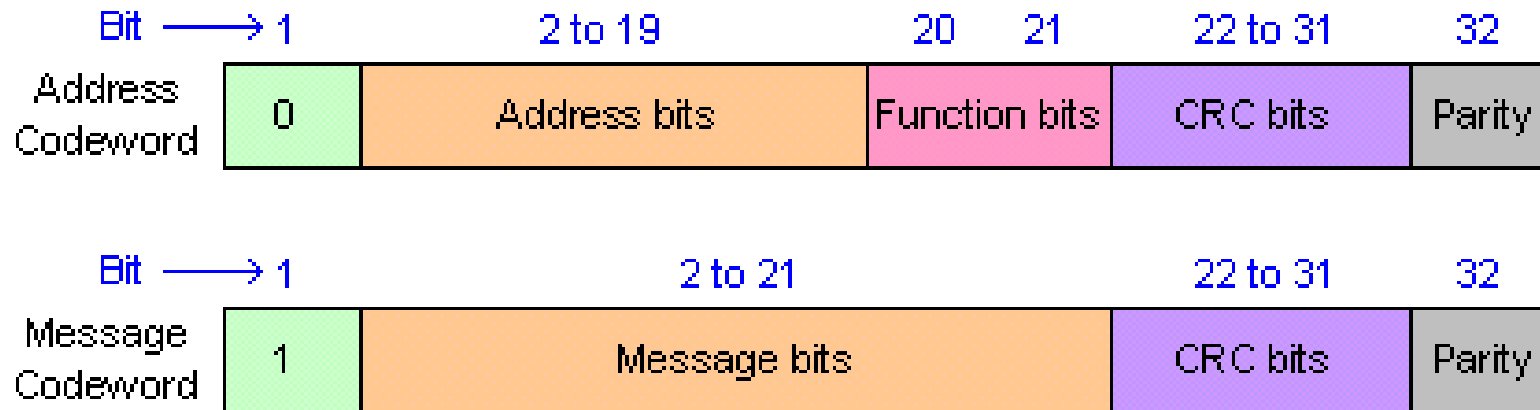
QAM



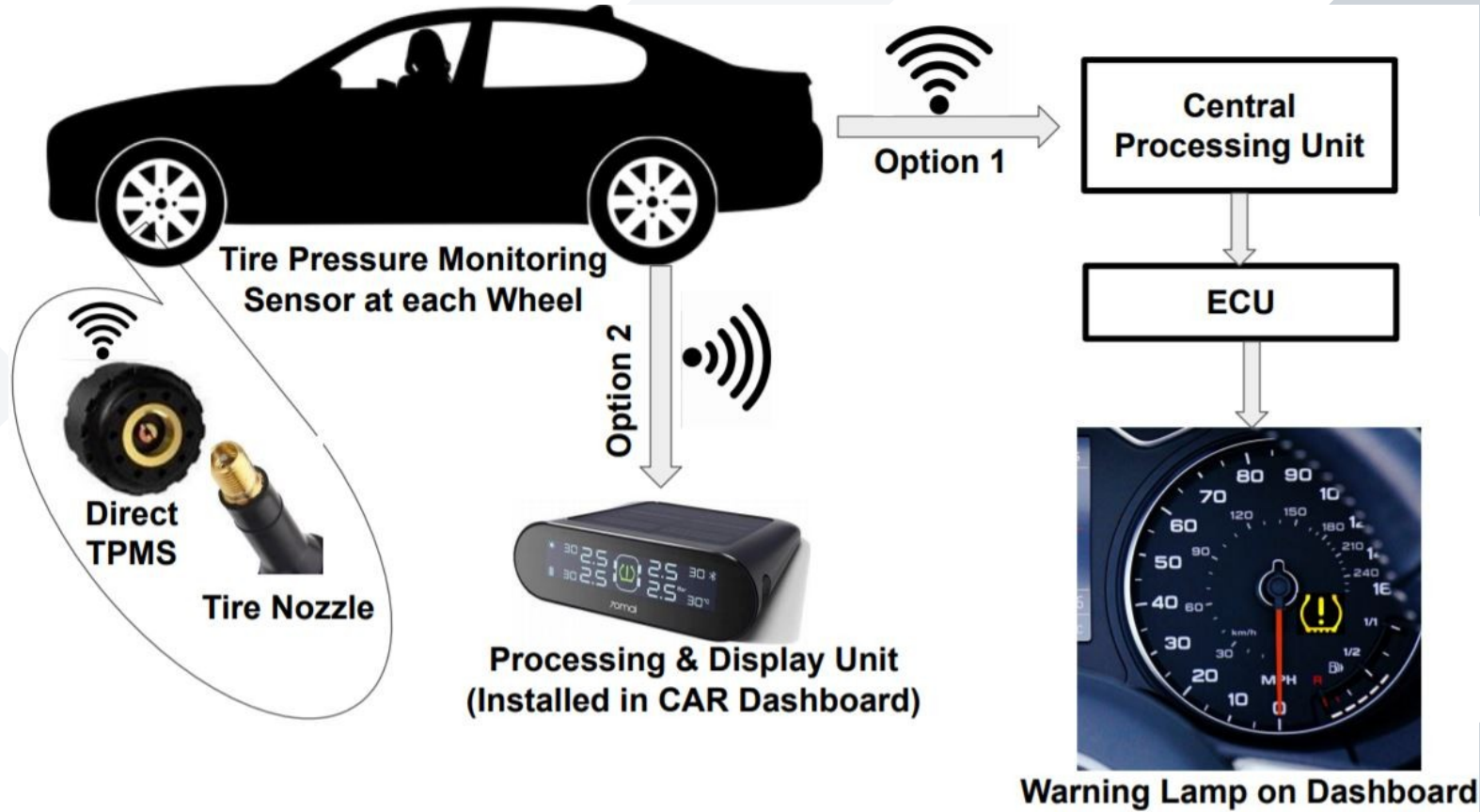


PROCOLOS

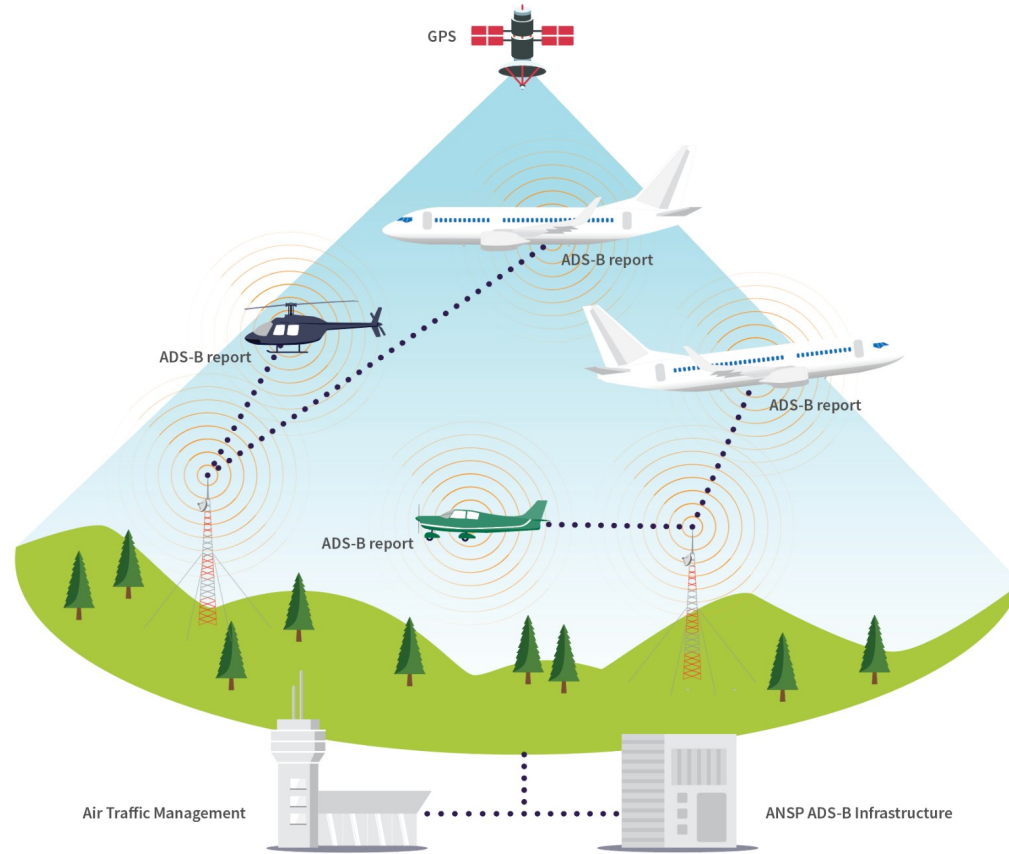
Protocollo binario



TPMS (Tire Pressure Monitoring System)

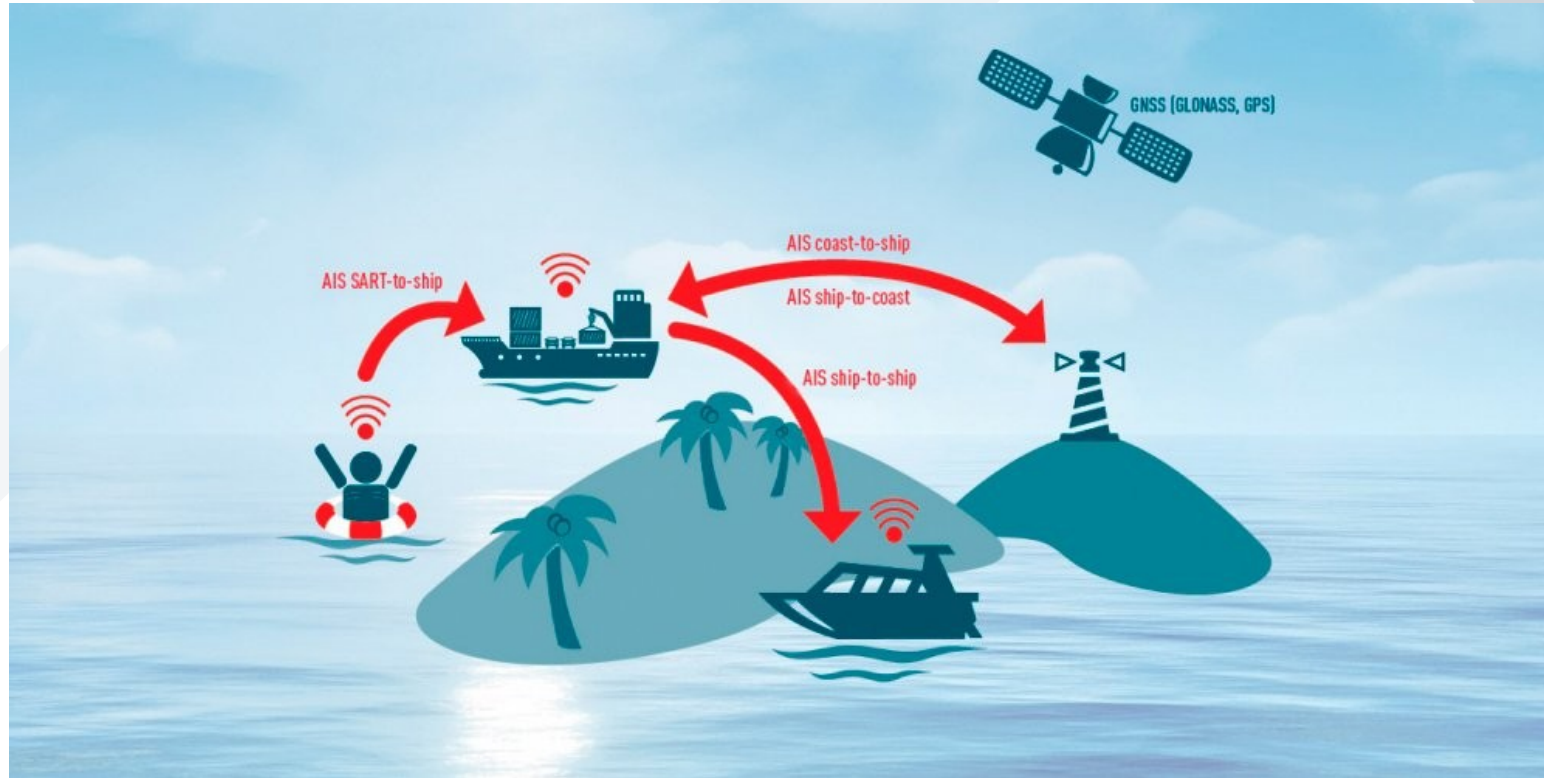


ADS-B (Automatic Dependent Surveillance Broadcast)



<https://globe.adsbexchange.com/>

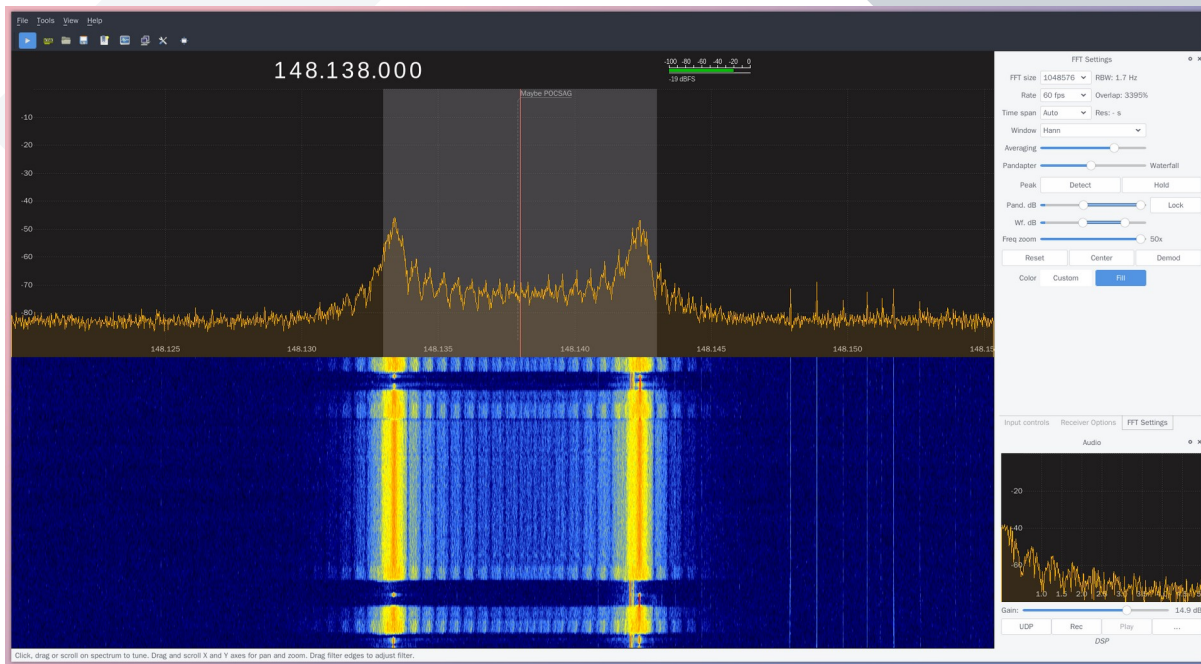
AIS (Automatic Identification System)



<https://www.vesselfinder.com>

<https://www.marinetraffic.com>

POCSAG (Radio-paging code No. 1)

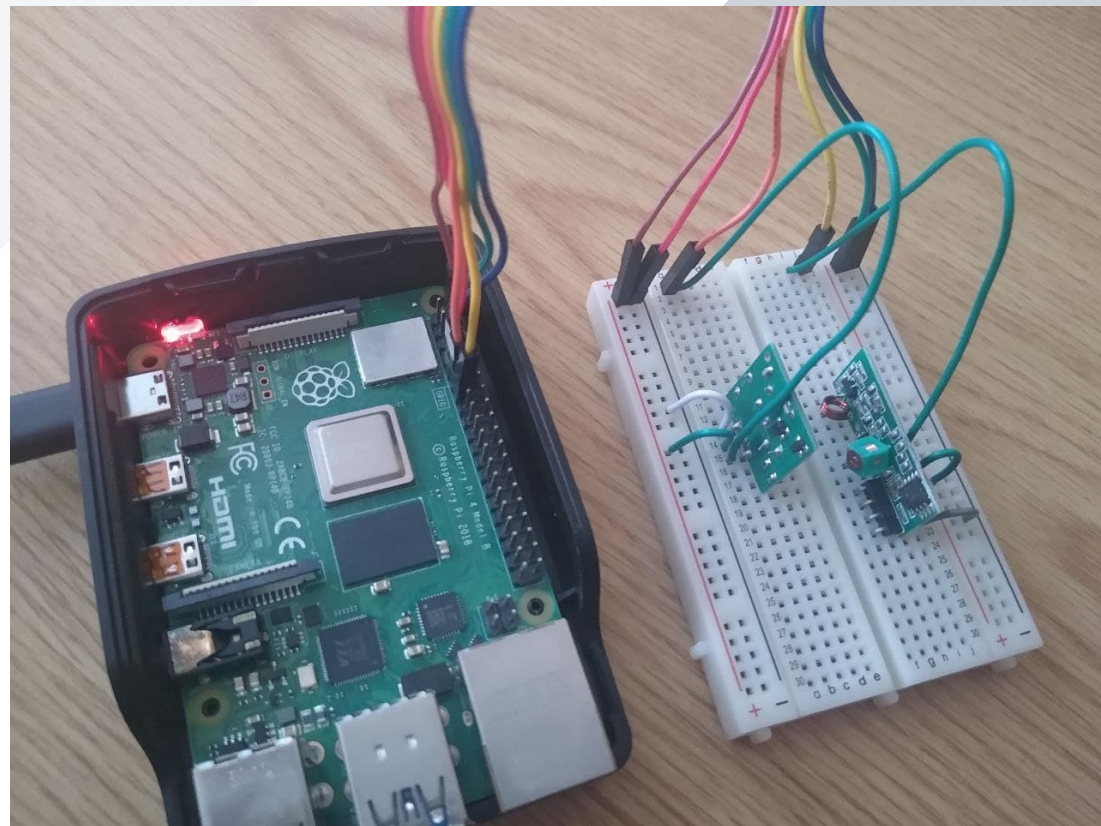
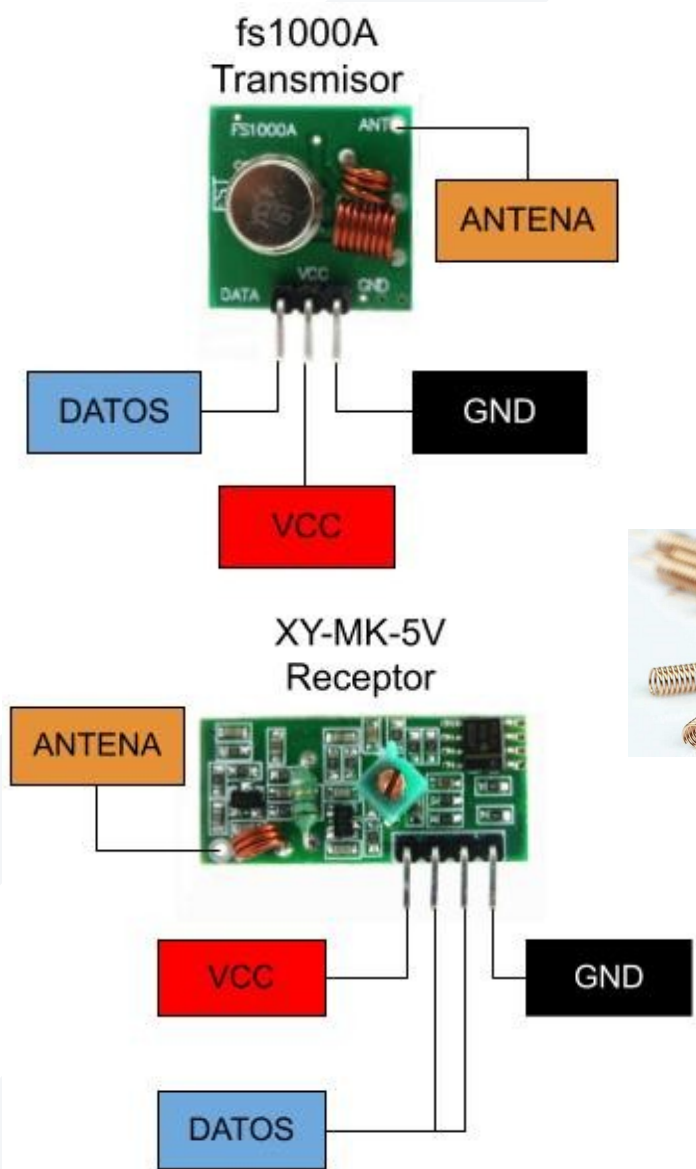


<https://www.kali.org/tools/multimon-ng/>
<https://github.com/EliasOenal/multimon-ng>
<https://paging-systems.readme.io/docs/getting-started>



HARDWARE

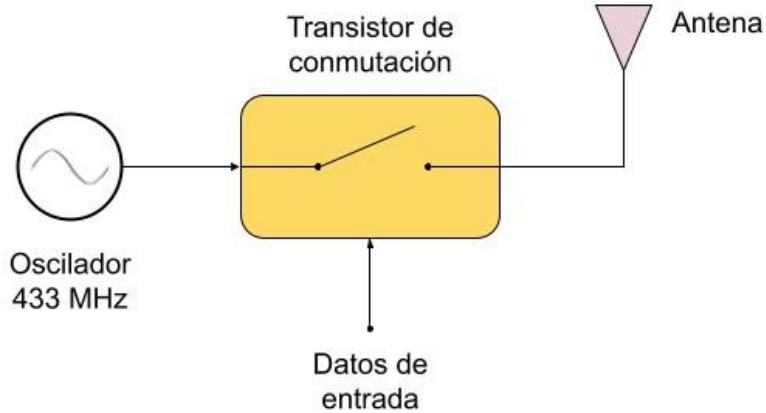
FS1000A / XY-MK-5V



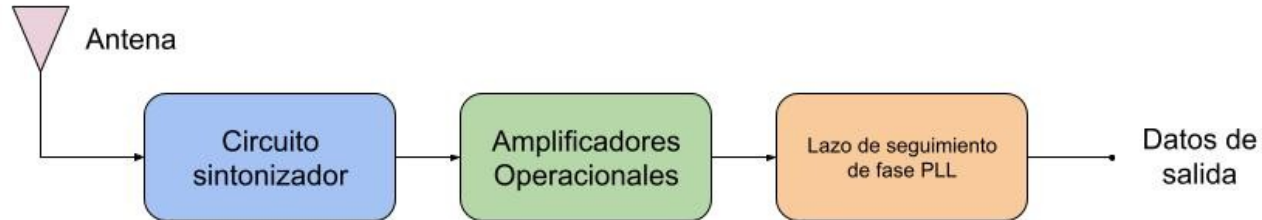
<https://pypi.org/project/rpi-rf/>

FS1000A / XY-MK-5V

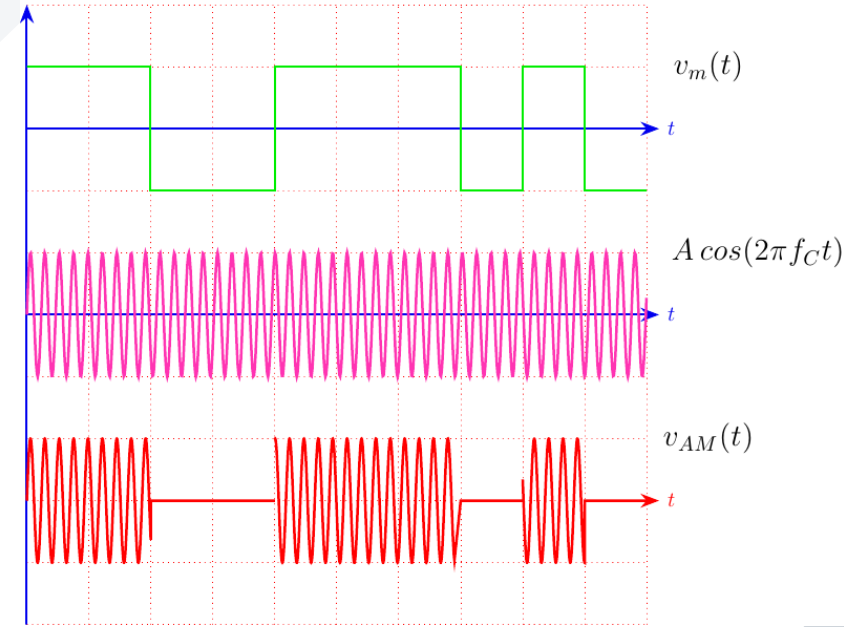
fs1000A
Transmisor



XY-MK-5V
Receptor



Señales de Modulación
Digital de Amplitud (OOK)



RTL-SDR

<https://www.rtl-sdr.com/buy-rtl-sdr-dvb-t-dongles/>

CHOOSE A GENUINE RTL-SDR BLOG V3

ENTIRE PCB REDESIGNED FOR LOWER NOISE

REDESIGNED THERMAL LAYOUT (FIXES VCO LOCK PROBLEMS)

IMPROVED FRONT END DESIGN (RESULTING IN HIGHER L-BAND SNR)

4.5V BIAS TEE (SOFTWARE CONTROLLED)

R820T2 / R860

1PPM TCXO

BETTER LDO (LESS NOISE AND LOWER VOLTAGE OPERATION)

5V LINE FERRITE CHOKE

SMA FEMALE CONNECTOR

ADDITIONAL ESD PROTECTION

DIRECT SAMPLING CIRCUIT (ENABLES HF RECEPTION (WITH LFP AND TUNED ATTENUATION CURVES))

EXPANSION PORTS

CLK SELECTOR JUMPER

GPIO EXPANSION PORTS

USB RF CHOKE (REMOVES USB NOISE)

STANDARD/OTHER BRAND RTL-SDR (NOISE FLOOR FULL OF SPURS AND INTERFERENCE)

RTL-SDR BLOG V3 NOISE FLOOR (SIGNIFICANTLY REDUCED SPURS AND INTERFERENCE)

TOUGH BLACK CONDUCTIVE METAL ENCLOSURE (REDUCES INTERFERENCE)

THERMAL PAD COOLING (REMOVES HEAT FROM PCB AND TRANSFERS IT TO THE METAL CASE RESULTING IN NO HEAT RELATED VCO LOCK PROBLEMS)

CHOOSE A GENUINE RTL-SDR BLOG V4

TRIPLEXED FRONT END DESIGN (IMPROVED FILTERING)

BIAS TEE LED

ADDITIONAL ESD PROTECTION

IMPROVED THERMALS (FIXES VCO LOCK PROBLEMS)

4.5V BIAS TEE (SOFTWARE CONTROLLED)

R828D

1PPM TCXO

NOTCH FILTERS

I2C, CLK, POWER EXPANSION PORTS

GPIO EXPANSION PORTS

ENTIRE PCB REDESIGNED FOR LOWER NOISE

IMPROVED POWER SUPPLY (REDUCED PHASE NOISE)

220 10V VT

USB RF CHOKE (REMOVES USB NOISE)

TOUGH BLACK CONDUCTIVE METAL ENCLOSURE (REDUCES INTERFERENCE)

THERMAL PAD COOLING (REMOVES HEAT FROM PCB AND TRANSFERS IT TO THE METAL CASE)

FULL 2-YEAR WARRANTY AGAINST MANUFACTURING FAULTS
EMAIL & FORUM SUPPORT
SUPPORTS THE BLOG FOR NEW CONTENT, TUTORIALS AND PRODUCTS!

GENUINE GUARANTEE:
BE WARY OF INFERIOR
RTL-SDR BLOG V3 COUNTERFEITS!



FULL TWO YEAR WARRANTY AGAINST MANUFACTURING FAULTS
FREE EMAIL & FORUM SUPPORT
SUPPORTS THE BLOG FOR NEW CONTENT, TUTORIALS AND PRODUCTS!

GENUINE GUARANTEE:
BE WARY OF INFERIOR
RTL-SDR BLOG COUNTERFEITS!

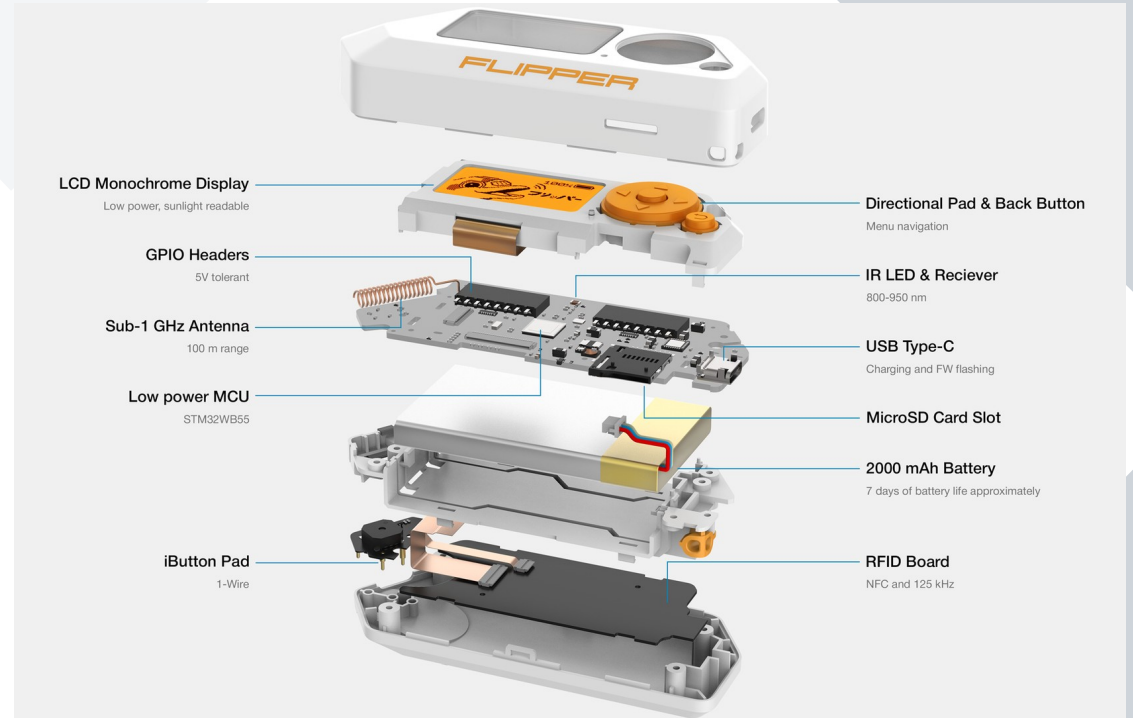
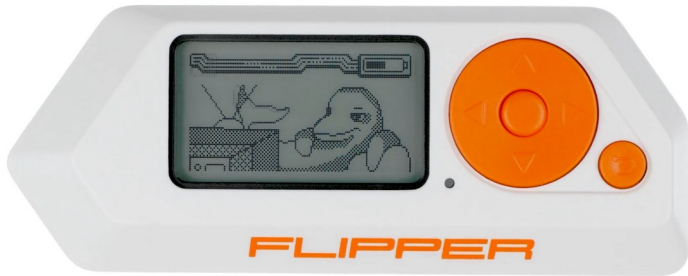


HackRF



<https://github.com/portapack-mayhem/mayhem-firmware>

Flipper Zero



<https://github.com/DarkFlippers/unleashed-firmware>

Radios VHF / UHF / FM / DMR / etc





SOFTWARE

gqrx

The screenshot displays the Gqrx software interface. At the top, the title bar reads "Gqrx 2.11.5 - rtl_tcp=radiopi:1234,psize=32768". The menu bar includes "File", "Tools", "View", and "Help". A toolbar contains various icons, with a play button icon circled in red and labeled "2". The main display area is split into two sections: a spectrum plot at the top and a spectrogram at the bottom. The spectrum plot shows a signal centered at 91.500.000 kHz, with a vertical red line and a grey shaded area around it. A scale at the top right of the plot indicates -100, -80, -60, -40, -20, and 0 dBFS, with a -4 dBFS marker. The spectrogram below shows a color-coded signal over time, with a yellow/orange band corresponding to the signal in the spectrum plot. On the right side, the "Receiver Options" panel is visible, with a circled "1" next to the "Hardware freq:" field. The "Frequency" field is set to 91500.000 kHz and is also circled in red. Other settings include "Filter width: Normal", "Filter shape: Normal", "Mode: WFM (stereo)", and "AGC: Off". Below these are "Squelch" and "Noise blanker" options. At the bottom right, the "Audio" panel shows a gain slider set to -7.2 dB and buttons for "UDP", "Rec", "Play", and "DSP".

File Tools View Help

91.500.000

Receiver Options

0 . 0 0 0 kHz

Hardware freq: 91.500000 MHz

Frequency 91500.000 kHz

Filter width Normal

Filter shape Normal

Mode WFM (stereo)

AGC Off

Squelch -150.0 dB A R

Noise blanker NB1 NB2 ...

Input controls Receiver Options FFT Settings

Audio

Gain: -7.2 dB

UDP Rec Play ...

DSP

GNU Radio

Options
Title: AM_transmit tutorial
Author: Barry Duggan
Copyright: 2020
Description: AM_tr...tutorial
Output Language: Python
Generate Options: QT GUI

Variable
Id: samp_rate
Value: 768k

QT GUI Range
Id: volume
Label: Audio gain
Default Value: 1.2
Start: 0
Stop: 10
Step: 100m

Audio Source
Sample Rate: 48 kHz
Device Name: hw:CA...ce,DEV=0

Repeat
Interpolation: 16

Multiply Const
Constant: 1.2

Add Const
Constant: 1

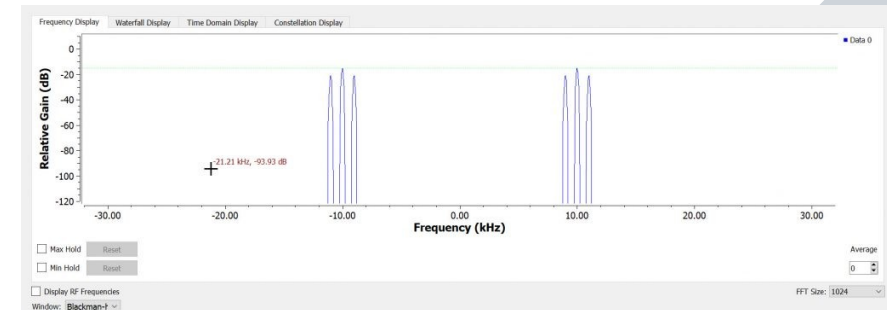
Multiply

ZMQ PUB Sink
Address: tcp://1...0.1:50001
Timeout (msec): 100
Pass Tags: No

Note
Note: 48kHz Carrier

Signal Source
Sample Rate: 768k
Waveform: Cosine
Frequency: 48k
Amplitude: 500m
Offset: 0
Initial Phase (Radians): 0

QT GUI Time Sink
Number of Points: 4.096k
Sample Rate: 768k
Autoscale: No



Audacity / Tenacity

The screenshot displays the Audacity/Tenacity audio editing software interface. The window title is "Tenacity". The menu bar includes File, Edit, Select, View, Transport, Tracks, Generate, Effect, Analyze, Tools, and Help. The toolbar contains various icons for playback, editing, and analysis. The transport controls show a play button, a stop button, and a "Click to Start Monitoring" button. The mixer section shows two channels: L (Left) and R (Right), both with a gain of -48. The project rate is set to 44100 Hz, and the sample format is 32-bit float. The main editing area shows two tracks: "Brownian noise" and "Label Track". The "Brownian noise" track contains two waveforms, one for the left channel and one for the right channel, both showing a dense, noisy signal. The "Label Track" contains two labels: "Noise and nothing else" and "More noise". The project is currently stopped, and the time display shows 00 h 00 m 06 s.

File Edit Select View Transport Tracks Generate Effect Analyze Tools Help

Click to Start Monitoring

ALSA default 2 (Stereo) Recording Cha... default

Brownian noise

Mute Solo 1.0

L R

Stereo, 44100Hz
32-bit float

Noise and nothing else

More noise

Project Rate (Hz) Snap-To Start and End of Selection

44100 Off 00 h 00 m 05.650 s 00 h 00 m 05.650 s 00 h 00 m 06 s

Stopped. Click and drag to select audio

Terminal

- `rtl_fm -f 100.2e6 -M wbfm -s 200000
-r 48000 - | aplay -r 48000 -f
S16_LE`
- `rtl_433 -f 434M`
- `rtl_sdr`

The background features several diagonal grey bars of varying lengths and shades, creating a modern, geometric pattern. The bars are positioned at various angles, some pointing towards the top-left and others towards the bottom-right.

¿PREGUNTAS?

The background features several diagonal grey bars of varying lengths and shades, creating a geometric pattern. The bars are positioned in the corners and along the edges of the frame.

0day.lol