

This document provides some tips for anyone who wants to build the “Retrophone” telephone jukebox for classic phones themselves. A complete list of all necessary parts, the 3D print files, and basic firmware for the Arduino Pro Mini used in the design are open-sourced and available at <https://github.com/Arnoud-Whizzbizz/retrophone>

Everyone is strongly encouraged to use the design for their own experiments. The electronic design and software are released under the [GPL-2.0 license](#). It is not permitted to use the designs or firmware for commercial purposes without permission.

Fully assembled and tested Retrophones (including a telephone, if desired) are available as custom-made units upon request. For professional custom projects, a modular system is used that can be triggered by external sensors, control door openers and relays, ring the bell in the telephone, etc. Please contact us via the contact form on the website [whizzbizz.com](http://whizzbizz.com) if you are looking for ready-made solutions for, for example, your escape room, exhibition, or art project.

I do not supply individual parts, kits, etc. However, a few remaining units of the first version of the circuit boards (marked “July 2023”) are available upon request for those who wish to build a Retrophone themselves immediately, without first having to have the circuit boards manufactured in a larger batch. Please submit your request or question via the contact form on the website [whizzbizz.com](http://whizzbizz.com)

### RJ11 or PTT Plug

There are two versions of the Retrophone available. If you want to be able to connect a classic Dutch telephone (such as the T65) immediately without any modifications, choose the model with the integrated PTT socket. The housing can be printed using the 3D files ‘wall-case.stl’ and ‘lid-flat-basic-holes.stl’.

The Q-Link surface-mount telephone jack (Part No. 00.133.44) available in the Netherlands also features an RJ11 port for modern or foreign telephones.

If you only need an RJ11 connector on the Retrophone, you can choose to print the housing (or have it printed) using the 3D print files “RJ11-port-case.stl” and “lid-flat-basic-holes-RJ11-lip.stl”.



### Touch-tone dialing and/or tone dialing

The Retrophone can be used with both traditional rotary-dial phones (such as the classic T65) and more modern push-button phones (such as the T65-TDK).

Traditionally, the dialing process for a phone with a classic rotary dial is referred to as “Impulse-Dialing” (IDK). Push-button phones are devices with so-called “Tone-Dialing” (TDK). These devices use tones instead of pulses. To use these devices, the Retrophone must be equipped with a so-called *Dual-Tone Multi-Frequency* (DTMF) decoder.

However, this is not necessary. If the Retrophone is used exclusively with a rotary-dial telephone, components U4 (the MT8870 DTMF decoder), crystal Y1, capacitors C1 and C6, and resistors R6, R9, and R11 can be omitted.

### Additional momentary switch

The SW2 and LED D6 (with series resistor R13) are also optional. They do not need to be included in the standard version of the Retrophone.

This additional “configuration pushbutton” is a potential future expansion and is not currently supported in the standard firmware. For specific customization, this pushbutton can, for example, be used to add additional functionality to the basic functions.

### Building instructions

1. Before soldering the Arduino Pro Mini board to the main PCB, make sure to install a 6-pin female header on the FTDI side for programming. This interface does not make any further contact with the PCB. For programming, you can use, for example, an FT232RL FTDI programmer board equipped with a 6-pin female connector.
2. Not all pins on the MP3 player and Arduino Pro Mini need to be soldered. Dots on the bottom silk screen indicate the pads that must be soldered (in version “PCB V2.0 - March 2025” of this board).
3. Mount the 7805CV voltage regulator with a small heat sink using an M3 12mm screw (flat head on the PCB side) and a 4mm metal (aluminum) spacer. Apply a small amount of thermal paste if necessary. Mount first, then solder.
4. The 7x7mm on/off switch and the momentary pushbutton must be mounted with the “double marking” (2 black lines visible through the white cover) facing to the right.
5. The LEDs must be mounted with the flattened side (cathode to ground) on the left.

The so-called Gerber files on GitHub have now been updated and include the “March 2025” designation, but if you are using PCB version 1 with the “July 2023” designation, there are a few things you need to keep in mind:

- NOTE: D1 was **unnecessary** and can be omitted.
- NOTE: Due to an error in the footprint printing, D5 must be mounted **reversed!**
- NOTE: A 3 $\mu$ F electrolytic capacitor must be soldered **over R10** (10K $\Omega$ ).
- NOTE: R7 was unnecessary and has been omitted; it must be **replaced with a wire jumper**.