

Internet Radio using PCM5102A

the following is a guide on how to create an internet radio using the PCM5102A amplifier.
for this tutorial, we used the Arduino IDE.

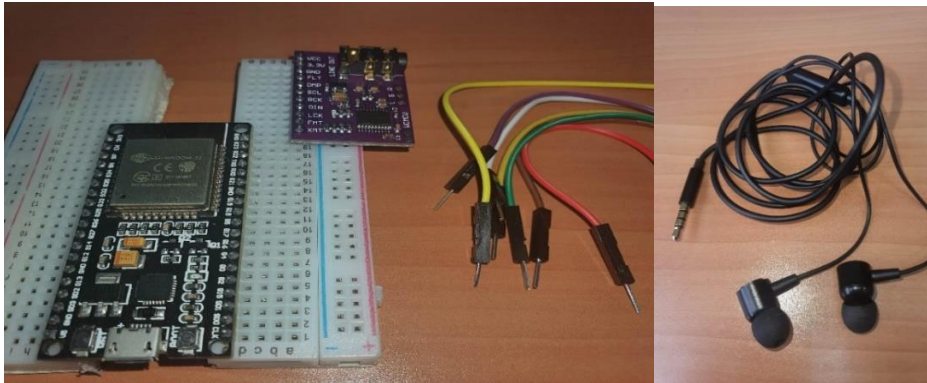
assumptions:

- you have downloaded the Arduino IDE.
- you have configured the IDE to work with the “DOIT ESP32 DIVKIT V1” board.

a guide to all the steps above can be found in the “bank of knowledge”.

needed material:

- ESP32 microcontroller
- PCM5102A amplifier
- breadboard
- WiFi connection
- 7 wires
- earphones with an aux jack



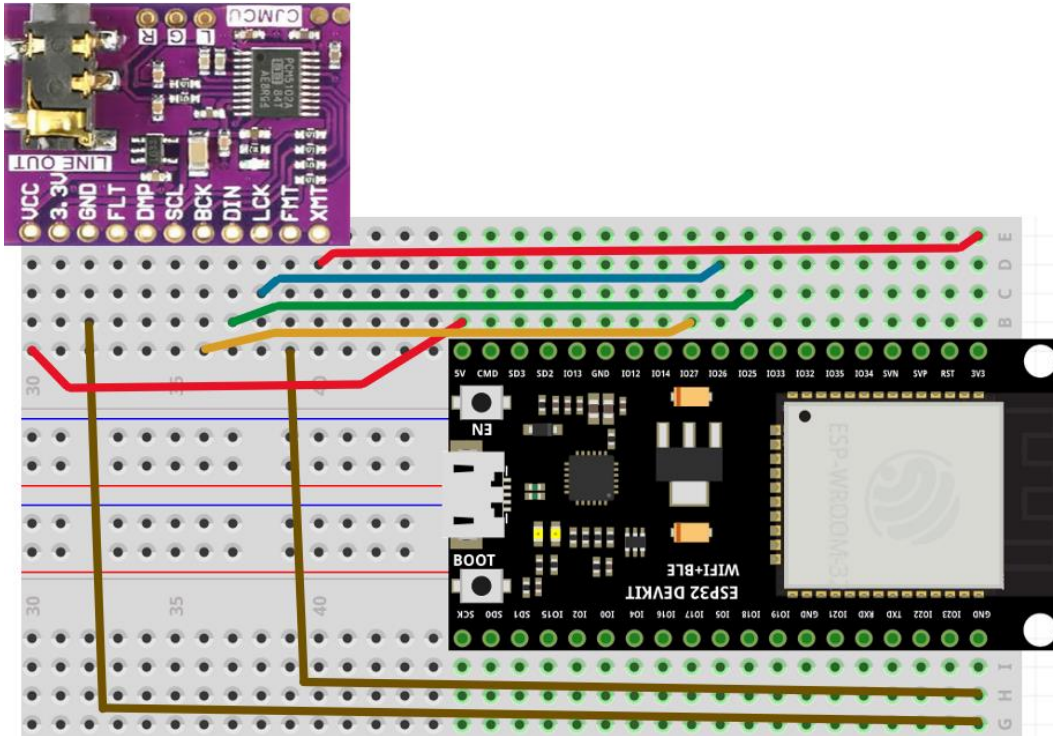
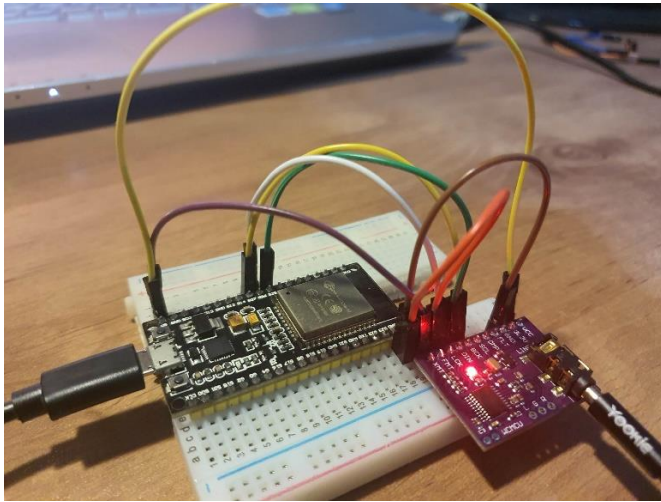
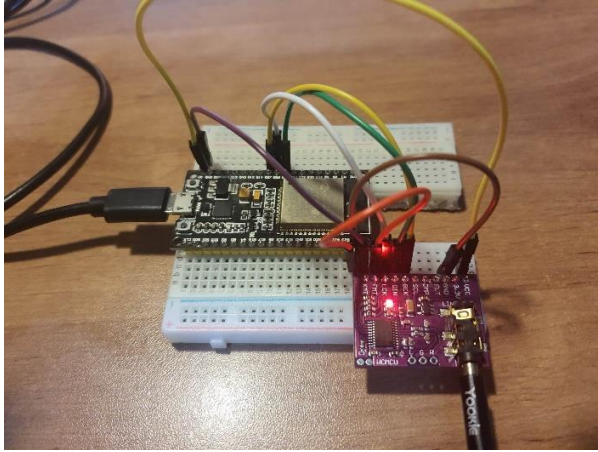
step 1: download the following Github repository as a zip file to your computer:

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

step 2: go to the Arduino IDE -> Sketch -> include library -> add .ZIP library -> choose the file you’ve downloaded in step 1.

step 3: setup the wiring as shown in the “audio input and output for microcontrollers” presentation, or as follows:

PCM5102/A	ESP32
Vcc	Vcc (5V)
GND	GND
BCK or BCLK	Pin 27 (G27)
DIN	Pin 25 (G25)
LCK	Pin 26 (G26)
FMT	GND
XMT	Vcc (5v\3.3v) preferably 3.3V



step 4: copy and paste the following code:

```
• #include "Arduino.h"
#include "WiFi.h"
#include "Audio.h"

// Digital I/O used
#define I2S_DOUT 25 // DIN connection
#define I2S_BCLK 27 // Bit clock
#define I2S_LRC 26 // Left Right Clock

Audio audio;

String ssid = "your WiFi name"; // insert your WiFi name here
String password = "your Password"; // insert your WiFi password here

void setup() {
  Serial.begin(115200);
  WiFi.disconnect();
  WiFi.mode(WIFI_STA);
  WiFi.begin(ssid.c_str(), password.c_str());
  while (WiFi.status() != WL_CONNECTED) delay(1500);
  audio.setPinout(I2S_BCLK, I2S_LRC, I2S_DOUT);
  audio.setVolume(15); // 0...21

  // audio.connecttohost("http://www.wdr.de/wdrlive/media/einslive.m3u");
  // audio.connecttohost("http://macslons-irish-pub-radio.com/media.asx");
  // audio.connecttohost("http://mp3.ffh.de/radioffh/hqlivestream.aac"); // 128k aac
  // audio.connecttohost("http://mp3.ffh.de/radioffh/hqlivestream.mp3"); // 128k mp3
  audio.connecttohost("http://vis.media-ice.musicradio.com/CapitalMP3"); // 128k mp3
  // audio.connecttospeech("Wenn die Hunde schlafen, kann der Wolf gut Schafe stehlen.", "de");
  // audio.connecttohost("http://media.ndr.de/download/podcasts/podcast4161/AU-20190404-0844-1700.mp3"); // podcast
}

void loop()
{
  audio.loop();
}

// optional
void audio_info(const char *info){
  Serial.print("info "); Serial.println(info);
}
void audio_id3data(const char *info){ //id3 metadata
  Serial.print("id3data "); Serial.println(info);
}
void audio_eof_mp3(const char *info){ //end of file
  Serial.print("eof_mp3 "); Serial.println(info);
}
void audio_showstation(const char *info){
  Serial.print("station "); Serial.println(info);
}
void audio_showstreaminfo(const char *info){
  Serial.print("streaminfo "); Serial.println(info);
}
void audio_showstreamtitle(const char *info){
  Serial.print("streamtitle "); Serial.println(info);
}
void audio_bitrate(const char *info){
  Serial.print("bitrate "); Serial.println(info);
}
void audio_commercial(const char *info){ //duration in sec
  Serial.print("commercial "); Serial.println(info);
}
void audio_icyurl(const char *info){ //homepage
  Serial.print("icyurl "); Serial.println(info);
}
void audio_lasthost(const char *info){ //stream URL played
  Serial.print("lasthost "); Serial.println(info);
}
void audio_eof_speech(const char *info){
  Serial.print("eof_speech "); Serial.println(info);
}
```

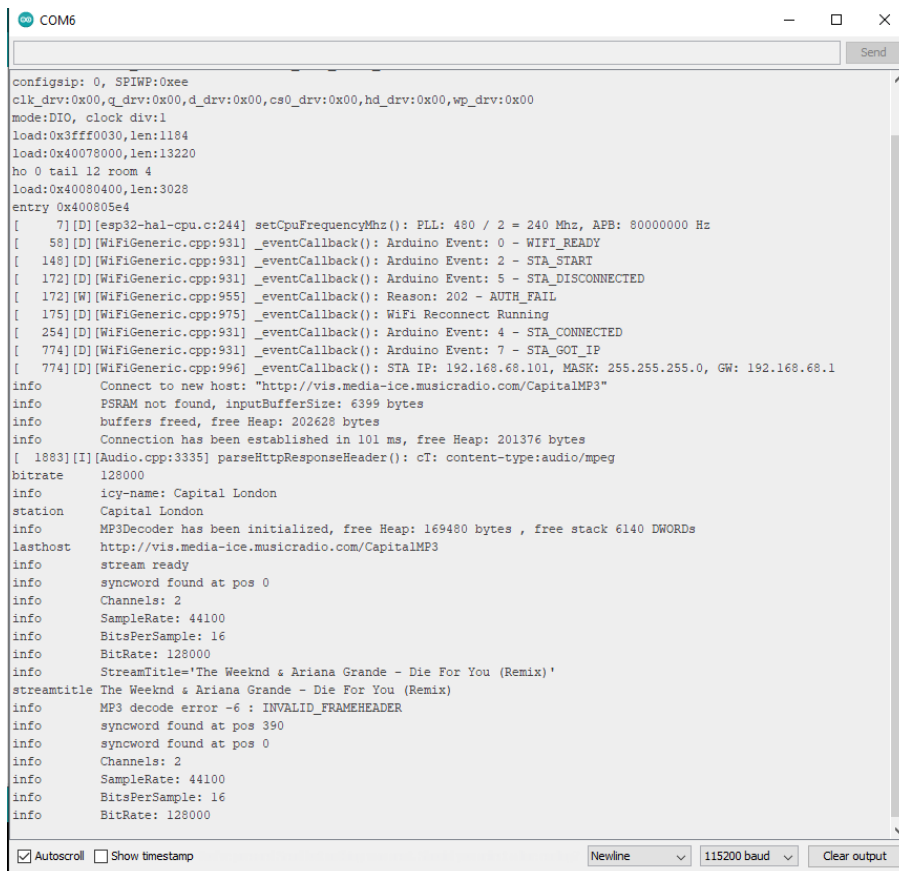
NOTE: make sure that the defined Pins match the wiring!

step 5: connect the ESP32 to your computer, compile and run the code, and then connect your earphones to the aux jack on your PCM5102. you might need to press on the “reset” button on your ESP32.

NOTE:

- it doesn't matter if the earphones were already connected or not when the code was being uploaded to the esp32.
- the earphones connection is a bit sensitive. if you don't hear a sound, try moving the headphone jack a little bit.

you should see something similar to the following in the serial monitor:



```
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0030,len:1184
load:0x40078000,len:13220
no 0 tail 12 room 4
load:0x40080400,len:3028
entry 0x400805e4
[ 7][D][esp32-hal-cpu.c:244] setCpuFrequencyMhz(): PLL: 480 / 2 = 240 Mhz, APB: 80000000 Hz
[ 58][D][WiFiGeneric.cpp:931] _eventCallback(): Arduino Event: 0 - WIFI_READY
[ 148][D][WiFiGeneric.cpp:931] _eventCallback(): Arduino Event: 2 - STA_START
[ 172][D][WiFiGeneric.cpp:931] _eventCallback(): Arduino Event: 5 - STA_DISCONNECTED
[ 172][W][WiFiGeneric.cpp:955] _eventCallback(): Reason: 202 - AUTH_FAIL
[ 175][D][WiFiGeneric.cpp:975] _eventCallback(): WiFi Reconnect Running
[ 254][D][WiFiGeneric.cpp:931] _eventCallback(): Arduino Event: 4 - STA_CONNECTED
[ 774][D][WiFiGeneric.cpp:931] _eventCallback(): Arduino Event: 7 - STA_GOT_IP
[ 774][D][WiFiGeneric.cpp:996] _eventCallback(): STA IP: 192.168.68.101, MASK: 255.255.255.0, GW: 192.168.68.1
info Connect to new host: "http://vis.media-ice.musicradio.com/CapitalMP3"
info PSRAM not found, inputBufferSize: 6399 bytes
info buffers freed, free Heap: 202628 bytes
info Connection has been established in 101 ms, free Heap: 201376 bytes
[ 1883][I][Audio.cpp:3335] parseHttpResponseHeader(): ct: content-type:audio/mpeg
bitrate 128000
info icy-name: Capital London
station Capital London
info MP3Decoder has been initialized, free Heap: 169480 bytes , free stack 6140 DWORDs
lasthost http://vis.media-ice.musicradio.com/CapitalMP3
info stream ready
info syncword found at pos 0
info Channels: 2
info SampleRate: 44100
info BitsPerSample: 16
info BitRate: 128000
info StreamTitle='The Weeknd & Ariana Grande - Die For You (Remix) '
streamtitle The Weeknd & Ariana Grande - Die For You (Remix)
info MP3 decode error -6 : INVALID_FRAMEHEADER
info syncword found at pos 390
info syncword found at pos 0
info Channels: 2
info SampleRate: 44100
info BitsPerSample: 16
info BitRate: 128000
```

step 6: enjoy your internet radio 😊