

make your own portable sound system

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Making a DIY Portable Sound System

by echo-loco

Chants can be boring. Personally, I hate 90% of all chants out there. They get old fast and they can be... shall we say... uninspiring. Good music, on the other hand, can bring up the spirits of a crowd, send the message you want in a creative way, and otherwise keep people moving at a demonstration. Of course, portable sound systems have unlimited applications, you might just be looking to start a good street party, or just have a decent sound system that is easy to set up in your backyard!

The problem with traditional protest music systems is that they tend to be car-mounted, bicycle-pulled, or on some kind of wagon. These can be great systems, but they're easily disrupted by police and other people who don't appreciate the rhythm you're providing the crowd. So when I saw this awesome water-jug-mounted system in Toronto, used by anti-Mining and No One Is Illegal activists, I was excited. It's light, loud, compact, somewhat weatherproof, and very mobile as it just hangs from your shoulder.

The main stumbling block most people have to DIY projects like this one is confidence. Almost a year after seeing the system in Toronto, I did cursory study of electronics in college, and finally got enough confidence to build this thing. Once the materials were acquired, it only took a day. And except for a few fancy things that are easily learnable or have good alternatives for the less electronically-inclined – like soldering and testing polarity on battery leads – the process was very simple and straightforward. So my advice is, if you're interested but think you are unskilled, don't worry! Get your friends together and go for it!

DIY Portable Sound System (contd.)

Materials:

- 5 gallon water jug (\$14 at Wal-Mart, but these can also be found for free.)
- 12v (or better yet, 14.4v) cordless drill (broken or disposable) with at least two click-in batteries and charger (\$50 for 12v Ryobi with two batteries and charger at Home Depot. Ask around.)
- 12v adapter with cable (check the transformer for voltage; these are everywhere in chargers etc.)
- TA 2020 Amp Chipset (I got mine off eBay from user "yourschoices" for \$20, the TA2020 PCB model with red/white inputs, 12v power, 25 watt per channel kind. It's unlikely that you'll find this locally.)
- Minimum 25w car-style speaker(s) with 4-ohm impedance (\$40 for two 80w speakers at Factory Direct. Check scrapyards.)
- RCA (red/white) to mini (headphone jack) cable
- Shoulder strap (e.g. cut-off from old purse)
- Duct tape
- Electrical tape

Tools:

- Permanent marker
- Measuring tape
- Small (electronics) Phillips screwdriver
- Hacksaw
- Jigsaw
- Drill
- 1/8" drill bit
- Exacto-knife
- Electronic Soldering Iron and Solder*
- Wire strippers*
- Needle-nosed pliers*
- DC voltmeter (or Multimeter)*

* These tools are ideal but not necessary.

DIY Portable Sound System Walkthrough

1. Acquire all your materials. The more time you have, the better. You can look on FreeCycle, Kijiji, check with friends etc. and get your materials much cheaper this way. Decide: Do you want to build your sound system with one speaker or two? You'll get twice the power with two, but also twice the weight and speaker cost. Remember, 4-ohm car-style speakers will give you the most bang for your buck!

Safety: Even 12V of electricity can harm you, so remove the drill battery while you are working on your sound system.

2. Open drill: Take your sacrificial drill, and remove the screws to open it up if they are accessible. Most cordless drills have three basic sections: 1) the battery, which is connected to (2) the trigger, which is connected to (3) the motor. (Figure 1) Cut your wires off between the battery and the trigger, just below where the wires attach to the trigger. Remove the trigger and motor. If you can't open your drill, don't worry. Just remove the battery and proceed to step 3.

3. Cut drill: With a hacksaw, cut the drill off at or just below the trigger. Push the battery wires down into the drill so you don't cut through them. Afterwards it should look like Figure 2.

4. Prepare wires: Cut your 12v adapter off at the transformer (black box). Splice a few inches into two individual wires at the cut-off end with an exacto-knife. With wire strippers/knife, strip an inch off each wire end and the battery leads (Figure 3).

5. Identify wires: One of your 12v adapter wires will be marked in some way, whether with writing, hashes, dots, etc. The marked wire is your negative (black) wire. The unmarked wire is your positive (red) wire. If you cannot decipher what's what, you can use a continuity tester; the negative wire-end will be continuous with the outside shell of the adapter, and the positive wire-end will be continuous with the inside of the adapter (Figure 4). As a last resort, you can do trial-and-error. Twist the positive battery and 12v adapter wires together, and do the same with negative wires. Plug your adapter into the TA2020 Chipset and if a red LED comes on, you're good to go. If it doesn't come on, reverse the adapter wires and see if that works.

6. Connect wires: If you have a soldering iron and solder, solder the negative (black) battery lead to the negative (black) adapter wire. Repeat with positive wires. Alternatively, you could connect your 12v adapter wire directly to the battery clips. Your battery might be marked with a +/- to indicate polarity, otherwise use trial and error. If you don't have solder, you can use a bit of busbar to connect the wires, ensuring that the busbar is rated for your size wire (probably 18 AWG). You could also try using small wire caps (marrettes) from the hardware store to connect the wires. Worst case scenario, you can twist them together and tape your joint with electrical tape, but I don't recommend this. However you connect your wires, tape the connection thoroughly with electrical tape.

7. Test circuitry: Plug your adapter into the chipset. Plug your RCA (red/white) adapter into the chipset and the other mini end into an mp3 player or equivalent. Strip speaker wires, attach one set of ends to left (L) positive (+) and minus (-) on the chipset, and the other to the corresponding inputs on your speaker. Turn the volume knob up and click in your drill battery. Hit play on your player and it should work. Play with the volume to make sure it plays clean, loud music. If there is a lot of static one of your connections could be loose; check and tighten.

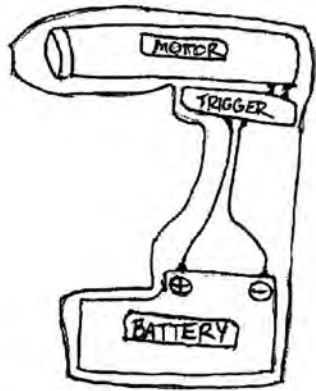


Fig. 1

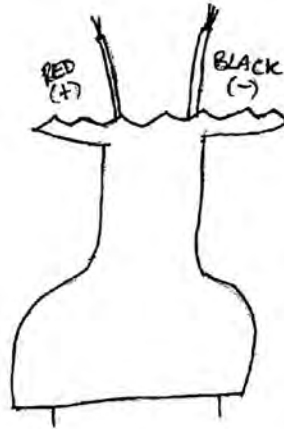


Fig. 2

8. Decorate: If you want to paint your water jug, now would be the right time (before you set equipment into it and cut your holes).

Safety: Always use protective eyewear when operating a jigsaw.

9. Cut access hatch: Now that your system works, you just need to house it in your water jug. Cut a hole in the side of the jug large enough to get your hand comfortable inside the bottle. You'll be using the hole to hold your speaker while mounting it, and taping your chipset into the bottle so don't be shy with how big it is. Keep the piece you cut out.

10. Cut hole for speaker: If your speaker came with a cardboard template and/or instructions, great! If not, try looking them up online with the speaker model. If you're shit out of luck, measure the inside dimensions of your speaker; that is, just inside where the outer mounting screw are. Basically, your speaker is going to be inside the base of your jug, blasting out through the hole you cut, but you need plastic where the mounting screws are positioned so they have something to screw through. In this case, err on the side of a smaller hole and enlarge if necessary. Draw an outline for your cut. Remember, measure twice and cut once!!! (Figure 5) Carefully cut along your outline with a jigsaw.

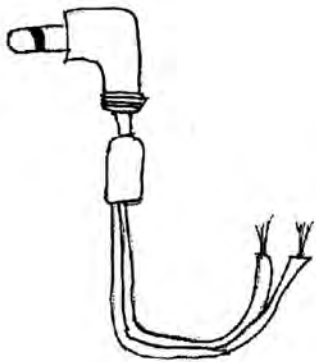


Fig. 3

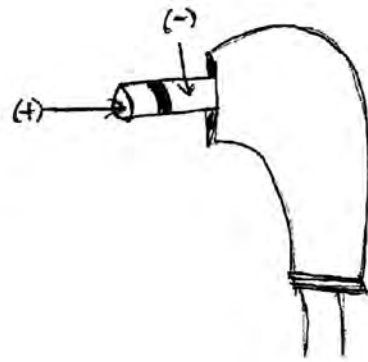


Fig. 4



Fig.5

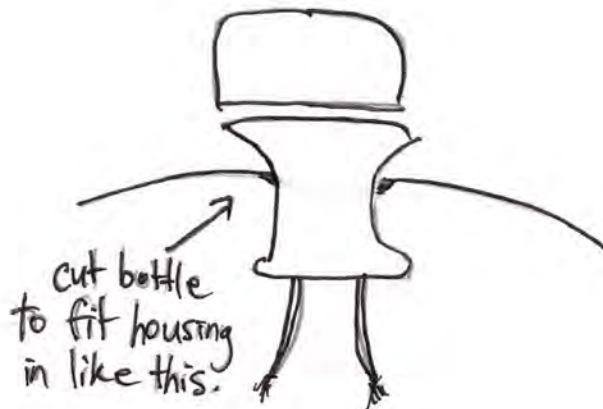


Fig.6

II. Mount speaker: Remove the plastic cover from your speaker. Drop the speaker through your hole, into the bottle, and line it up with the base of your jug, so you can see mounting holes through plastic. Use a template or cover to mark holes for mounting. Drill out your holes with an 1/8" drill bit (or whatever size it right for your mounting screws). Place the speaker cover on the outside of the jug, and with mounting screws or bolts attach your cover to the speaker inside the jug, creating a tight fit. This might take a few tries, since the base of your jug might not be perfectly flat, but you'll get it! If you've decided to set two speakers into your system, repeat steps 10 and 11 for your second speaker.

Congratulations, the hardest part is over!!!

12. Mount drill base: See Figure 6 for how this should look. Basically, your drill base should sit battery-end out in a hole cut into the side of your jug small enough that the battery-end won't fall into the jug. The opposite problem, the wiring-end of the drill base falling out of the jug, can be dealt with in a number of ways. I just duct-taped the shit out of it both inside and outside of the jug, and positioned it so that the battery sits on top of the jug when I'm carrying it on a strap.

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13. House circuitry: Finally, you can plug in all your circuitry (leave the battery out). Pop your line-in side of the RCA cable out the jug, or through the cap, or however so you can plug an mp3 player in from the outside. You could get fancy-shmancy and set an audio jack into the outside wall of the jug; good for you! You could also use caulking that bonds to plastic and caulk any seams to make your system more water resistant! Turn the volume knob on the chipset to max (control volume with your mp3 player), and test it! If it seems good, wrap the chipset in foam, bubble wrap or equivalent and tape it with duct tape to the side of the jug (ideally the bottom of the jug when you carry it). I also tie-wrapped and taped all the wires to the jug, just so they don't bounce around. Give it a shake to see if anything's loose.

14. Replace Hatch: Take the hatch piece you cut out, and tape it back to the bottle. Use lots of tape but not excessive amounts, since you may want to re-open this hatch to fix your circuit if anything happens.

15. Strap: Attach your strap to the handle of the jug, or however you like, and sling it over your shoulder to adjust so it's comfortable.

16. Bask in triumph.

17. Alert your local radical community that they have a new asset at their disposal, and share these instructions (and any improvements) with your friends and allies!

**I would love it if you sent
questions, comments,
pictures, ideas for
improvement, etc. to me by
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