DIY Nintendo GAMEBOY Classic Flash Cartridge.

PROCEDURES:

Please Read through this entire document before you commence soldering.

You can use the accompanying Instructional Videos I have made, along with this PDF Document for the best chances of success. YouTube VIDEO LINK Below:

**PART #1 of 5:**

http://youtu.be/KzrYFI0aHVo

# Need some help? Join the GAMEBOY ELECTRONICS Group:

http://groups.yahoo.com/group/GAMEBOY_Electronics/

STEP #1:
The first step is to de-solder the original ROM chip from the Game Cartridge PCB. If you don't have access to a Special De-soldering Iron, the best way to remove the existing solder from the ROM pins is to use Rosin FLUX solution and copper Wire Solder wick. This is available at almost any Electronics Component store or even Radio Shack.

Coat the Copper Wire wick with Rosin Flux solution. When this wick then comes into contact with heated molten solder, it will chemically bond the solder to the Copper Wire wick. Just like metal to a magnet. It will literally suck away the Solder from the IC's PINs.
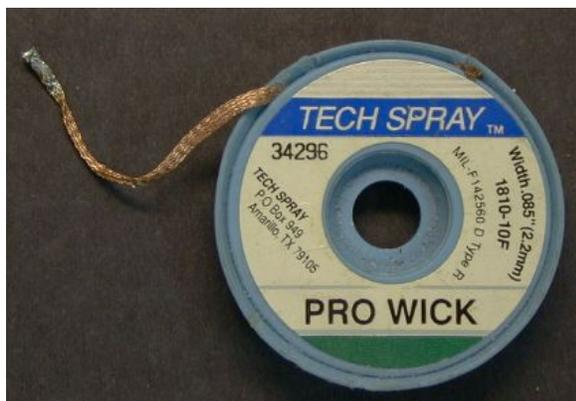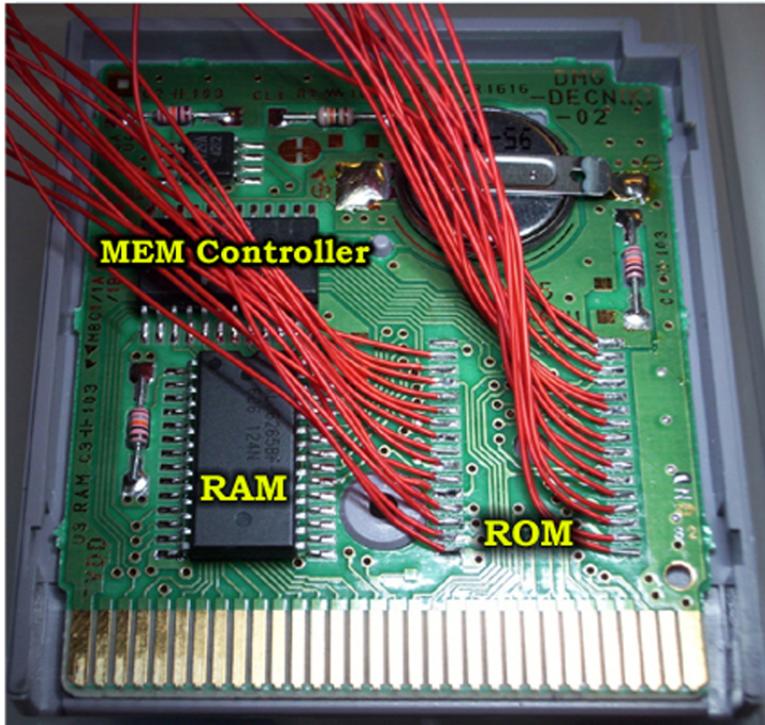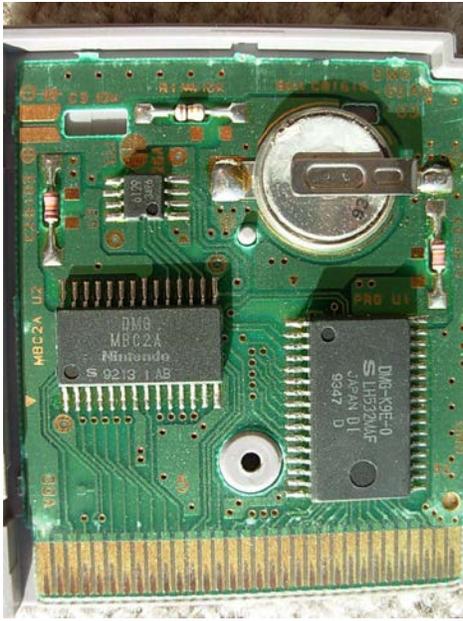
The Above images are Gamboy cartridges with onboard RAM and a Battery backup. The cartridge on the bottom is "YOSHI's BLOCKBALL" which has an **"MBC1"** memory bank controller chip.

A similar cartridge is "ZELDA DX" and this cart is recommended for this project.
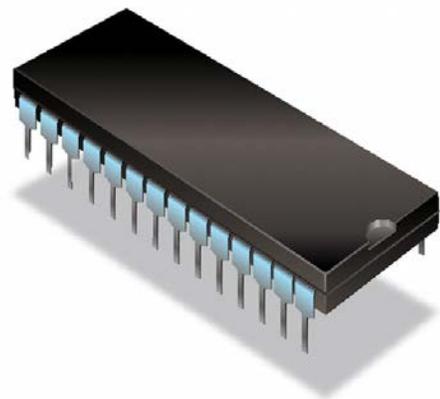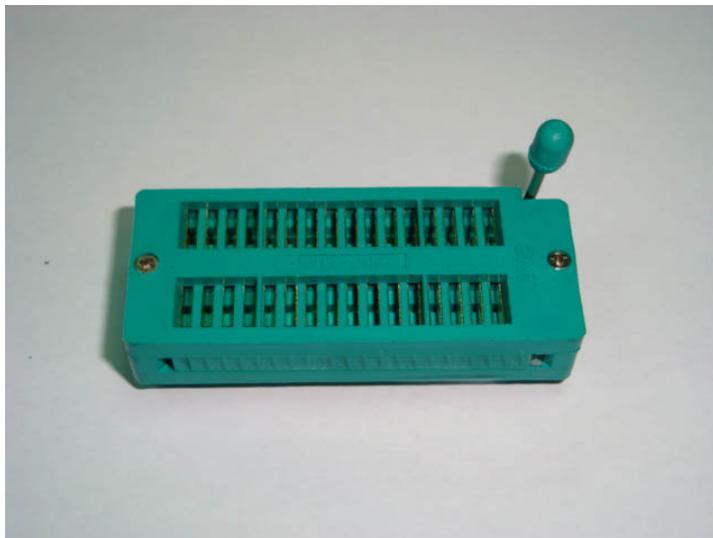
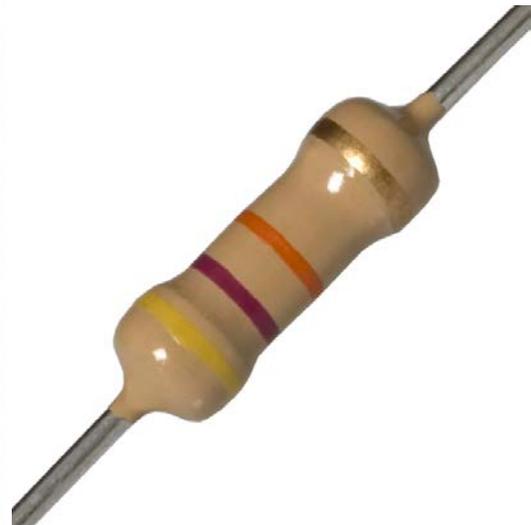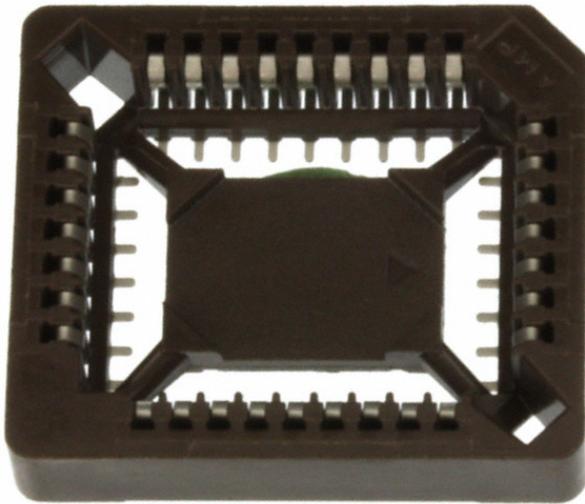The key difference is that the "ZELDA DX" cart uses an **"MBC5"** Memory controller chip which supports almost all games for the Gamboy & Gameboy color, compared to the "MBC1" chip. In the above image, You can see the 30 AWG wires soldered to the Cartridge ROM contacts. These wires will then connect to your PLCC socket or your ZIF socket depending on which FLASH chip package you choose to use.

The Cartridge ROM Chips are all Surface-mount components and are very small. It is recommended that you use a Magnifying lamp or better yet, a Dissecting Microscope to perform all of your soldering work.
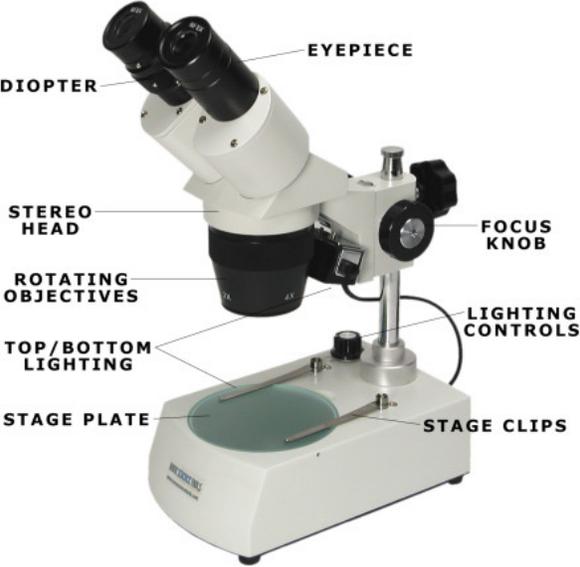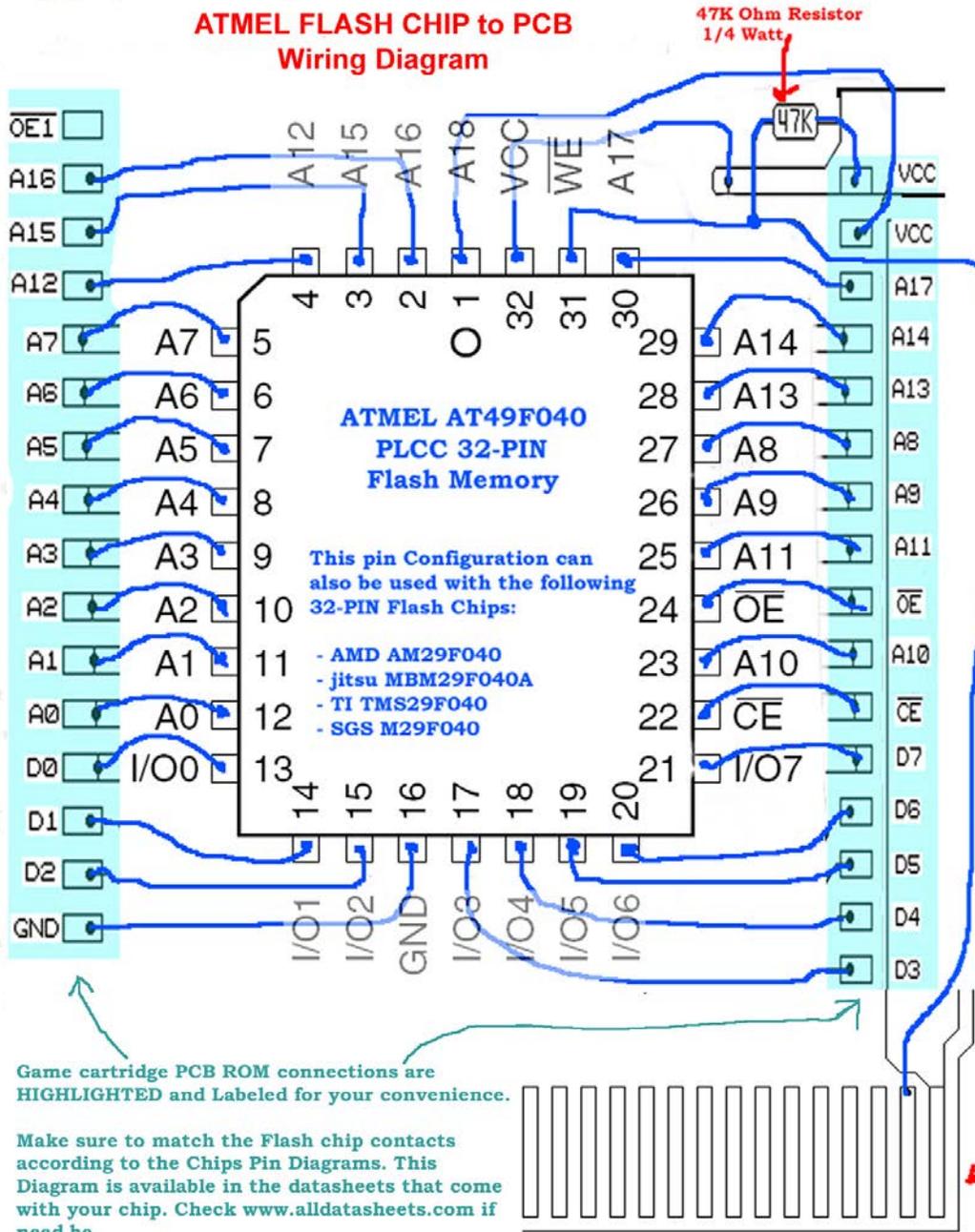
STEP #2:

Solder a 32-PIN ROM chip PLCC Socket & a 47K ohm Resistor to the Cartridge PCB ROM contacts, as shown in the Wiring diagram below. You Can also use a ZIF type socket if you are going to use the DIP (Dual Inline package) format Flash chip for this project. The ZIF socket is reccomended if you are going to be removing the chip frequently for programming. Download the Component datasheet for your DIP format flash chip from www.alldatasheet.com and use the provided pin connection diagrams. As long as you match up the Pins in the same manner as shown in the Wirirng diagram below, you shouldn't have any problems.

ATMEL FLASH CHIP to PCB
Wiring Diagram

47K Ohm Resistor 1/4 Watt

47K

OE1

A16

A15

A12

A12 A15 A16 A18 VCC WE A17

VCC
VCC
A17

| A7 | A7 | 5 | O | 32 | 31 | 30 | 29 | A14 | A14 |

ATMEL AT49F040
PLCC 32-PIN
Flash Memory

A6	A6	6					28	A13	A13
A5	A5	7					27	A8	A8
A4	A4	8					26	A9	A9

This pin Configuration can also be used with the following 32-PIN Flash Chips:

A3	A3	9			25	A11	A11
A2	A2	10			24	OE	OE
A1	A1	11	- AMD AM29F040	23	A10	A10

- jitsu MBM29F040A
- TI TMS29F040
- SGS M29F040

| A0 | A0 | 12 | | 22 | CE | CE |
| D0 | I/O0 | 13 | | 21 | I/O7 | D7 |

14 15 16 17 18 19 20

D1

D2

I/O1 I/O2 GND I/O3 I/O4 I/O5 I/O6

D6
D5
D4
D3

GND

Game cartridge PCB ROM connections are HIGHLIGHTED and Labeled for your convenience.

Make sure to match the Flash chip contacts according to the Chips Pin Diagrams. This Diagram is available in the datasheets that come with your chip. Check www.alldatasheets.com if need be.
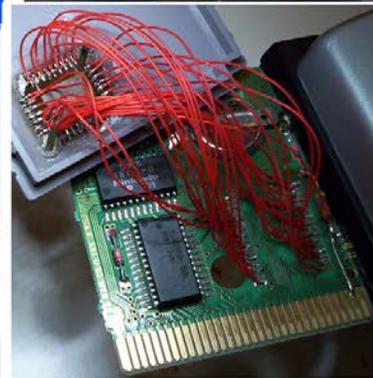
Cartridge gold edge Connections.

Also make sure to Solder a connection from PIN 31 of the Chip, to the second gold edge contact as shown here.

MEM Controller
RAM
ROM

The PLCC socket will fit through a square hole at the top side of the cartridge that you must cut open.
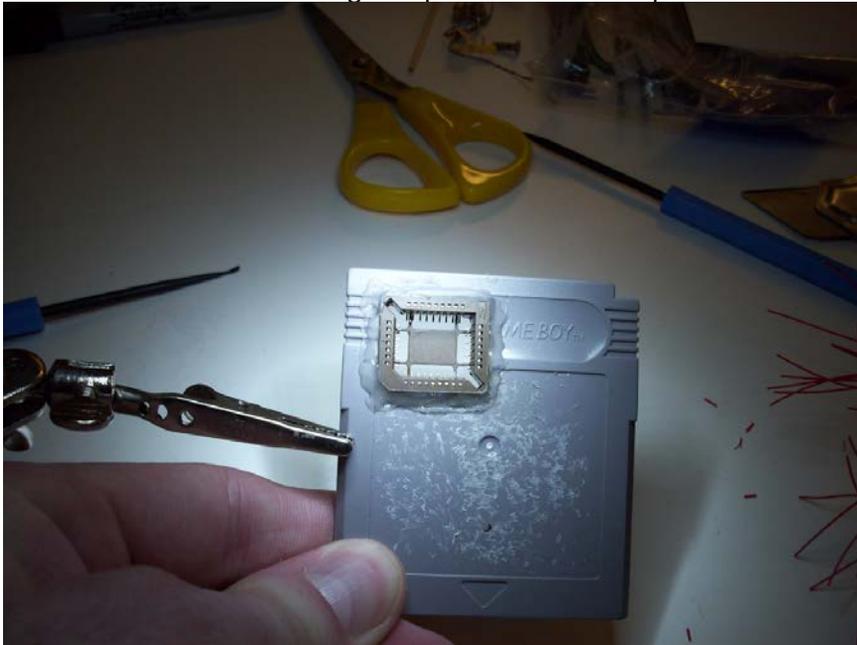
It is recommended to use 26 AWG wire or better yet, to use 30 AWG insulated wire.
This will allow you to close the cartridge regardless of all the wiring work.
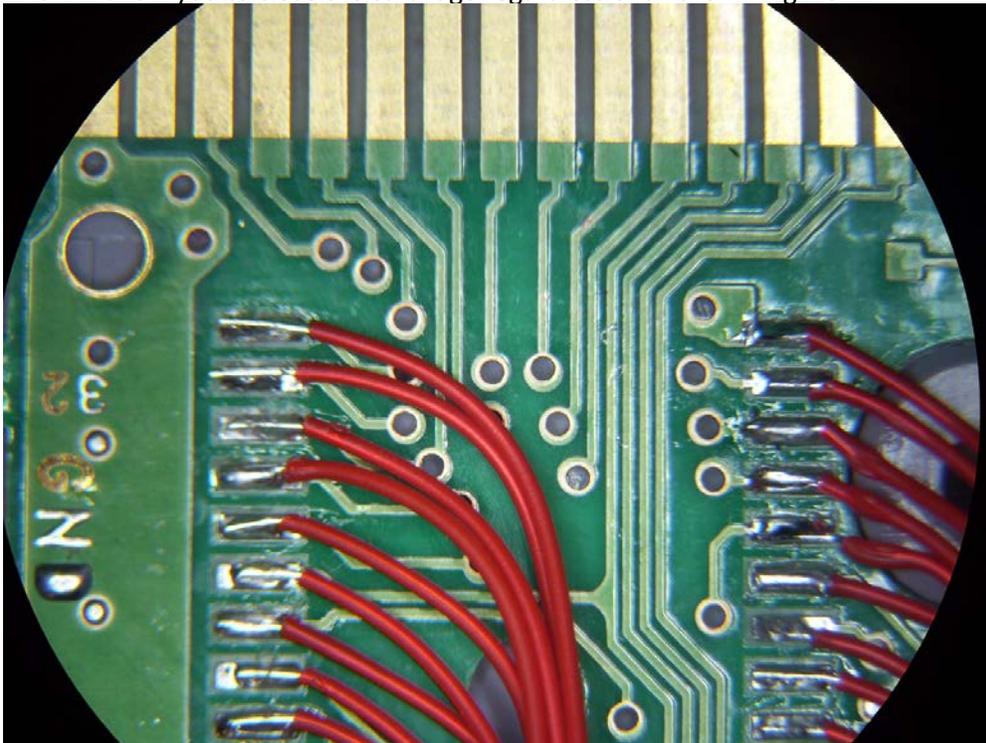
Use Rosin Flux solution and apply a small coat to each contact. Then pre-solder all connections with a very small amount of solder before connecting your wires.
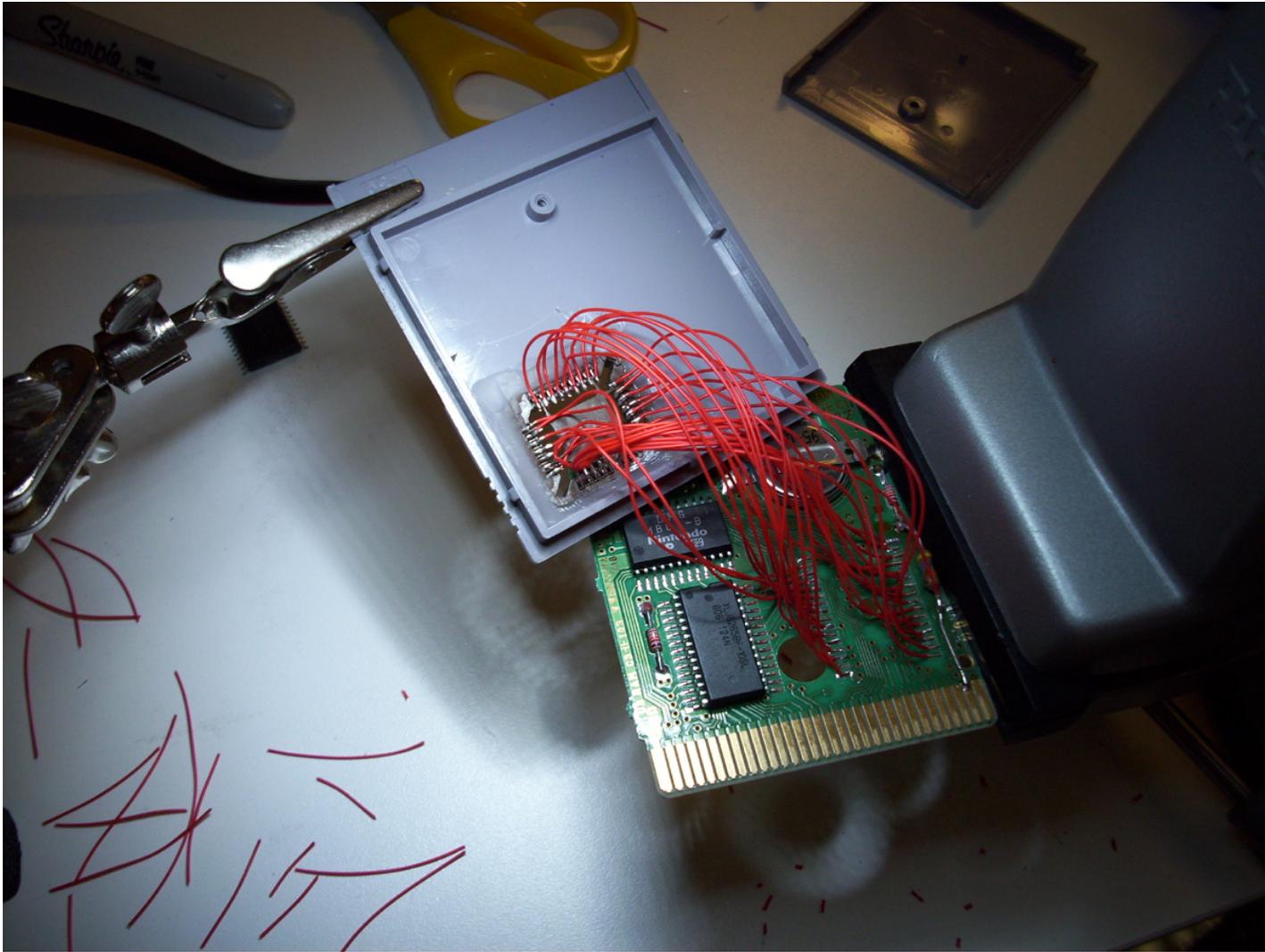
If you pre TIN your wire leads in the same manner, this will greatly improve your soldering work. Just be careful not to get to close to the adjacent contacts, a solder blob can be a pain to remove, especially if you run out of Flux and Copper wire wick.

STEP #3:
Program your FLASH Chip with the ROM file you wish to load, using a Universal Programmer like the "WILLEM PROGRAMMER".
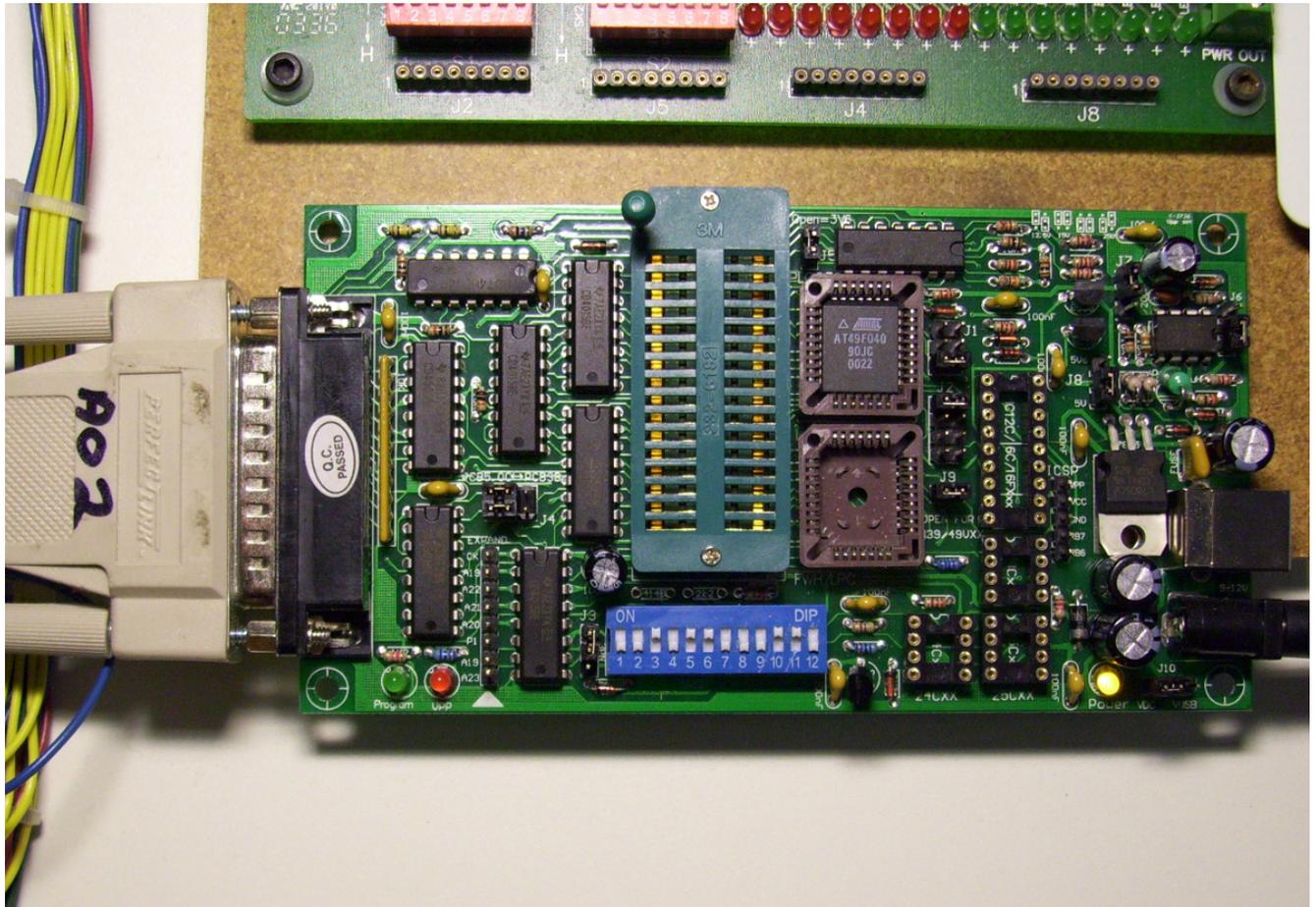
You can get these on Ebay. Or if you're a real Do it yourselfer, you can build your own Cartridge Docking style Programmer. (But this is a whole other project entirely and will not be discussed here.)

When you program the FLASH chip, in your software settings...under the "DEVICE SELECT" option, make sure you use the exact model number of the flash chip you are using.
Otherwise the .rom or .gb image file will not program to the chip correctly. As a result when you run the game, all you'll get is a grey box scrolling down the screen instead of the all mighty NINTENDO logo.
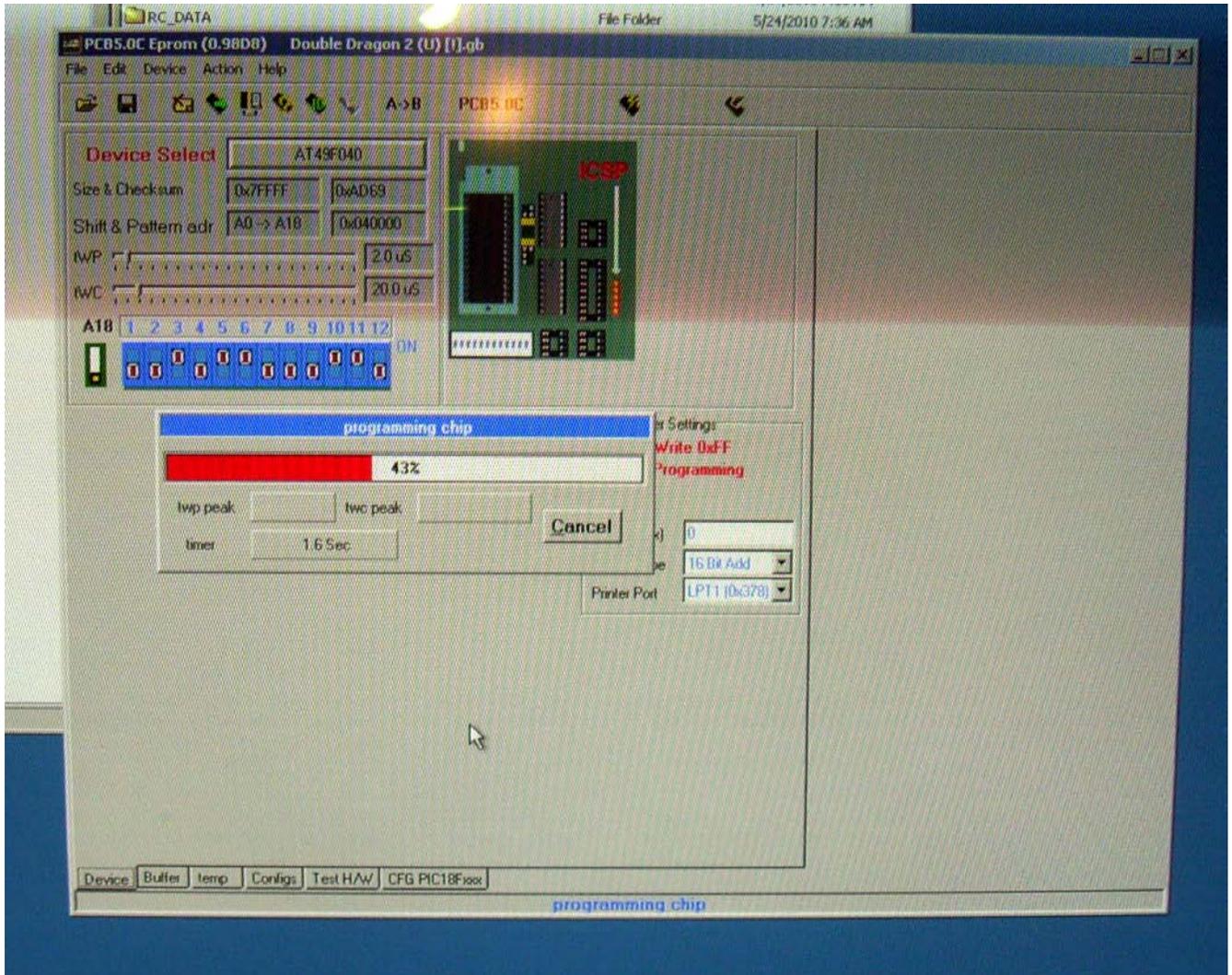
THAT'S IT Folks!
ENJOY.

Kind Regards,
-Gerry O'Brien

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