Ferrofluid Display Speaker Manufacturing Instructions

Version: 1.0
By Paul Miao

Material list

1. FerroAudioAmp PCBA.
2. XY-S100L - 2.1 channel Bluetooth audio power amplifier module high and low bass subwoofer
3. KK-P49/21 - Electric Magnet P49/21 Sucker DC 24V Lifting 40Kg 400N Solenoid Electromagnet
4. Ferrofluid bottle - Glass bottle with saturated salt (NaCl) solution and ferrofluid
5. Speaker pair
6. 24V Led strip
7. Screws
8. 3.5mm jack audio cable
9. 3D Printed Casing parts
10. JST 2.5mm 2 Pin plug and wires

Check BOM.xls for more details.

PCBA

Use the PCB files to generate fabrication files and assembly files. Send these files to you PCB vendor or just send them the original design if you don't know what to do. They will sort it out for you. There isn't many components on this board so if you are good at soldering do it yourself! You will reduce the overall cost by half.

For this *Ferrofluid Display Speaker* project, some components will not be used, so you can decide not to solder them.

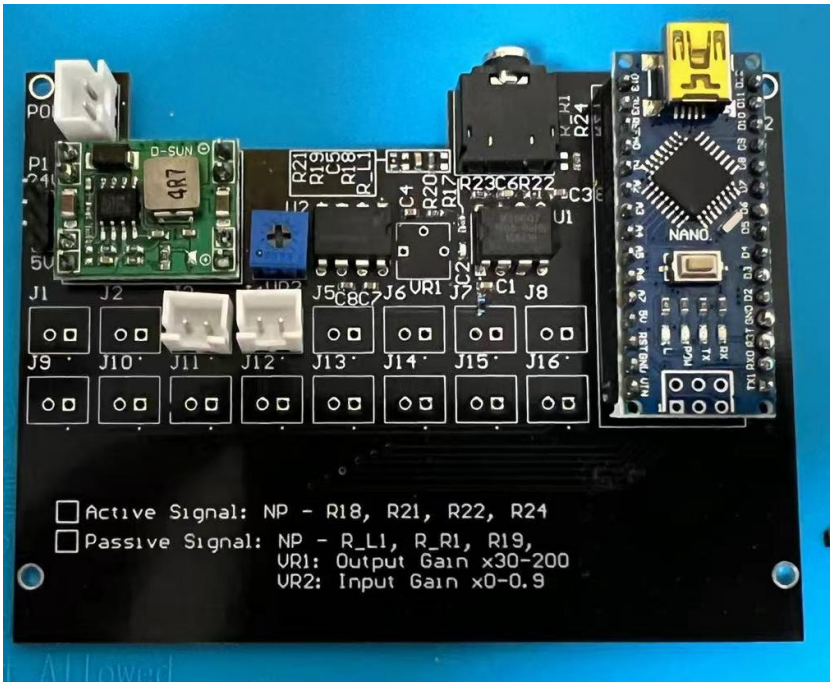

Figure 1 FerroAudioAmp PCBA

The signal for *Ferrofluid Display Speaker* project is a passive signal, do not populate:
R_L1, R_R1, R20

For a basic version, only J2 and J3 are used for controlling. If extra control pins are not needed the following components are not necessary.
R0, R1, R4 – R15
M0, M1, M4 – M15
D0, D1, D4 – D15
J0, J1, J4 – J15

VR1, VR2 and R19 decide sensitive of band analyser IC.
Variable resistor VR1 controls output gain from X30 to X200, R19 provides a constant output gain X50. Only one of them is needed on the board.
Variable resistor VR3 controls input gain from x0 – x0.9.

P1 is used to select output voltage on J0 – J15, in this case 24V output is selected. Short 24V pin and middle pin on P1 connector.

XY-S100L

Assembly XY-S100L with provided parts.
Add heat sink.

Figure 2 Add Heat Sink onto XY-S100L

Stack up PCBAs with spacer, and screws.

Figure 3 Mid-layer

Figure 4 Top-layer FerroAudioAmp PCBA

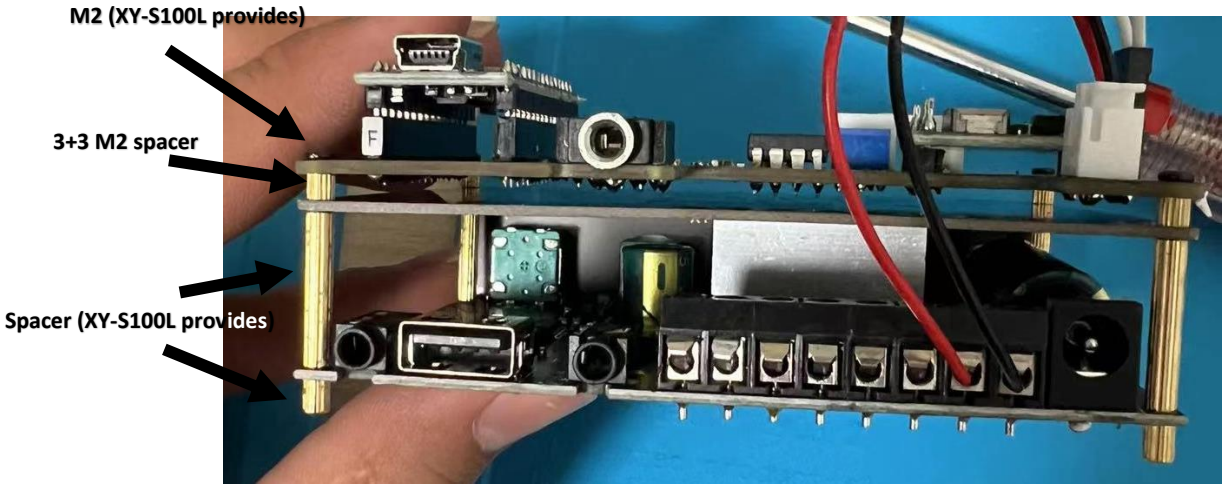

Figure 5 Side View

Plug in audio cable and power wires. Right angle jacks are preferred, and its length should be as short as possible.

Figure 6 Insert Audio Cable and JST 2.5m Power Cable

Electric Magnet and Led strip

Solder JST 2.5mm 2P plug cable onto electric Magnet and led strip.

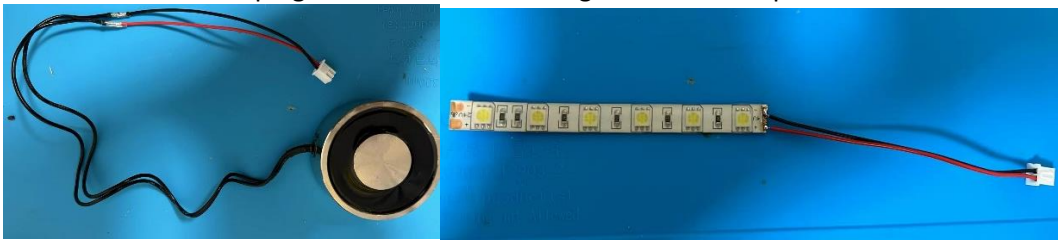

Figure 7 Electric Magnet and Led strip

Stick led strip on the Main Casing (Case1-spk) as the following picture:

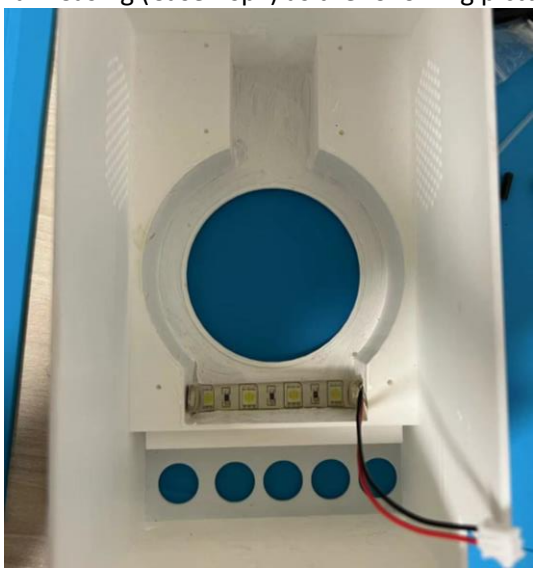

Figure 8 Main Casing and Led Strip

Mont the electric magnet to MagCap as the following picture:

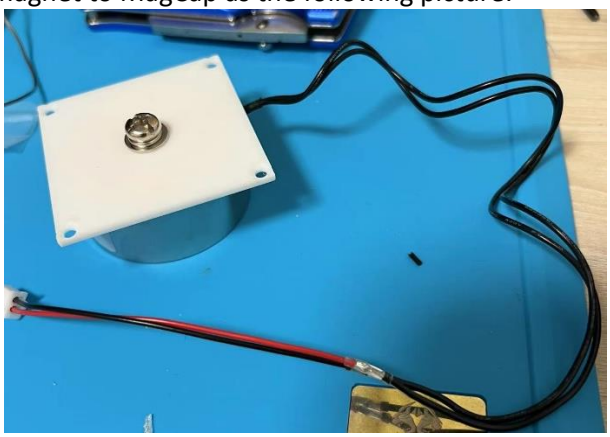

Figure 9 Electric Magnet and MagCap

InnerCap assembly

Stick the MagGapper on InnerCap. If you have a better 3D printer, print them as a whole.

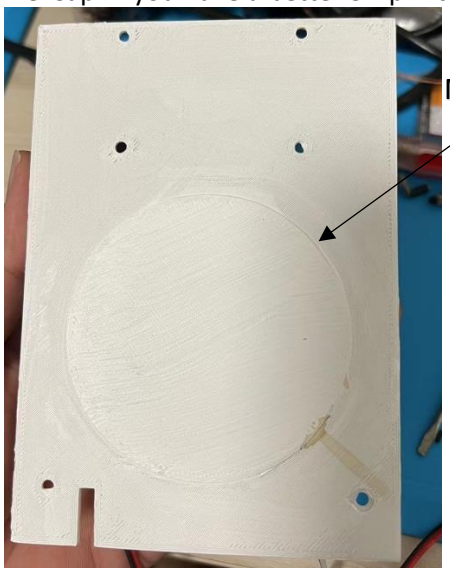

Figure 10 MagGaper and InnerCap

Insert speakers. In this picture, the speaker on the left hand side is the R-speaker, and another one is the L-speaker.

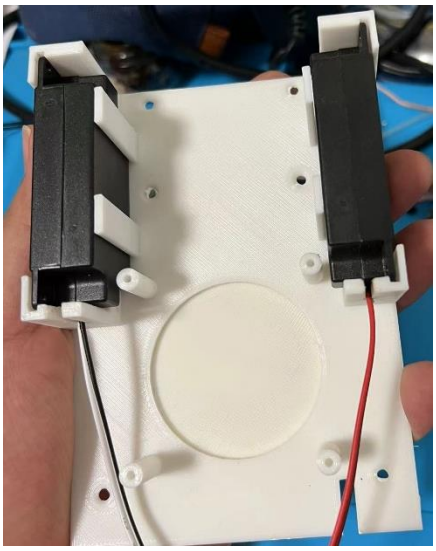

Figure 11 Insert Speakers

Use 4x 4G x 12mm self-tapper screw to mount the electric magnet:

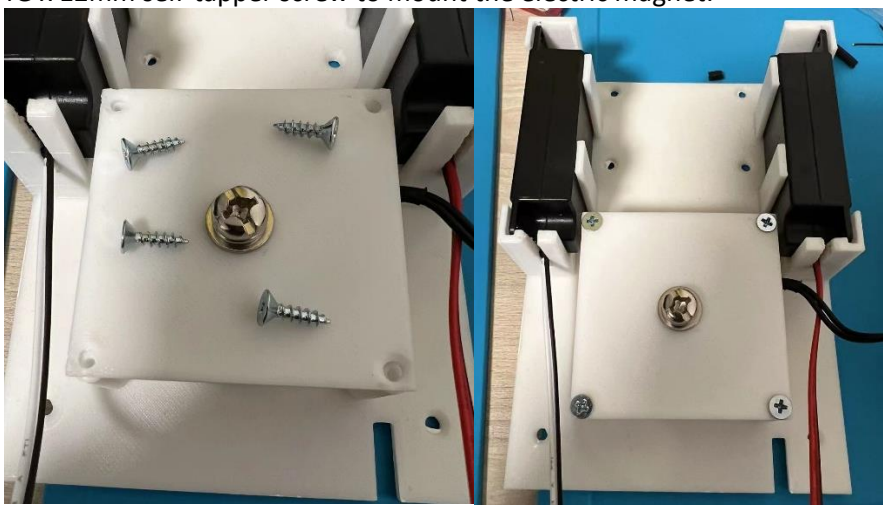

Figure 12 Complete InnerCap

Final Assembly

Insert the Ferrofluid Bottle into the main casing(case1-spk):

Figure 13 Insert Ferrofluid Bottle

Screw the InnerCap onto the main casing by using 6pcs 4G x 12mm self-tapper screw.

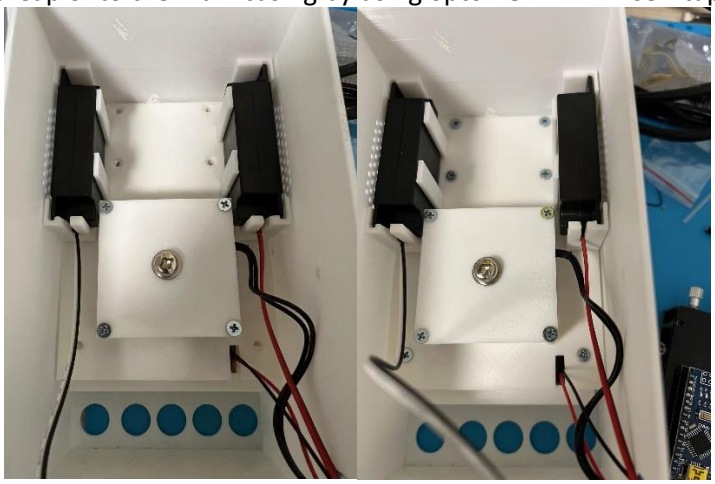

Figure 14 Complete InnerCap and Main Casing

Insert the XY-S100L module and its bottom layer board into the main casing and then connect the speakers, electric magnet, and led strip to the XY-S100L module (The electric magnet connects to J2 and the led strip connects to J3). Screw the module and the main casing together with 4x M2 x 6mm screws:

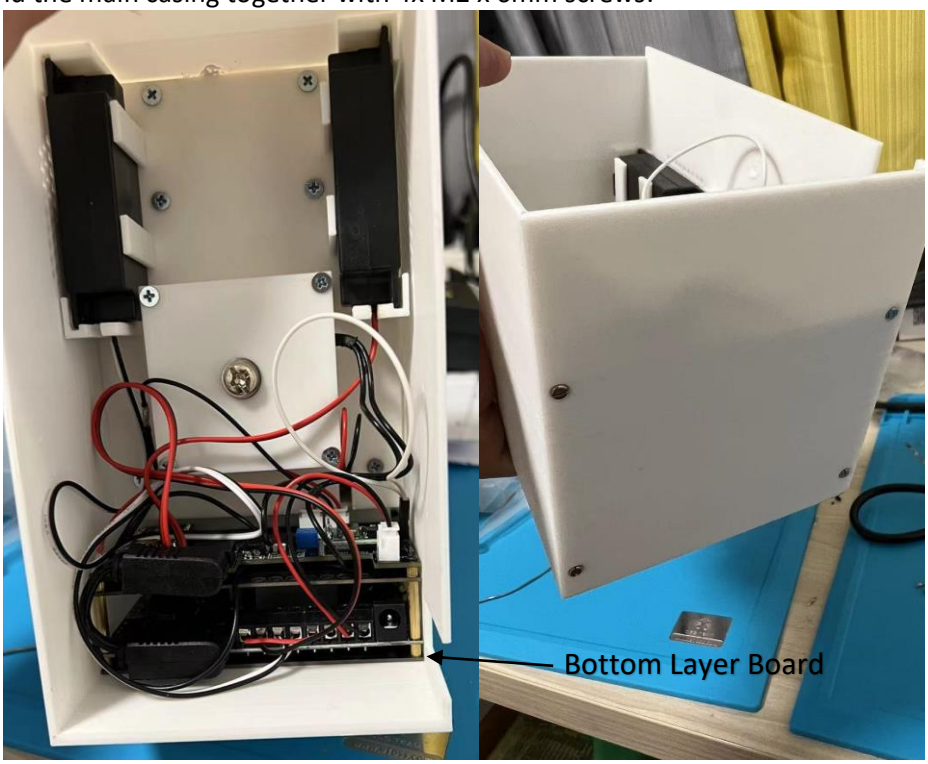

Figure 15 PCBAs and Main Casing

Install rotatory button caps at the front and complete the enclosure

Figure 16 Install Rotatory Button Caps

Figure 17 Insert Back Casing (Case2-spk)

This is the end of Ferrofluid Display Speaker Manufacturing Instructions