

Here's ANOTHER handheld Pi game console! It was designed to use the Pi Zero and fit smaller printers (80x104mm) whilst still being simple to put together (no soldering a bunch of wires straight to the Pi, just the header). The front and back are completely separate until you close the case, so you can work on one half at a time and keep everything neat inside.

This build pretty much follows the Adafruit PiGRRRL Pocket one, but the image doesn't work on the Pi Zero (for me anyway) so you'll have to manually set up the screen and buttons after installing a RetroPie image for the Pi Zero. This build does not have any audio.

In addition, the controller button layout is different to better fit the case and make it a bit nicer to use. I placed the LR shoulder buttons on the sides rather than the front so that it's easier to press them without needing to take your thumbs off the D-pad or face buttons. This was easily done using the GPIO pads on the screen (like the PiGRRRL), but attaching them with wires instead of directly to the board.

Bill of Materials:

- Breadboard-friendly SPDT Slide Switch <https://www.adafruit.com/products/805>
- Tactile Button switch (6mm) x 20 pack <https://www.adafruit.com/products/367>
- Tactile Switch Buttons (6mm slim) x 20 pack <https://www.adafruit.com/products/1489>
- PowerBoost 1000 Charger - Rechargeable 5V Lipo USB Boost @ 1A - 1000C <https://www.adafruit.com/products/2465>
- Adafruit PiTFT 2.4" HAT Mini Kit - 320x240 TFT Touchscreen <https://www.adafruit.com/products/2455>
- JST 2-pin cable <https://www.adafruit.com/products/261>
- GPIO Ribbon Cable for Raspberry Pi Model A and B - 26 pin <https://www.adafruit.com/products/862>
- Adafruit Perma-Proto Half-sized Breadboard PCB – Single <https://www.adafruit.com/products/1609>
- Lithium Ion Polymer Battery - 3.7v 2500mAh <https://www.adafruit.com/products/328> (Adafruit were out of stock so I got this one instead http://www.ebay.co.uk/itm/262064902439?_trksid=p2057872.m2749.l2649&ssPageName=STRK%3AMEBIDX%3AIT) the dimensions of the battery I used are 58x49mm.
- M3x8mm countersunk machine screws x 13
- USB micro plug (cannibalise a charge lead from something)

The image can be found here <http://blog.petrockblock.com/retropie/retropie-downloads/retropie-image-for-raspberry-pi-1/>

To get the screen working you can follow the Adafruit guide here:

<https://learn.adafruit.com/running-opengl-based-games-and-emulators-on-adafruit-pitft-displays/>

Whilst using the settings from the PiGRRRL Pocket guide here:

<https://learn.adafruit.com/pocket-pigrrl/software>

Then you'll need to install retrogame, a guide can be found here under "Adafruit Retrogame Setup" here:

<https://learn.adafruit.com/super-game-pi/initial-setup>

Here's my retrogame.c setup:

```
ioStandard[] = {
    // This pin/key table is used when the PiTFT isn't found
    // (using HDMI or composite instead), as with our original
    // retro gaming guide.
    // Input  Output (from /usr/include/linux/input.h)
    { 4,  KEY_LEFT  }, // Joystick (4 pins)
    { 17, KEY_RIGHT },
    { 18, KEY_UP   },
    { 27, KEY_DOWN },
    { 22, KEY_LEFTCTRL }, // A/Fire/jump/primary
    { 23, KEY_LEFTALT  }, // B/Bomb/secondary
    { 2,  KEY_X  }, //X BUTTON
    { 3,  KEY_Z  }, //Y BUTTON
    { 6,  KEY_A  }, //L SHOULDER
    { 12, KEY_S  }, //R SHOULDER
    { 5,  KEY_ESC }, //EXIT ROM
    { 13, KEY_ENTER }, // START
    { 16, KEY_SPACE }, // PAUSE/SELECT
    // For credit/start/etc., use USB keyboard or add more buttons.
    { -1, -1      } }; // END OF LIST, DO NOT CHANGE
```

I made the extra button on the front into a shutdown button using the guide here:

https://www.element14.com/community/docs/DOC-78055/1/adding-a-shutdown-button-to-the-raspberry-pi-b#jive_content_id_Step_2_Connecting_the_button

The script there uses GPIO 18, you'll want to use GPIO 5 instead, like this (if you copy the script from here into the editor you might get an indent error, each line has to start at the beginning of the line without any spaces before them EXCEPT line 16 and 23 which do need indents):

1. #!/bin/python
2. # Simple script for shutting down the raspberry Pi at the press of a button.
3. # by Inderpreet Singh
- 4.
5. import RPi.GPIO as GPIO
6. import time
7. import os
- 8.

```

9. # Use the Broadcom SOC Pin numbers
10. # Setup the Pin with Internal pullups enabled and PIN in reading mode.
11. GPIO.setmode(GPIO.BCM)
12. GPIO.setup(5, GPIO.IN, pull_up_down = GPIO.PUD_UP)
13.
14. # Our function on what to do when the button is pressed
15. def Shutdown(channel):
16.     os.system("sudo shutdown -h now")
17.
18. # Add our function to execute when the button pressed event happens
19. GPIO.add_event_detect(5, GPIO.FALLING, callback = Shutdown, bouncetime = 2000)
20.
21. # Now wait!
22. while 1:
23.     time.sleep(1)

```

Notes:

This video guide was super helpful for getting to grips with setting up the Pi:

<https://youtu.be/ySoTQhQgZdl>

I used a Pi2 to set up my SD card because I didn't have a Wifi dongle or powered USB hub to hand. I also used an Xbox 360 controller to check I had things working; this later caused a problem where RetroPie used my retrogame buttons for the menus, but wouldn't use them for ROMs. If you have this problem too, find the joypads folder at /opt/retropie/configs/all/retroarch-joypads and delete the file there for the Xbox controller (or any other controller you used).

The space key in the Gameboy Advance emulator makes the game run at twice the speed. This could be a problem since the Select button is also mapped to the space key. To change this you'll need to edit the retrogame.c file to use some other button (KEY_D for example), and then compile it again. Then edit the retroarch.cfg file to use the key you changed it to.

If you're going to emulate MAME or Neogeo etc, you might want to change the default emulator to libretro because it'll map all the keys correctly without you needing to change them manually. Enter:

```
sudo nano /opt/retropie/configs/neogeo/emulators.cfg
```

And change the line that says default to "default="lr-fba"

Then put all your roms in the neogeo folder

You can install new themes through the retropie_setup.sh shell under SETUP / CONFIGURATION then "Install themes for Emulation Station". The readily available themes can be seen here <https://github.com/RetroPie/RetroPie-Setup/wiki/themes> once installed you can change the theme on the Pi by pressing START, selecting UI SETTINGS and scrolling down to THEME SET.

The emulation station START menu has an option called SCRAPER, this will find metadata for your games so your games have cover artwork and other info if you have the patience to select each one (they can be added automatically if you turn off "user decides on conflicts" but it's not always accurate).

I'll try to answer any questions you have, but I only learnt what was needed to get mine working, hopefully you won't have any problems.