THE WORLD'S THINNEST BOOMBOX
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QUICK START

To turn on the boombox, slide the on/off switch on the backside of the
PCB to the right. You should hear a small "pop" sound from the piezo
speaker elements as the audio drivers are enabled. This is a good
thing. You should see the green LED on the Raspberry Pi flicker with
activity as the system operates. Keep body parts away from the
capacitive touch buttons during power-up as they are calibrated during
this stage.

Once the boombox is completely initialized, which takes ~30 seconds,
it will automatically resume playback. If the track playback was
stopped before power down, the track will automatically start playing
from the beginning. If the track playback was paused before power
down, the track will automatically continue playing from the location
of the paused track. The boombox will save its state, including volume
setting, when properly powered down. The playback is set to repeat all
tracks in the playlist automatically.

To turn off the boombox, slide the on/off switch on the backside of
the PCB to the left. You will see the green LED on the Raspberry Pi
flicker with activity and eventually turn off. This takes ~5 seconds.
When the LED is off, the boombox has properly powered down.

CASSETTE TAPE

Besides the on/off switch, the included cassette tape can be used to
turn on and off the boombox. The tape has been modified with magnets —
two in the corners to hold the tape into place through the PCB and one
in the center, which will trigger the reed switch on the back of the
PCB. Only one side will properly "stick" to the boombox thanks to the
magic of magnetism — this will vary depending on the tape manufacturer
and style.

If you plan to use the cassette tape, ensure the on/off switch is set
to off (left). When you attach the tape to the front side, you may
need to adjust it slightly in order for the center magnet to trigger

the reed switch. To turn off the boombox, simply remove the tape.

If you want to have the tape in place solely for aesthetics and use the on/off switch on the back of the PCB to turn the boom box on/off, then you can either remove the center magnet from the cassette tape (unscrew it and remove the magnet, which is stuck to the tape housing with an adhesive dot) or remove the reed switch from the back of the PCB.

BATTERY

The boombox uses an off-the-shelf, rechargeable Lithium-Polymer battery pack. It provides 5V @ 2A maximum output with a 5000mAh capacity. At maximum volume, the boombox can draw over 1.5A. In theory, this means the battery can provide ~3 hours of use. When the boombox is on but not actively playing music, the current consumption is ~400mA. In theory, this means the battery can provide ~12 hours of idle. When the boombox is turned off, the current draw is negligible but may eventually discharge the battery.

The USB type A connector on the battery provides power to the boombox via a short USB cable. The microUSB side of the cable has been shaved down in order to be flush to the board and connect to the microUSB connector on the boombox without stressing the connector.

The battery is charged using an Apple iPhone Lightning cable, which plugs into the top slot of the battery closest to the boombox's PCB frame. When the battery is charging, a series of white LEDs on the edge of the battery will indicate its current charging state (all four LEDs will be solid white when the battery is fully charged). For fastest charging, the short USB cable providing power to the boombox should be disconnected from the battery.

To prevent discharge of the battery when the boombox isn't in use (or during shipping, storage, etc.), disconnect the short USB cable from the battery. If the boombox presents any strange behavior (hanging, rebooting during music playback), charge the battery.

MUSIC PLAYBACK

The boombox's music is controlled by Mopidy, a standalone music server running on the Raspberry Pi (https://mopidy.com/).

Mopidy can be controlled in multiple ways:

1) The boombox's capacitive touch sensors

On the front side of the boombox underneath the tape slot, you will see 6 graphical "buttons" stylized to look like the buttons of an original boombox. From left to right, they are:

– Volume down
– Track back
– Play/pause
– Stop
– Track forward
– Volume up

Simply touch and release the desired button. A green LED will illuminate above the button indicating that the button press was properly detected and the boombox will perform the designed function.

2) Mopidy's web server

Mopidy allows multiple methods of remote/network control. The main server is accessible at port 6680 of the boombox's IP address (e.g., http://192.168.1.78:6680).

Two web clients are enabled on the boombox:

– Iris (e.g., http://192.168.1.78:6680/iris/): Intended for browser-based control from a desktop computer using an iTunes-like GUI
– Mobile (e.g., http://192.168.1.78:6680/mobile/): Intended for browser-based control from a mobile phone using a simplified GUI interface

In order to control Mopidy over the network, you must ensure that the boombox is properly connected to the same network as your controlling device (see the WiFi Access section).

WIFI ACCESS

Network connectivity is required to control the boombox (besides using the capacitive touch sensors), to configure the boombox software on the Raspberry Pi, and as an optional method to load songs onto the boombox.

Because the boombox is headless (e.g., there is no display or GUI available), changing the WiFi network requires creating a file on the microSD card that will be automatically loaded on reboot of the Raspberry Pi. To do this, you will need to remove the microSD card from the Raspberry Pi and insert it into your computer. You can follow the official Raspberry Pi instructions here:

https://www.raspberrypi.com/documentation/computers/
configuration.html#configuring-networking29

An example wpa_supplicant.conf file is as follows:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=US

network={
 ssid="Name of your wireless LAN inside the quotes"
 psk="Password for your wireless LAN inside the quotes"
}
```

Once the file is properly created, eject the microSD card from your
computer and place it back into the boombox. When you power up the
system for the first time with this new file, the boombox may take up
to 5 minutes to connect to the network. The network settings will
persist through reboots, so you will only need to create a
wpa_supplicant.conf file if you are changing networks.

The boombox should be accessible through the boombox.local address or
you can use nmap (e.g., sudo nmap -sn 192.168.1.0/24) or look in your
router logs to determine the actual IP address (e.g., 192.168.1.78).
The user name is "pi" and the password is "raspberry". If you're
unable to detect the boombox on the network, check your configuration
settings in the wpa_supplicant.conf and try again.

Once the boombox is properly connected to the network, you can then
connect to it via ssh for shell/console access (e.g., ssh
pi@boombox.local or ssh pi@192.168.1.78), copy new music onto the
boombox (see Loading New Music section), or control music playback
remotely (see Music Playback section).

There are no network security features configured on the boombox. It's
recommended that you connect the boombox only to a local, private
network (such as your home network or tethering to your phone) and not
a public one.

LOADING NEW MUSIC

The boombox is currently configured to play music from local storage,
which is the Raspberry Pi's microSD card. All music should be loaded

into the /home/pi/Music folder. This can be done over the network via scp/ftp (e.g., scp song.mp3 pi@192.168.1.78:Music/) or inserting the microSD card into a Linux system and accessing the folder directly. The microSD card uses an ext4 journaling file system.

Once music is loaded into the folder, you'll need to have Mopidy rescan the Raspberry Pi to collect the new tracks. This can be done through the Mopidy's web server/GUI (see the Music Playback section) or by typing "sudo mopidyctl local scan" from the shell/console.

Mopidy also supports music playback from Spotify playlists, podcasts, or other Internet streaming services, but those features are not implemented in this version.

END OF FILE