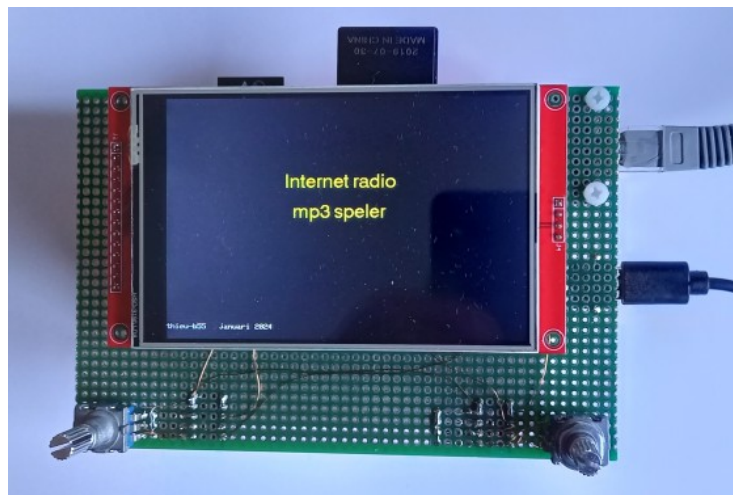
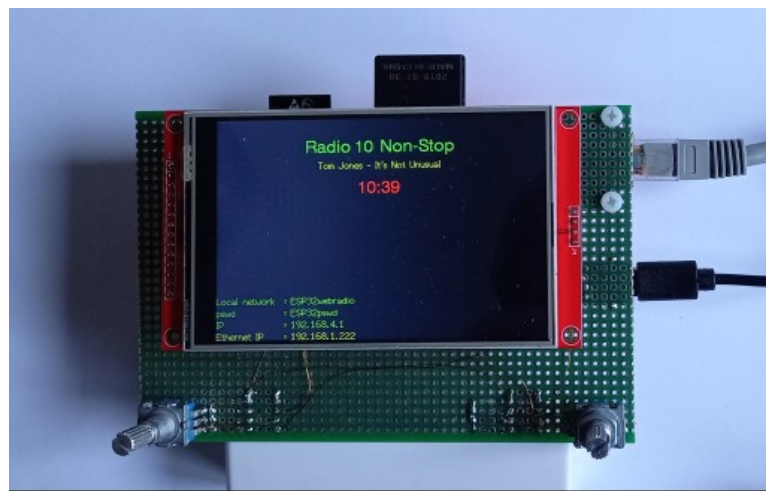


# The # I want this # ESP32-S3 Internet radio



Splash screen



Connected to Ethernet



WiFi or Ethernet connection, can be selected at start-up

With Ethernet connection, local ESP32 network to operate internet radio

Network ESP32webradio

Password ESP32pswd

address 192.168.4.1

75 preset radio stations possible

About 50 completed

4" TFT Touch screen

Local time

local time zone can be looked up via web page:

[https://github.com/nayarsystems/posix\\_tz\\_db/blob/master/zones.csv](https://github.com/nayarsystems/posix_tz_db/blob/master/zones.csv)

Specification Time Zone with TZ:

[https://www.gnu.org/software/libc/manual/html\\_node/TZ-Variable.html](https://www.gnu.org/software/libc/manual/html_node/TZ-Variable.html)

mp3 player

plays mp3 files randomly.

More than 5000+ files

Advanced EC11 - rotary encoder – signal processing.

Only 1 ESP32 GPIO input per EC11

absolutely interference-free

Control via

web page

2 rotary encoders

touch screen

Once programmed, all settings can be adjusted via web page:

Network ssid

Network password

local time zone

ntp server

freely selectable IP address (within range of your own router)

Excellent sound quality thanks to:

<https://github.com/schreibfaul1/ESP32-audioI2S>

With volume and equalizer control (web page)

Easy to build

To avoid problems with incompatible library updates :  
used libraries available on Github page

**Internet\_ETH\_WiFi.bin** file present on Github page  
can easily be programmed into the ESP32 with <esptool.py>  
>> ALWAYS a working software version

<https://docs.espressif.com/projects/esptool/en/latest/esp32/installation.html#installation>

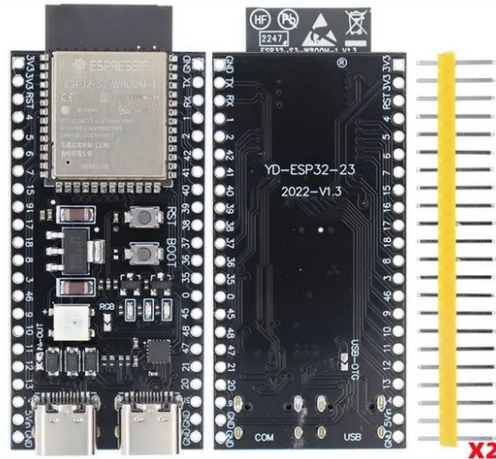
**Github pagina :**

<https://github.com/thieu-b55/The---I-want-this---ESP32-S3-Internet-radio>

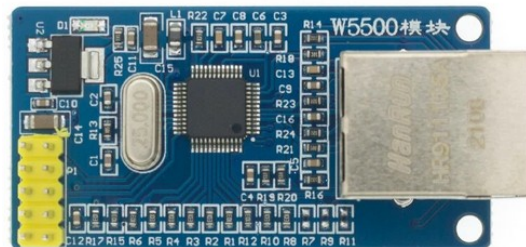
## Components

1 x ESP32-S3 WROOM-1 Devkit N16R8

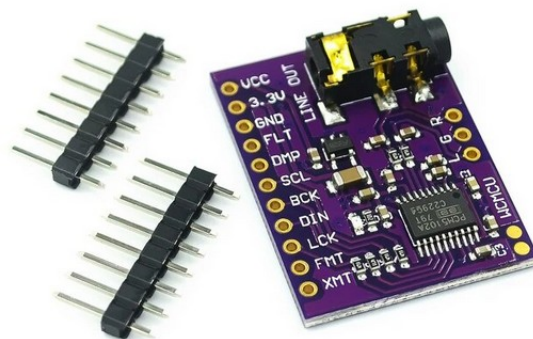
### ESP32-S3 N16R8 Black board



1x W5500



1x PCM5102



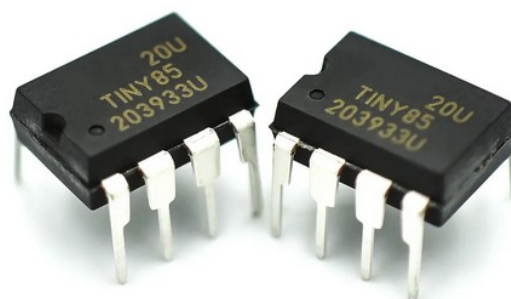
2x EC11



1x 4" TFT 480x320 with touch / SD card



2x ATTINY85



1x SD kaart

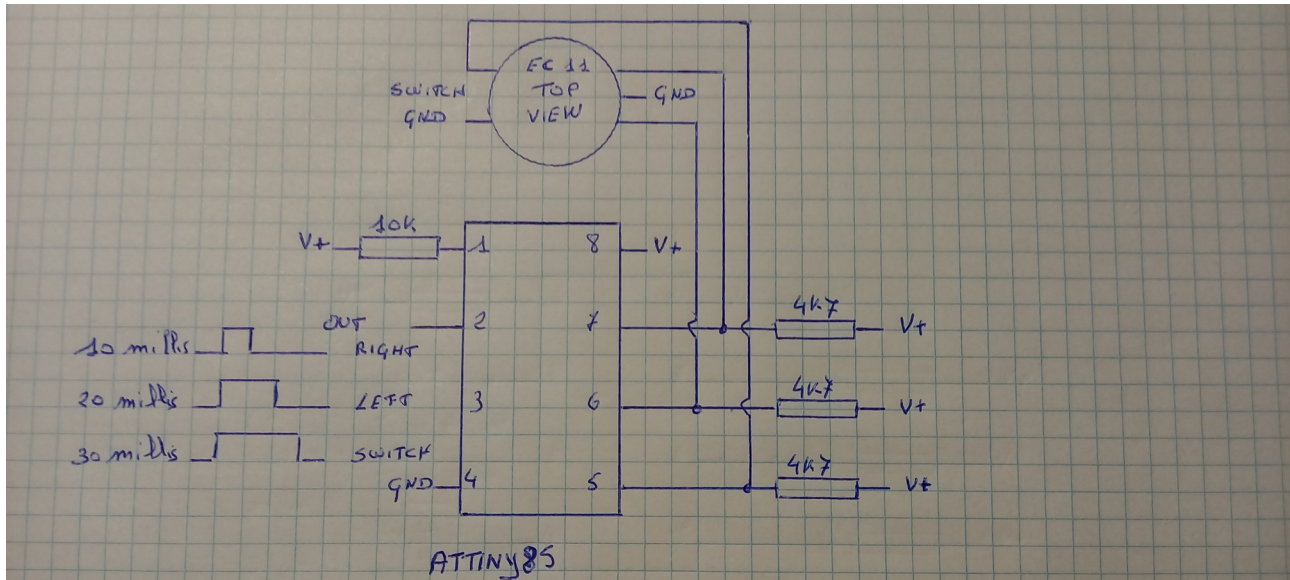
6x R 4K7

2x R 10K

## EC11 ATTINY85 1 OUTPUT

2x (1x volume, 1x channel selection)

**V+ = 3.3V van ESP32-S3**



EC11 with ATTINY85 output on IC pin 2 (Arduino Pin 3)

Pulse of 10 milliseconds when turning to the right

Pulse of 20 milliseconds when turning to the left

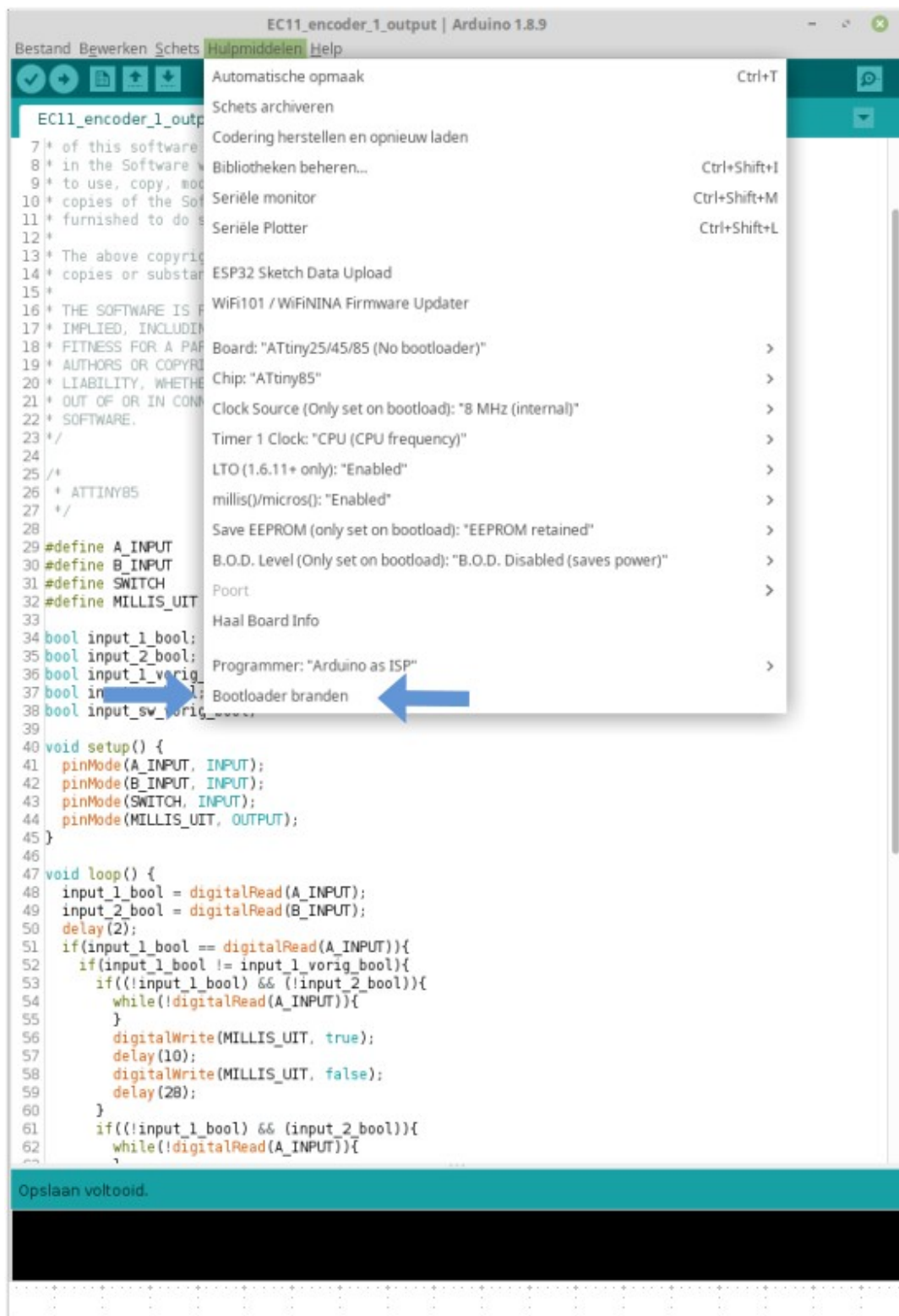
Pulse of 30 milliseconds when pressing Switch.

**Program ATTINY85 with program:**

EC11\_encoder\_1\_output.ino



## Arduino IDE setup



Program bootloader see blue arrows



## Connections to ESP32-S3

### EC11 module volume

V+	>>	+3.3V	ESP32-S3
GND	>>	GND	
IC pin 2	>>	ESP32-S3	GPIO14

### EC11 module station

V+	>>	+3.3V	ESP32-S3
GND	>>	GND	
IC pin 2	>>	ESP32-S3	GPIO9

### PCM5102A

VCC	>>	+5V	
GND	>>	GND	
FLT	>>	GND	
SCL	>>	GND	
FMT	>>	GND	
XMT	>>	+3.3V	PCM5102A
DMP	>>	+3.3V	PCM5102A
BCK	>>	ESP32-S3	GPIO16
DIN	>>	ESP32-S3	GPIO15
LCK	>>	ESP32-S3	GPIO17

### W5500

5V	>>	+5V	
GND	>>	GND	
MISO	>>	ESP32-S3	GPIO13
MOSI	>>	ESP32-S3	GPIO11
SCS	>>	ESP32-S3	GPIO10
SCLK	>>	ESP32-S3	GPIO12
INT	>>	ESP32-S3	GPIO4

### SD op TFT scherm

SD_MISO	>>	ESP32-S3	GPIO5
SD_MOSI	>>	ESP32-S3	GPIO6
SD_SCLK	>>	ESP32-S3	GPIO7
SD_CS	>>	ESP32-S3	GPIO18

**TFT scherm**

VCC	>>	+5V	
GND	>>	GND	
CS	>>	ESP32-S3	GPIO8
RESET	>>	ESP32-S3	RST
DC	>>	ESP32-S3	GPIO39
SDI(MOSI)	>>	ESP32-S3	GPIO6
SCK	>>	ESP32-S3	GPIO7
LED	>>	ESP32-S3	+3.3V
SDO(MISO)	>>	ESP32-S3	GPIO5

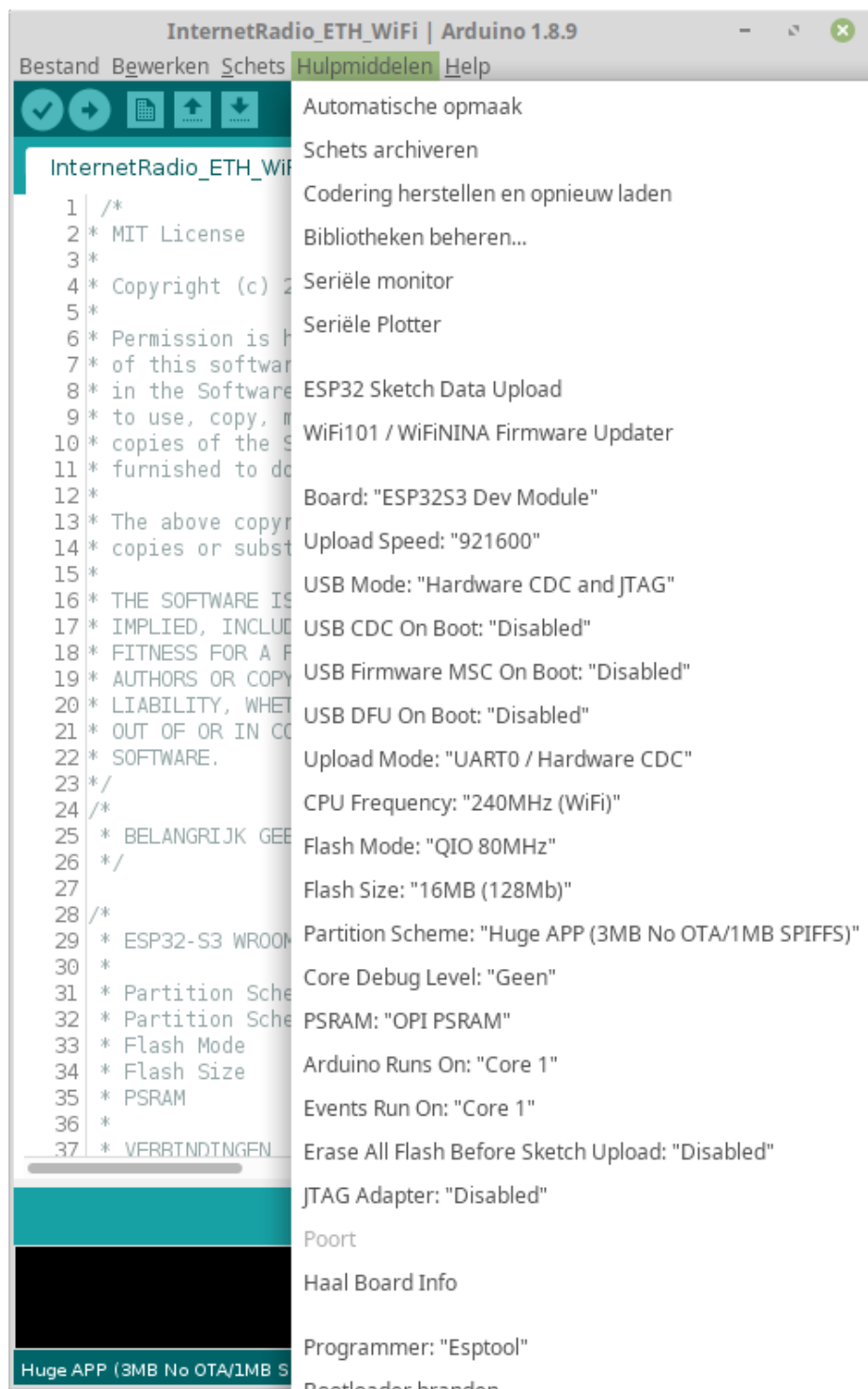
**TOUCH**

T_CLK	>>	ESP32-S3	GPIO7
T_CS	>>	ESP32-S3	GPIO40
T_DIN	>>	ESP32-S3	GPIO6
T_DO	>>	ESP32-S3	GPIO5
T_IRQ	>>	ESP32-S3	GPIO41

**ESP32-S3**

<b>Power</b>	<b>ESP32-S3</b>	<b>EC11 Volume</b>	<b>EC11 zender</b>	<b>PCM 5102A</b>	<b>W5500</b>	<b>SD</b>	<b>TFT</b>	<b>Touch</b>
5V	5V							
GND	GND (4x)	GND	GND					
	3.3V	V+	V+				LED	
	RST						RESET	
	GPIO14	IC pin 2						
	GPIO9		IC pin 2					
	GPIO15			DIN				
	GPIO16			BCK				
	GPIO17			LCK				
	GPIO4				INT			
	GPIO10				SCS			
	GPIO11				MOSI			
	GPIO12				SCLK			
	GPIO13				MISO			
	GPIO5					SD_MISO	SDO	T_DO
	GPIO6					SD_MOSI	SDI	T_DIN
	GPIO7					SD_SCLK	SCK	T_CLK
	GPIO18					SD_CS		
	GPIO8						CS	
	GPIO39						DC	
	GPIO40							T_CS
	GPIO41							T_IRQ

## Arduino IDE settings



## TFT\_e-SPI settings

```
// Only define one driver, the other ones must be commented out
// #define ILI9341_DRIVER // Generic driver for common displays
// #define ILI9341_2_DRIVER // Alternative ILI9341 driver, see https://github.com/Bodmer/TFT_eSPI/issues/1172
// #define ST7735_DRIVER // Define additional parameters below for this display
// #define ILI9163_DRIVER // Define additional parameters below for this display
// #define S6D02A1_DRIVER
// #define RPI_ILI9486_DRIVER // 20MHz maximum SPI
// #define HX8357D_DRIVER
// #define ILI9481_DRIVER
// #define ILI9486_DRIVER
// #define ILI9488_DRIVER // WARNING: Do not connect ILI9488 display SDO to MISO if other devices share the SPI bus (TFT SDO does NOT tr
// #define ST7789_DRIVER // Full configuration option, define additional parameters below for this display
// #define ST7789_2_DRIVER // Minimal configuration option, define additional parameters below for this display
// #define R61581_DRIVER
// #define RM68140_DRIVER
// #define ST7796_DRIVER
// #define SSD1351_DRIVER
// #define SSD1963_480_DRIVER
// #define SSD1963_800_DRIVER
// #define SSD1963_800ALT_DRIVER
// #define ILI9225_DRIVER
// #define GC9A01_DRIVER

// ##### EDIT THE PIN NUMBERS IN THE LINES FOLLOWING TO SUIT YOUR ESP32 SETUP #####

// For ESP32 Dev board (only tested with ILI9341 display)
// The hardware SPI can be mapped to any pins

#define TFT_MISO 5
#define TFT_MOSI 6
#define TFT_SCLK 7
#define TFT_CS 8 // Chip select control pin
#define TFT_DC 39 // Data Command control pin
#define TFT_RST 4 // Reset pin (could connect to RST pin)
#define TFT_RST -1 // Set TFT_RST to -1 if display RESET is connected to ESP32 board RST

// For ESP32 Dev board (only tested with GC9A01 display)
// The hardware SPI can be mapped to any pins

// #define TFT_MOSI 15 // In some display driver board, it might be written as "SDA" and so on.
// #define TFT_SCLK 14
// #define TFT_CS 5 // Chip select control pin
// #define TFT_DC 27 // Data Command control pin
// #define TFT_RST 33 // Reset pin (could connect to Arduino RESET pin)
// #define TFT_BL 22 // LED back-light

#define TOUCH_CS 40 // Chip select pin (T_CS) of touch screen

// #define TFT_WR 22 // Write strobe for modified Raspberry Pi TFT only

// For the M5Stack module use these #define lines
// #define TFT_MISO 19
// #define TFT_MOSI 23
// #define TFT_SCLK 18
// #define TFT_CS 14 // Chip select control pin
// #define TFT_DC 27 // Data Command control pin
// #define TFT_RST 33 // Reset pin (could connect to Arduino RESET pin)
// #define TFT_BL 32 // LED back-light (required for M5Stack)
```

## ESP32-S3 programming

To avoid problems with incompatible libraries, all used libraries can be found in the libraries folder. Also the ESP32 hardware version used in the **esp32 by Espressif Systems version** folder

Load the program **InternetRadio\_ETH\_WiFi.ino** into the Arduino IDE and program the ESP32-S3.

Separate 5V power supply is required, USB power supply may not provide enough power.

There is an already compiled **Internet\_ETH\_WiFi.bin** file in the bin folder. This can be easily loaded into the ESP32-S3 with **esptool.py**.

For further explanation, see Readme file in bin folder.

This way, a working software version can always be easily loaded into the ESP32-S3.

Copy all files (not the folder) from the folder “SD kaart” to an SD card.

If you are going to connect to WiFi, the password and ssid of the connection must be entered in the pswd and ssid files.

File ntp contains the address of the ntp server :  
pool.ntp.org

File tz contains the time zone.  
Here Brussels  
CET-1CEST,M3.5.0,M10.5.0/3

for a different time zone see the following link  
[https://github.com/nayarsystems/posix\\_tz\\_db/blob/master/zones.csv](https://github.com/nayarsystems/posix_tz_db/blob/master/zones.csv)

file "zender\_data.csv" contains the names and URLs of the preferred stations.

You can change all these files on the SD card but also via the program.

### **Important 1!!!**

**Always use an http:// address and NOT a https:// address for the URLs of the preferred channels. Omitting the “s” from https is sufficient.**

**The computing power of an ESP32-S3 is not infinite.**

### **Important 2!!!**

**It may happen that a URL address no longer works, causing the ESP32-S3 to enter an infinite loop.**

**To solve this. Switch ESP32-S3 off and on again.**

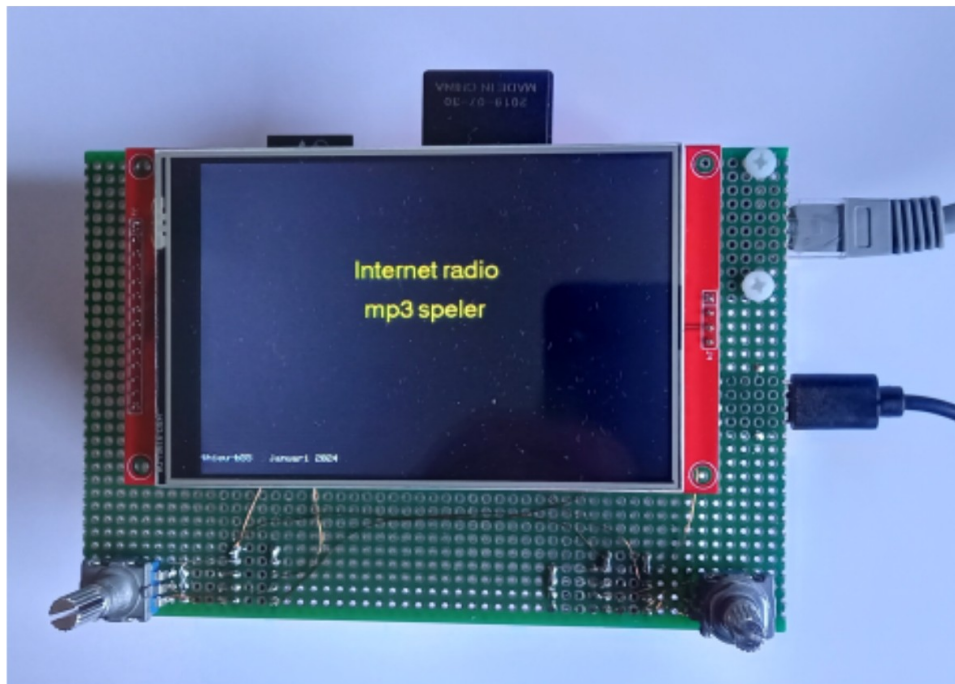
**When selecting the network, press the <confirm> button. This is the switch on channel selection EC11.**

**The ESP32-S3 will now restart with one of the first 5 preset channels randomly.**

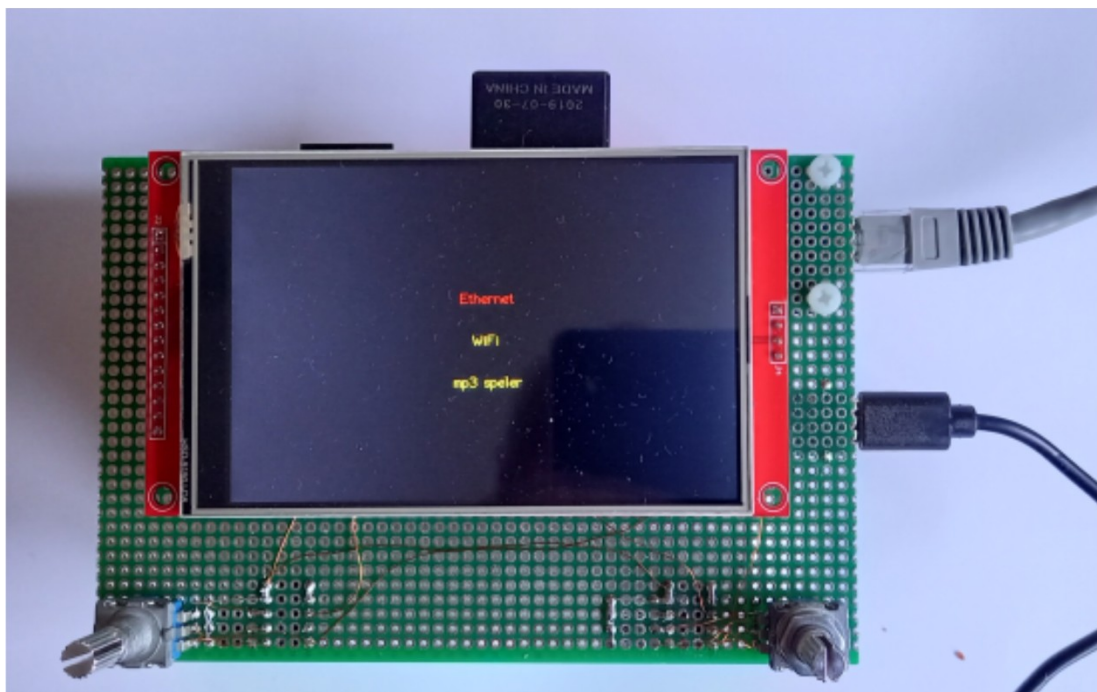
**Then correct the incorrect URL address.**

**<confirm> is the switch on the EC11 channel selection**

Splash screen



Network choice



Using the EC11 channel selector select the desired network and confirm by pressing <confirm>. For MP3 selection as shown here, see further in the manual. After <confirm> the ESP32-S3 restarts and returns to this screen. If you agree with the previous choice, just wait until the desired network arrives.



### **Ethernet connection**

If not changed, the default IP address is 192.168.1.222

IP address also appears at the bottom left of the screen.

The ESP32-S3 web radio can be reached via the address 192.168.1.222 via cable or WiFi if available on this network.

The ESP32-S3 web radio can also be reached via its own network

Network	ESP32webradio
Password	ESP32pswd
address	192.168.4.1

### **WiFi connection**

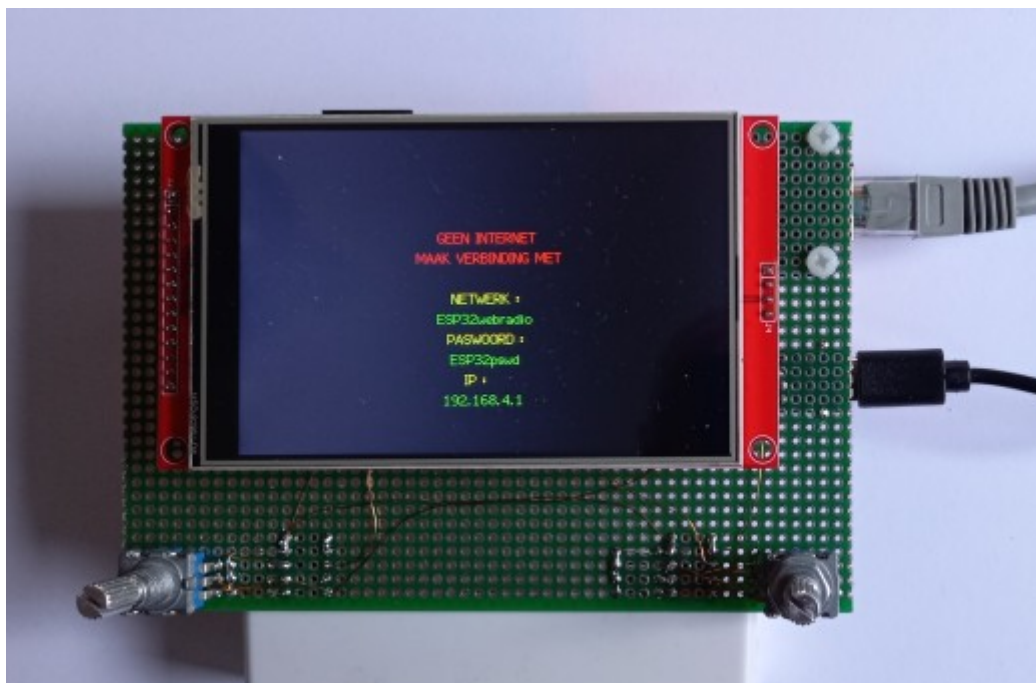
when connected to the network the default address is 192.168.1.222

IP address also appears at the bottom left of the screen

The ESP32-S3 web radio can be reached via this address.

If there is no network connection, the ESP32-S3 web radio can be reached via its own network

Network	ESP32webradio
Password	ESP32pswd
address	192.168.4.1



Screen WiFi no connection

## Service

The internet radio can be operated with

### ***EC11 rotary encoders***

The usage is self-explanatory.

Confirm channel selection using <confirm>

**<confirm> is the switch on the EC11 channel selection**

### ***Touch screen***

Tap the screen to display the touch screen menu.

Volume control and channel selection using the arrows.

Confirm channel selection by pressing the blue square on the right of the screen.

### Web page

The IP address can regularly be seen on the TFT screen

With WiFi, connect via the IP address of the router

With Ethernet, connect via the IP address of the router or via the ESP32-S3 local network.

If there is no network, connect via the local network.

Network     ESP32webradio  
Password     ESP32pswd  
address     192.168.4.1

**ESP32 internetradio**

**Radio 10 Non-Stop**

Talk Talk - It's My Life

Radio 10 Non-Stop

-

OK

+

**EQ -40 <-> 6**      **Volume 0 <->21**

L :  M :  H :  V :

OK

**Instellen zender en url : 0**

Radio 1

<http://icecast.vrtcdn.be/radio1-high.mp3>

-

OK

+

Instellingen

thieu-b55 januari 2024

Home screen

The operation is quite simple

**Radio 10 Non-Stop**

Talk Talk - It's My Life

Radio 10 Non-Stop

- OK +

The station is selected with +/-.  
<OK> to confirm

**EQ -40 <-> 6**      **Volume 0 <->21**

L : 3    M : 0    H : 3    V : 9

OK

Tone and volume control  
<OK> to confirm

**Instellen zender en url : 0**

Radio 1

http://icecast.vrtcdn.be/radio1-high.mp3

-

OK

+

Set channel name and URL  
Maximum is 75  
Confirm with <OK>

**Important 1!!!**

Always use an http:// address and NOT a https:// address for the URLs of the preferred channels. Omitting the “s” from https is sufficient.  
The computing power of an ESP32-S3 is not infinite.

**Important 2!!!**

It may happen that a URL address no longer works, causing the ESP32-S3 to enter an infinite loop.  
To solve this. Switch ESP32-S3 off and on again.  
When selecting the network, press the <confirm> button. This is the switch on channel selection EC11.  
The ESP32-S3 will now restart with one of the first 5 preset channels randomly.  
Then correct the incorrect URL address.

Instellingen

click on <Instellingen> to set the internet radio

### Tijdzone instellen

CET-1CEST,M3.5.0,M10.5.0/3

Bevestig

### NTP server instellen

pool.ntp.org

Bevestig

### ESP32 Netwerk instellingen

ssid :

### Tijdzone instellen

CET-1CEST,M3.5.0,M10.5.0/3

Bevestig

192

168

1

222

Bevestig

Hoofdpagina

### Tijdzone instellen

CET-1CEST,M3.5.0,M10.5.0/3

Bevestig

Set desired time zone

[https://github.com/nayarsystems/posix\\_tz\\_db/blob/master/zones.csv](https://github.com/nayarsystems/posix_tz_db/blob/master/zones.csv)

[https://www.gnu.org/software/libc/manual/html\\_node/TZ-Variable.html](https://www.gnu.org/software/libc/manual/html_node/TZ-Variable.html)

### NTP server instellen

pool.ntp.org

Bevestig

Set desired NTP server

<https://gist.github.com/mutin-sa/eea1c396b1e610a2da1e5550d94b0453>

### ESP32 Netwerk instellingen

ssid :

pswd :

Bevestig

If WiFi

Set SSID and password



**Gewenst IP address (default 192.168.1.222)**

192

168

1

222

Bevestig

Set IP address.

Hoofdpagina

Back to main page

## **mp3 player**

Before the internet radio can be used as an MP3 player, a few actions must first be performed.

As an example we have 915 mp3 files.

The intention is to divide these over different folders to keep the search time for the next MP3 file as short as possible.

The MP3 files are played on a random basis.

It is best to have as many folders as there are files in the folder.

**Importantly, there must be the same number of files in each folder except the last one.**

915 mp3 files >> 30 folders with 30 files and a 31st folder with 15 files.

Numbering of MP3 folders

mp3\_0

mp3\_1

mp3\_2

.....

mp3\_30

Numbering must follow each other. If the next number is missing, the program stops searching.

Copy the folders to the SD card.

If there are still "songlijstX" folders on the SD card >> delete.

Choose in the program:

“mp3 lijst maken” and <confirm>

The ESP32-S3 needs approximately 4 minutes per 1000 MP3 songs.

Progress can be followed on the TFT screen.

When done, the program continues with the MP3 player.

Github page :

<https://github.com/thieu-b55/The---I-want-this---ESP32-S3-Internet-radio>

Dear X, girls, boys that's it,

regards,  
thieu-b55



Image found on the internet.