BTAEXv1

Miniature portable Bluetooth stereo audio exciter

Version 1.0

Dan - YO3GGX - yo3ggx@gmail.com

Contents

Introduction

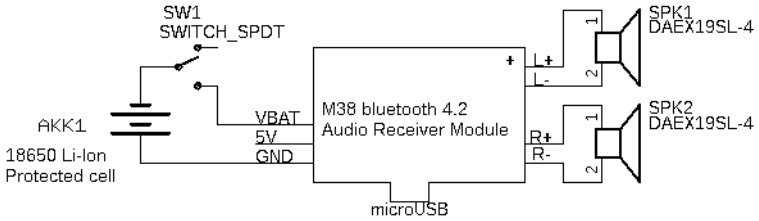
This is a very small device that can be used to play audio from any Bluetooth enabled device (ex. Smartphone, tablet, watch, etc.) by simply placing it on a cardboard package or any other surface that can vibrate freely.

Can be built very easily, using just a few components. The whole case is 3d printed.

The final products look like in the following picture. The full size (L x l x h without the exciters cap) is 76mm x 38mm x 36mm or 3” x 1.5” x 1.5”.

The schematic

Schematic is very simple; you just have to use some pieces of 30 AWG isolated stranded wires to interconnect the modules.



The switch SW1 must be in ON position in order to charge the battery.

WARNING!!!: Is mandatory to use a protected Li-Ion cell, as there is no protection included in the M38 module and you risk to overcharge or fully discharge the battery. THIS MAY CAUSE FIRE!!!

When you connect the audio exciters, take into consideration + and – signs marked on the Bluetooth module and the exciters.

The BOM

This is the complete list of parts (BOM):

Part	Qty	Value	Device
AKK1	1	Li-Ion 18650	Single Li-Ion Protected Cell
SPK1-2	2	DAEX19SL-4	4W Dayton Audio exciter
SW1	1	SPDT	SPDT miniature switch
BT1	1	M38	M38 BT 4.2 Audio Receiver Module 5W+5W

Let's now see where we can find the main components from a trusted source.

XTAR 18650 3.7V 3500mAh Li-Ion 18650 Protected cell (~ $14/pcs.) at:

https://www.ebay.com/itm/283431901778

DAEX19SL-4 4W Dayton Audio exciter (~$10/pcs.) at:

https://www.amazon.com/Dayton-Audio-DAEX19SL-4-Slimline-Exciter/dp/B01N1A1EO5

SPDT miniature switch (~ 30c) at:

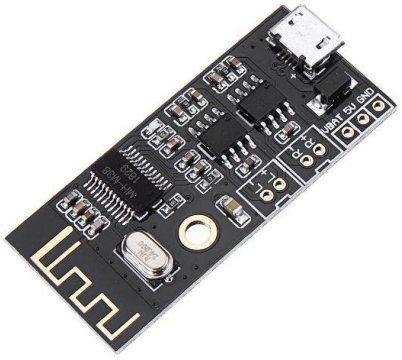
https://www.conexelectronic.ro/ro/comutatoare-cu-translatie/19097-COMUTATOR-CU-TRANSLATIE.html

You can find it in many places, just use the dimensions below:

- The distance between the fixing holes: 15mm
- Length: 19,5mm

M38 BT 4.2 Audio Receiver Module 5W+5W (~ $3.5/pcs.) at:

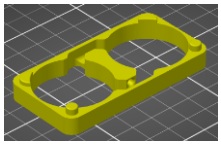
https://www.banggood.com/M38-bluetooth-4_2-Audio-Receiver-Module-5W5W-Lossless-Car-Speaker-Headphone-Amplifier-Board-Wireless-Refit-p-1486746.html?rmmds=category&cur_warehouse=CN



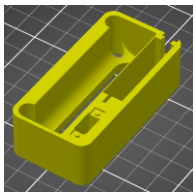
The case

You can easily 3d print the case, the actuators mounting template and the protection cap.

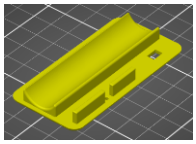
Case bottom



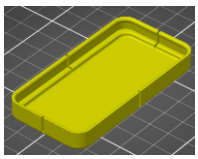
Case main body



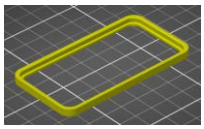
Case top upper



Exciters cap



Exciters mounting template



The STL files can be downloaded from here: https://www.yo3ggx.ro/btaexv1/case.zip

or from my Thingiverse page here: https://www.thingiverse.com/tdanro/designs

Mounting the components

Glue the two exciters to the case bottom. Use the exciters mounting template to keep the exciters ~ 1.5mm outside the case, in order to provide enough space to vibrate. You may need to trim the contacts of the exciter. Take care not to cut the thin wires.

Solder 4 piece of 30AWG wires (~8cm in length) to the exciters and pass two of them through the hole in the case bottom, in order to have all of them on the BT module side. Solder the wires to the BT module (L+, L-, R+, R-). Connect the + of the Li-Ion battery to the SW1 switch. Connect the other contact of the SW1 switch to the VBAT contact of the BT module. Connect the – of the Li-Ion battery to the GND contact of the BT module. This is all.

Before mounting the top of the case, let's do a test. Put the switch in ON position. The blue LED on the BT module will start blinking. From a smartphone search for a Bluetooth device named MH-M38 and do the pairing. Check that you can play from the smartphone to the BT audio exciter. If everything is ok, you can mount the case top.

NOTE: There is no need to glue case parts.

Short video with the device in action: https://www.youtube.com/watch?v=glH1CZMhR9A

Bibliography

M38 module datasheet: https://www.sunrom.com/get/996418
DAEX19SL-4 datasheet: https://www.parts-express.com/pedocs/specs/295-261--dayton-audio-daex19sl-4-specifications.pdf

Document History

Initial version of the document (v1.0).