



Game Grrl

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<https://learn.adafruit.com/game-grrl>

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Overview

So there I was...

Working on my thesis...when I really just wanted to play some Arkanoid. Unfortunately, my original NES was busted a long time ago (blinky), and furthermore I didnt even have a TV. Lucky for me I had a couple things kicking around my workbench that did the trick. This is a design for a very simple, very inexpensive portable Nintendo gaming system with built in games. Theres no provision for cartridges, but its comfy to play.



Specifications

- Screen: 2.5" with CCFL backlight
- Audio: Headphone/line out
- Games: "75million!" more like 50
- Controller: original NES
- Cost: Under \$75
- Case: Handheld, easy to work with, built-in battery compartment

- Construction Time: 10 hours, perhaps less if you dont have to reverse engineer everything
- Power: 4 x AA batteries (rechargeable or alkaline)
- Play time: 12hrs on alkaline, 6-8hr on NiMH

Make

Parts

These are the required components:



"Power Player III"/"Mega Joy III" 'nintendo on a chip' game controller. Search on google for a seller, sometimes they're available in malls. Completely pirate, but so much fun! Should run \$25 with shipping.



"Hip Gear Screen Pad" or "Intec Screen Pad", these have been recently discontinued but are still available at ToysRUs and similar places for about \$25-\$40.

Now-adays I'd actually suggest going with one of the NTSC displays we have in the Adafruit shop as they have a true LED backlight which is thinner and uses a LOT less power



PacTec HP-4AA enclosure, which happens to fit everything just about perfectly. Available in ivory or black, sold by [Mouser](#) as well. \$6



NES controller. Available everywhere for like, \$5 or less. Or look through your stuff, you probably have one in that keyboard box.

Tools

- Soldering iron. Nothin' fancy. Also, solder, solder sucker, heatshrink, wire, etc.
- Hot glue gun & sticks
- Superglue
- Drill press/drill/dremel...something to cut the ABS plastic case.

Step by step

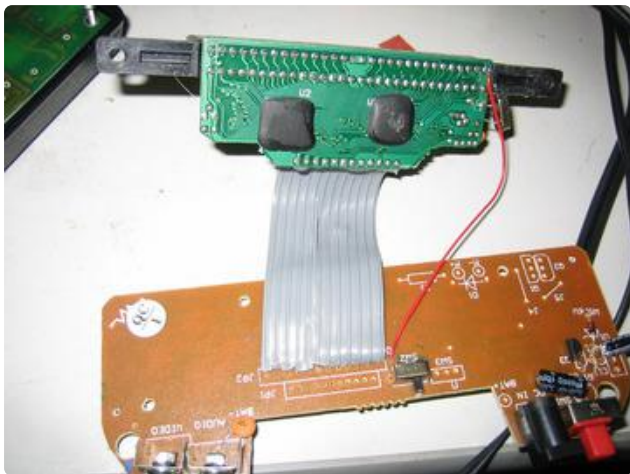
These instructions are a little rag-tag...there might be minor steps that are missing or incomplete descriptions. Hopefully they are still useful to someone.



Check out the case, put in the metal bits for the batteries.



Disassemble the 'HIP Screen Pad,' take out the screen (unplug the connector) and verify that it fits right above the battery compartment. The screw holes should line up. You might have to notch the pcb a little to let the HV (white & pink) wires around.



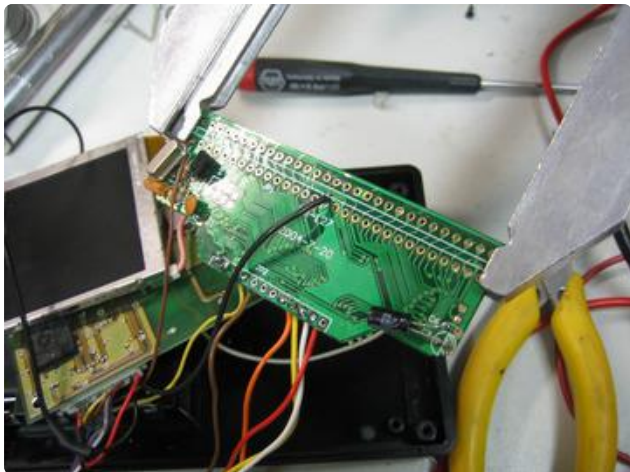
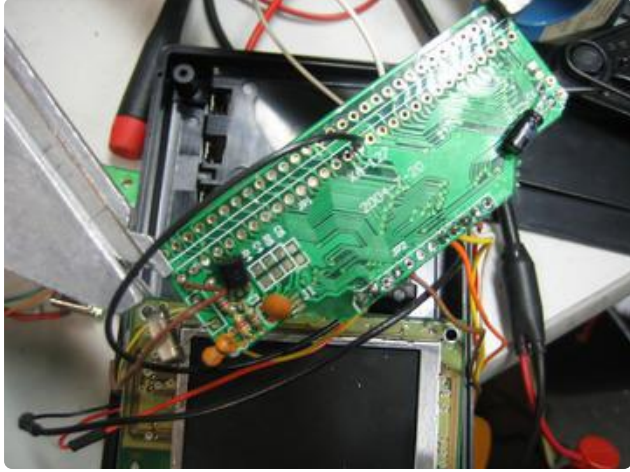
Disassemble the Megajoy.



Desolder the Famicom connector. Also desolder the ribbon cable. In order, the pinout of the bottom cable is (left to right as shown):

1. Controller #2 something
2. Controller #1 clock
3. +5V to controllers
4. C#1 data
5. Controllers #1&2 latch
6. Controller #2 something
7. Controller #2 something
8. Reset (pull low to reset)
9. Ground
10. Audio out
11. Video out
12. +5V in for nintendo

Connect the MegaJoy to the LCD. The LCD connect wiring is (according to my notes):



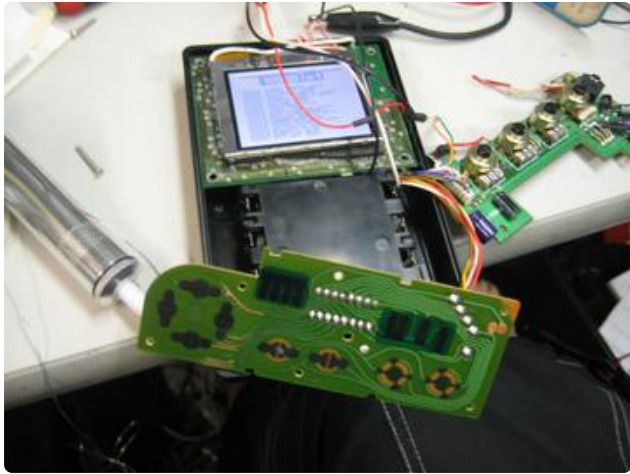
1. N/C
2. Adjust ground (grey)
3. common with 2 (grey)
4. common with 2 (grey)
5. N/C
6. N/C
7. Brightness adjust (blue)
8. Contrast adjust (yellow)
9. Color adjust (white)
10. Adjust power +5V (purple)
11. Composite video in (yellow)
12. Video ground (brown)
13. N/C
14. Power ground (black)
15. Power (red)

(if there's a grey ribbon cable, see this [diagram \(\)](#), courtesy of [bquach \(\)](#))

For now, don't disconnect the adjusts (#1-10). Connect power ground to video ground to the megajoy ground. Connect lcd power to megajoy power and provide 6V (4xAA). Solder video in to the video out pin.

I also connected the original NES pad as shown. Note that there are a few ground pins on the famicom connector so you can use them as ground solderpoints.

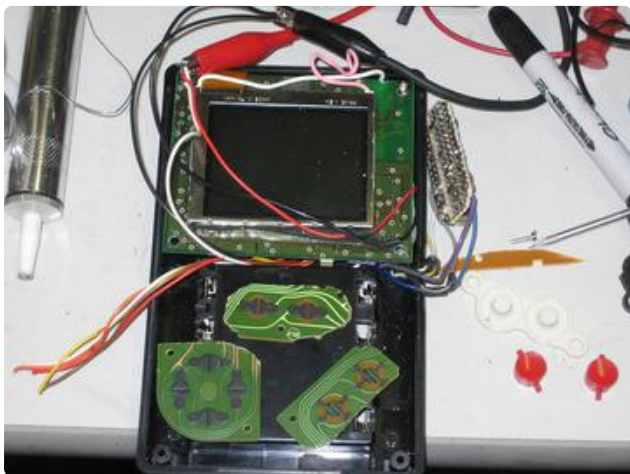
The megajoy got taped to the case behind the screen. Turn it on. Should work :)



Note heatshrink on wires extended from the LCD.

I made a small version of the LCD adjust board but if I recall correctly, you just cut it off completely and the screen defaults to a nice setting.

(In case you want to make your own adjust board: Contrast is purple->2k->10K pot -> 2K -> grey. Brightness is purple -> 2K -> 10K pot -> grey. Color is purple -> 5.1K -> 10K pot -> 1K -> grey. A [diagram \(\)](#) is available courtesy of [bquach \(\)](#). [Mine looks like this \(\)](#).)



Cut up the nintendo controller for the valuable buttons, elastomers and pads. Scratch off some of the overlay so that you can solder to it.



Arrange the buttons as desired.



Cut out the holes for the controller.



Cut out the hole for the LCD (drill and then file? Whatever works for you).



(Not shown: Take the original controller for the megajoy and solder the pads from the NES controller to the epoxy'd chip in the middle. My notes claim that the pinout for the chip is as follows: (clockwise from 1 o'clock: select, start, B, turbo, A, ground, +6V (triangular trace), white/clock, yellow/ data, orange/latch, left, up, gnd, right, down. I'd double check this visually, as I might have a mistake about the directional buttons. Basically a button press should short that signal line to ground.

Use superglue to tack the elastomers in the right spot. Put the buttons on top, hot glue the shards, place the case top and kinda push around the buttons until they are in the right place. Wait for the hot glue to dry.



Almost done! Make sure that all the power wires (LCD power, Megajoy power, controller power) all connect to the positive battery terminal. All grounds should eventually connect to the negative battery terminal.



Add batteries. If you feel like it, add a power switch of some sort (disconnects the batteries from the circuitry).



Now would be a bad time to drop one of the buttons under the table. (Found it eventually)

Extra stuff

I eventually added a headphone jack. You can use the audio amp chip in the megajoy and some sort of volume knob...

Resources

Other portables

- [Nestable \(\)](#)
A collection of links and information about NES portables (including a design for a somewhat chunky NES portable)
- [Portables of Doom \(\)](#)
A clearing house of information about building all sorts of portables. Currently AWOL.
- [Ben Heckendorn's site \(\)](#)
A pioneer in building portablized games, includes an [instructional book \(\)](#) on portable building (available for purchase now!), a forum, and lots of info.

Gallery & Other fine toys

Share & Enjoy

Here are some people's finished projects...if you made something using the instructions/information on this page, post it to the [forums \(\)](#) & I'll put up your pix.

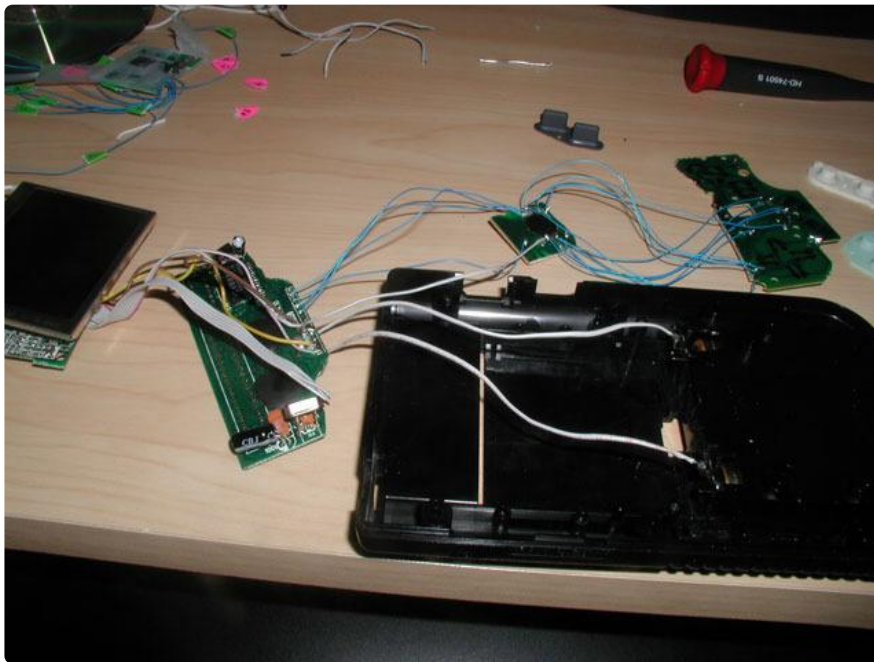
Mega Joy Boy

No, no, not that new bar down in the Castro...its All4Sky's portable nintendo. He used the same sorts of components in the GameGrrl but put it in a cool black GameBoy case. Wish I had thought of it!

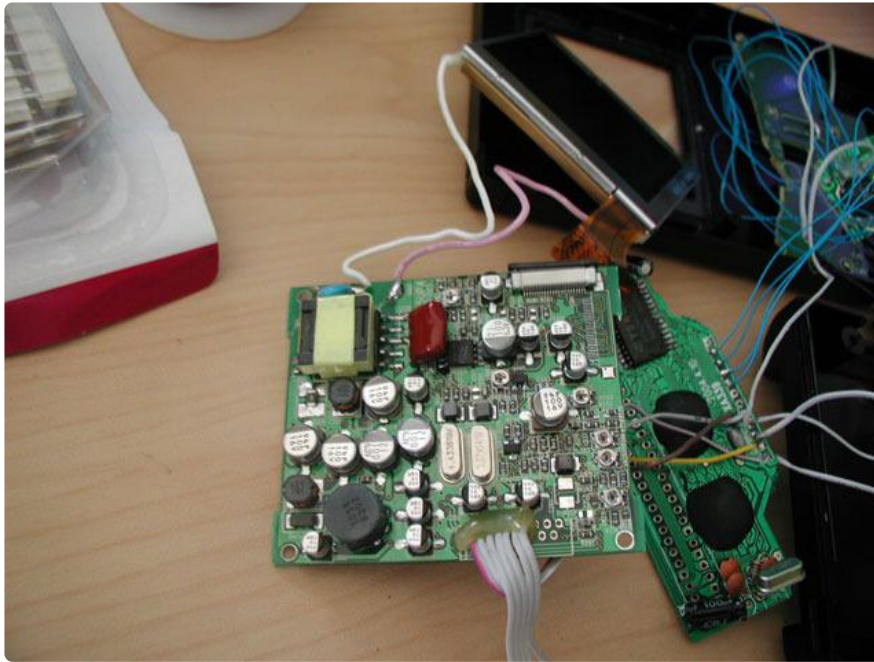
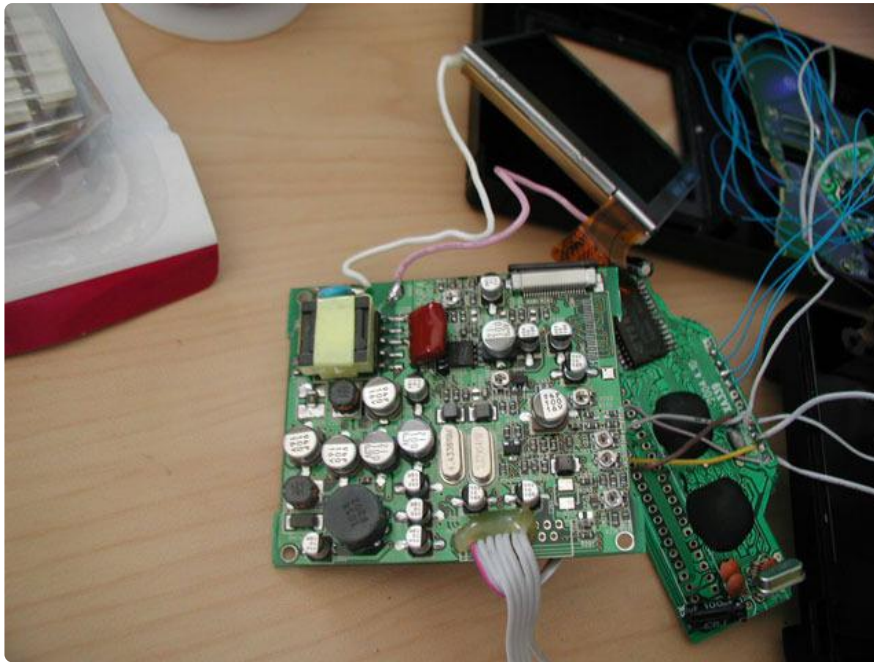
All4Sky Sez: "Essentially I crammed a Hip-Gear screen (xbox grey ribbon cable version) and NOAC 76000 in one Mega Joy into an old Gameboy case I had laying around. I used the original Gameboy battery holder, power switch, buttons, and headphone jack. Here are some pictures of the installation:

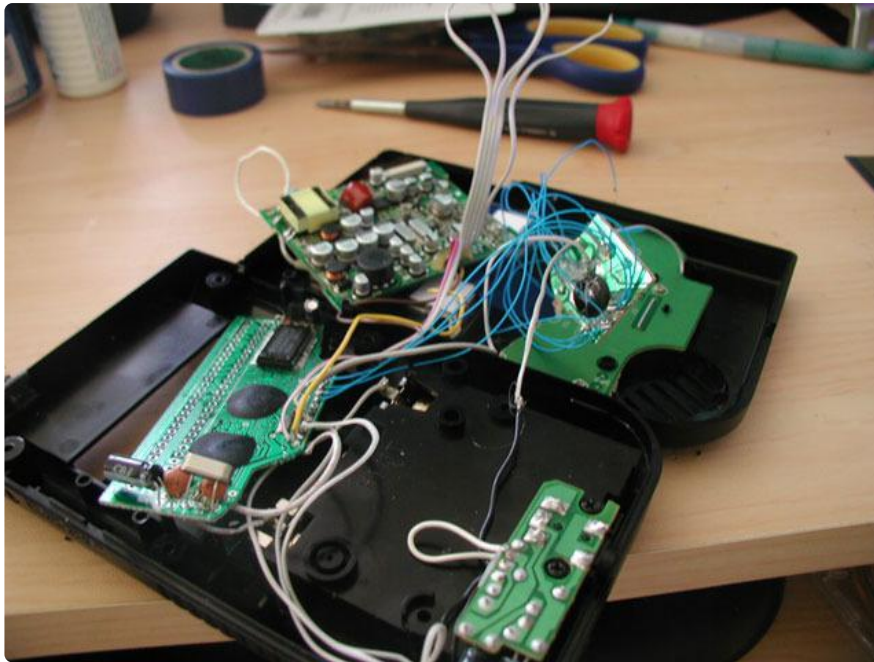


In this picture you can see the original gameboy control board w/ screen. I cut off the bottom part:



Here are the pictures of everything being wired up:





A picture of the control board I installed where a cartridge would usually slide in, I plan on cutting up an old gameboy cartridge and using it as a cover:



A picture of the finished product with the infamous 76000 game listing!:



Close-up shot of the screen playing Contra, the video adjust board really helps tweak the picture on the Hip-Gear screen:



There is actually a lot of room inside the gameboy once you gut everything out. My favorite part about this project was being able to still use the original gameboy pad and buttons, I feel like I'm playing with a gameboy except there is a nice color screen and 76000 games! Seriously though, I really enjoyed making this portable, it took me about 2.5 days at about 4hrs per day. The trickiest part was probably getting the original gameboy controls to work with the glop-top controller chip in the NOAC. If you get familiar with the way the NES controllers work it won't be so hard... As for those pesky (ed: triwing) screws, I just used a flat head jeweler's screwdriver and they came off quite easily.."

Game Gear portable

Nifty!



All4Sky goes nuts!

[Woah! \(\)](#) He's unstoppable