



RetroVideo Games

The Electronics of
Hand-held Video Games

What's in a Game?



What's in a Game?

Game Program Memory

Holds the game itself



Power!

Processor

The "brain" that runs the game



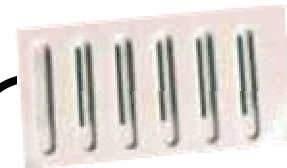
Display Output

Shows the game



Input

Buttons let the user play the game



Speaker Output

Produces game sounds

What's in a Game?

Game Program Memory

Holds the game itself



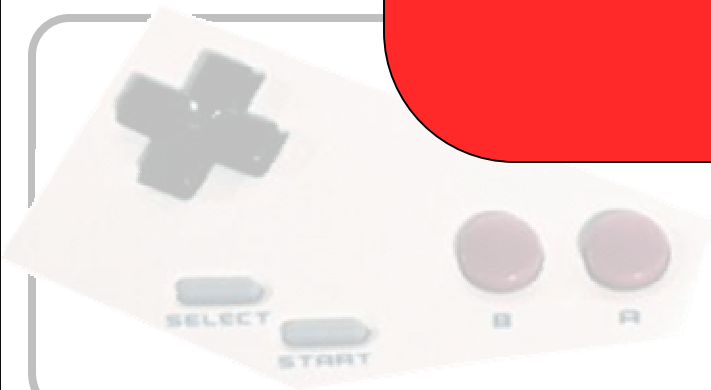
Power



Same Parts as in a Computer!

Input

Buttons let the user play the game

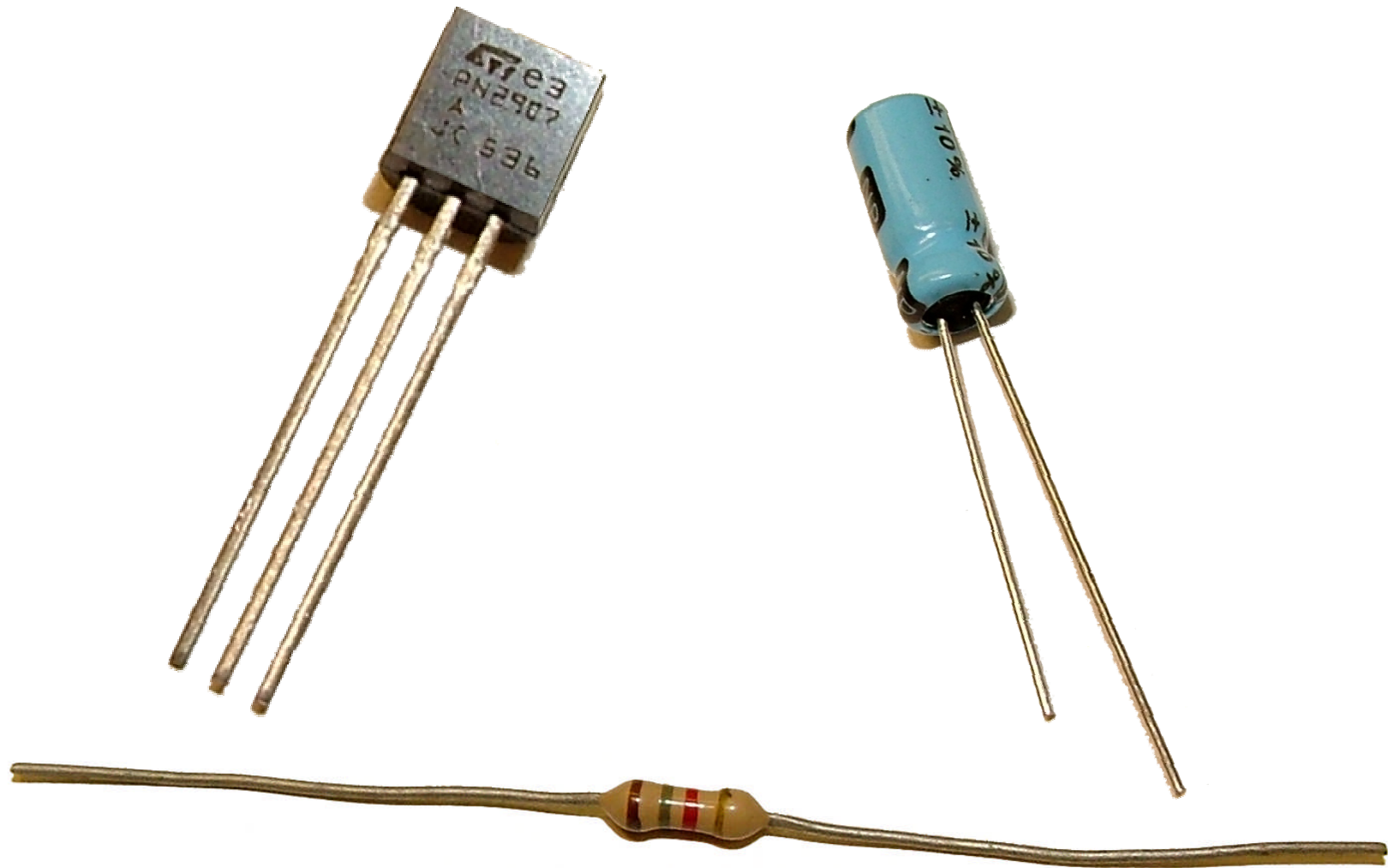


Speaker Output

Produces game sounds



ManyOther Thingstoo ...



Let's Build a Video Game!

One-of-a-kind "Retro" Video Game!

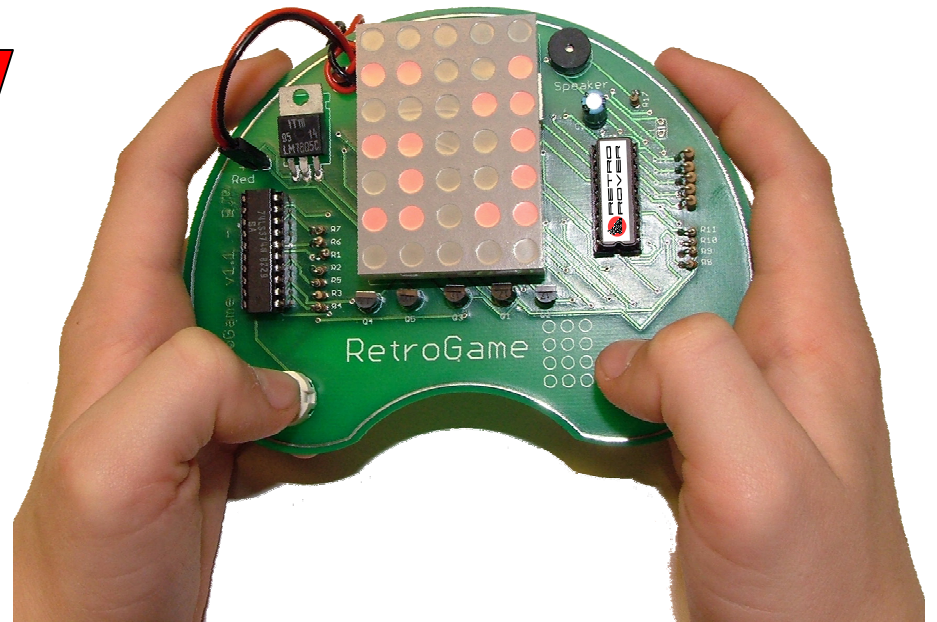
The same components as other Games

Get a box of parts

We'll assemble it together

Take it HOME!

Tell everyone that
YOU built it!



Let's Build a Video Game!



NOWORRIES!

You can touch anything on the video game you are building! Nothing is going to ***SHOCK*** you!

In fact, it's fun to touch different things to see what happens!

Let's Build a Video Game!



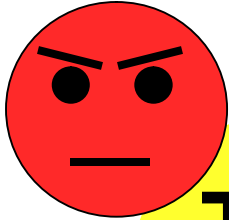
But BE CAREFUL!

Electronic parts are delicate. Be careful not to bend the pins.

Just go slow, and ask the adults for help.

If you accidentally break a part, we have spares

One Very Important Warning



Take Care of Your Younger Brothers & Sisters!

The game you are building has small parts that can come loose. Make sure you keep the game well away from young children!

Let'sGet Started!

- Get your boxes in front of you...

BatteryConnector



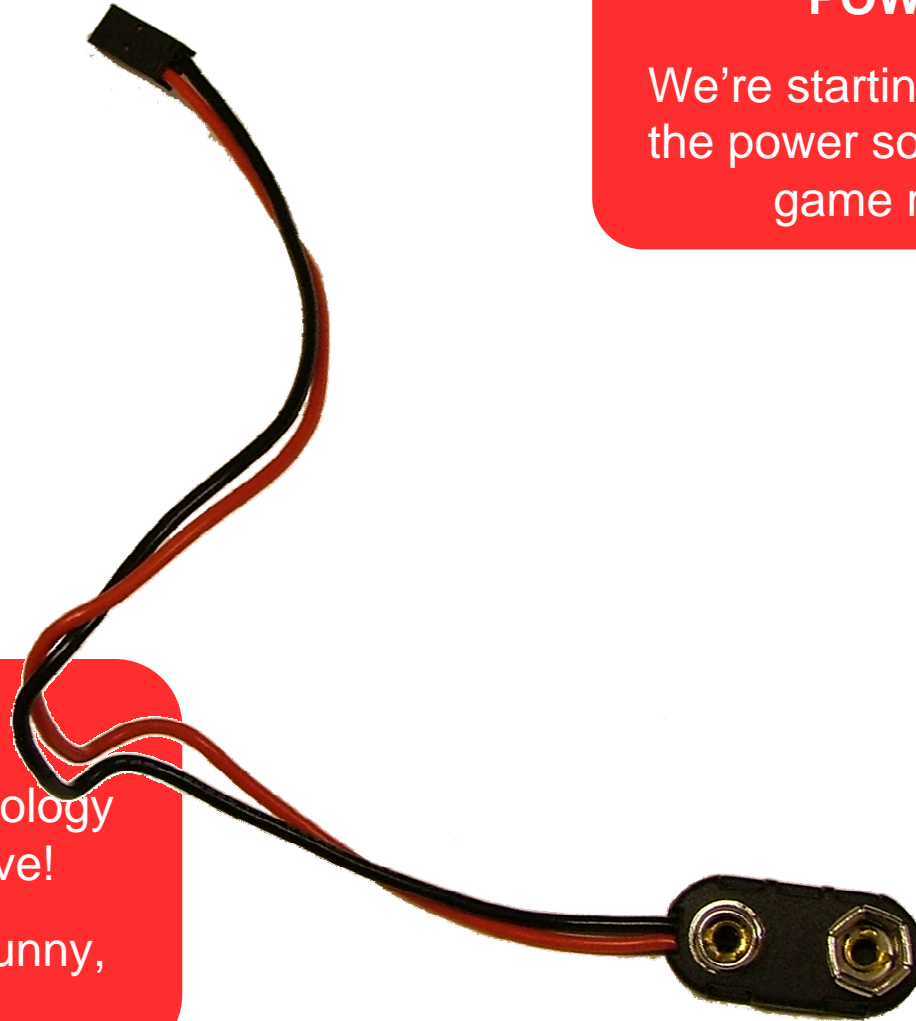
POWER!

We're starting by getting the power source for the game ready.

Yikes!

This game uses old technology that EATS batteries alive!

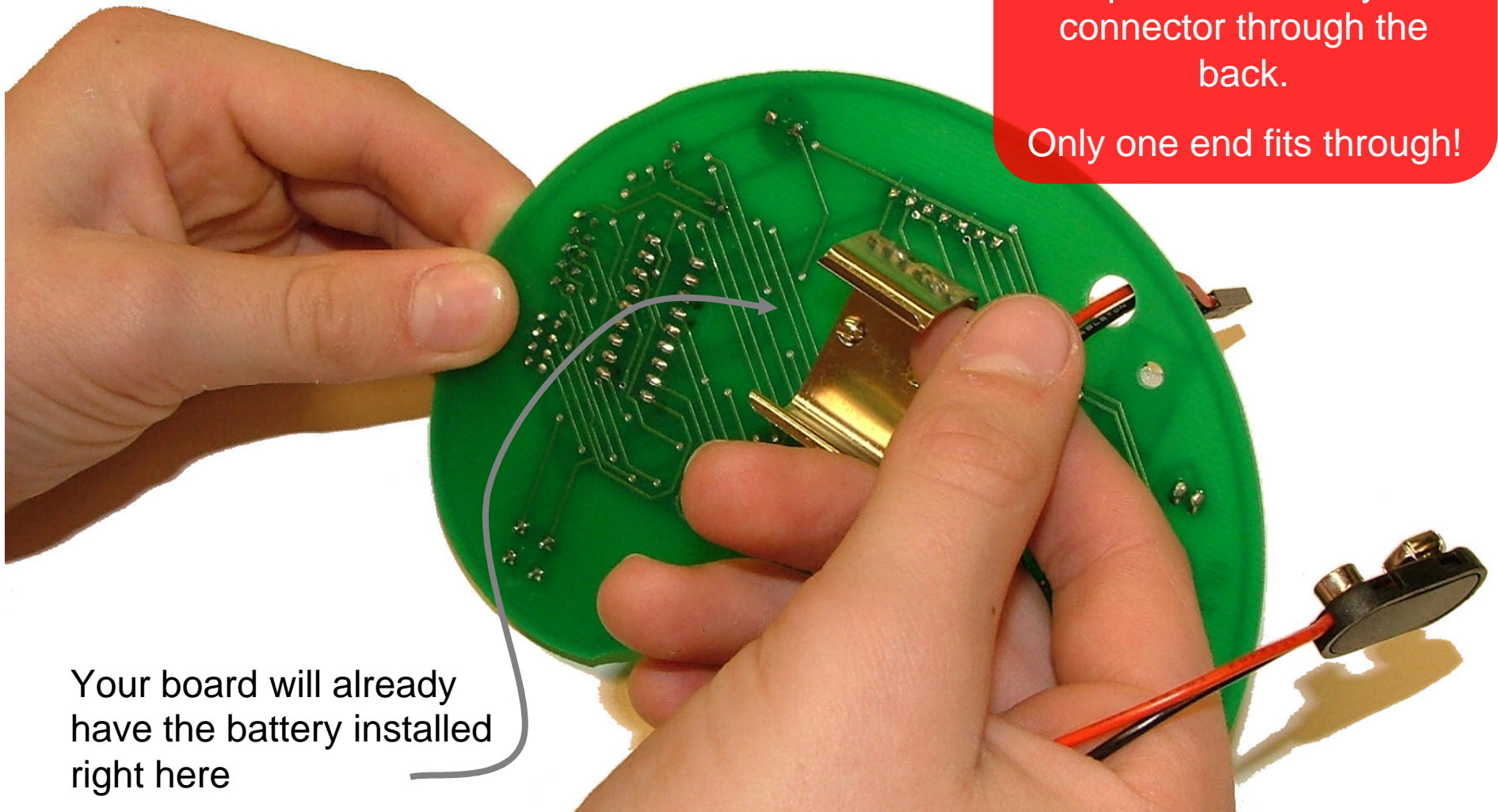
If the game starts to act funny, get a new battery!



Step1: Install Battery Connector

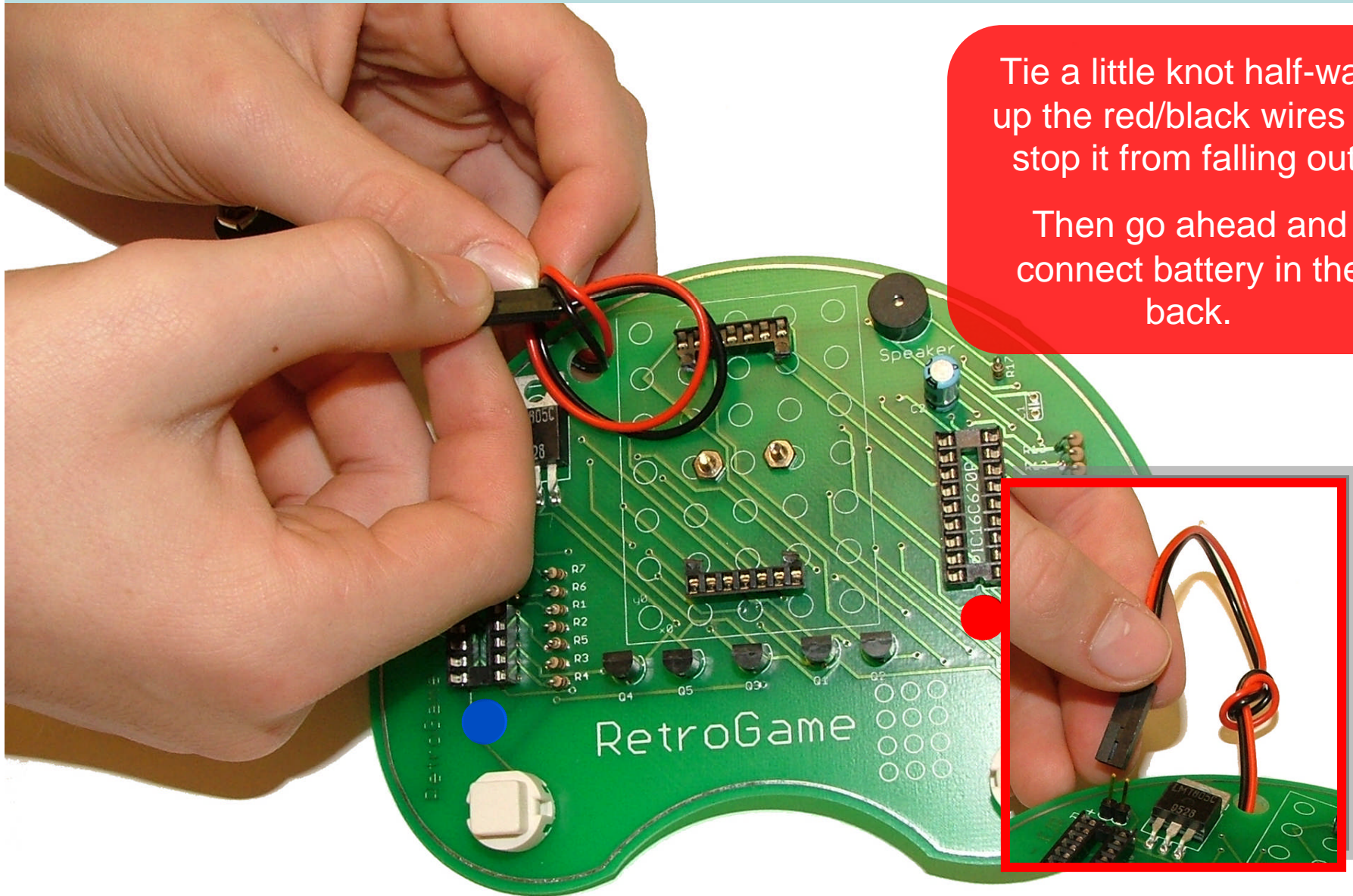
Flip the board over and push the battery connector through the back.

Only one end fits through!



Your board will already have the battery installed right here

Finish the Battery Connector



Tie a little knot half-way up the red/black wires to stop it from falling out.

Then go ahead and connect battery in the back.

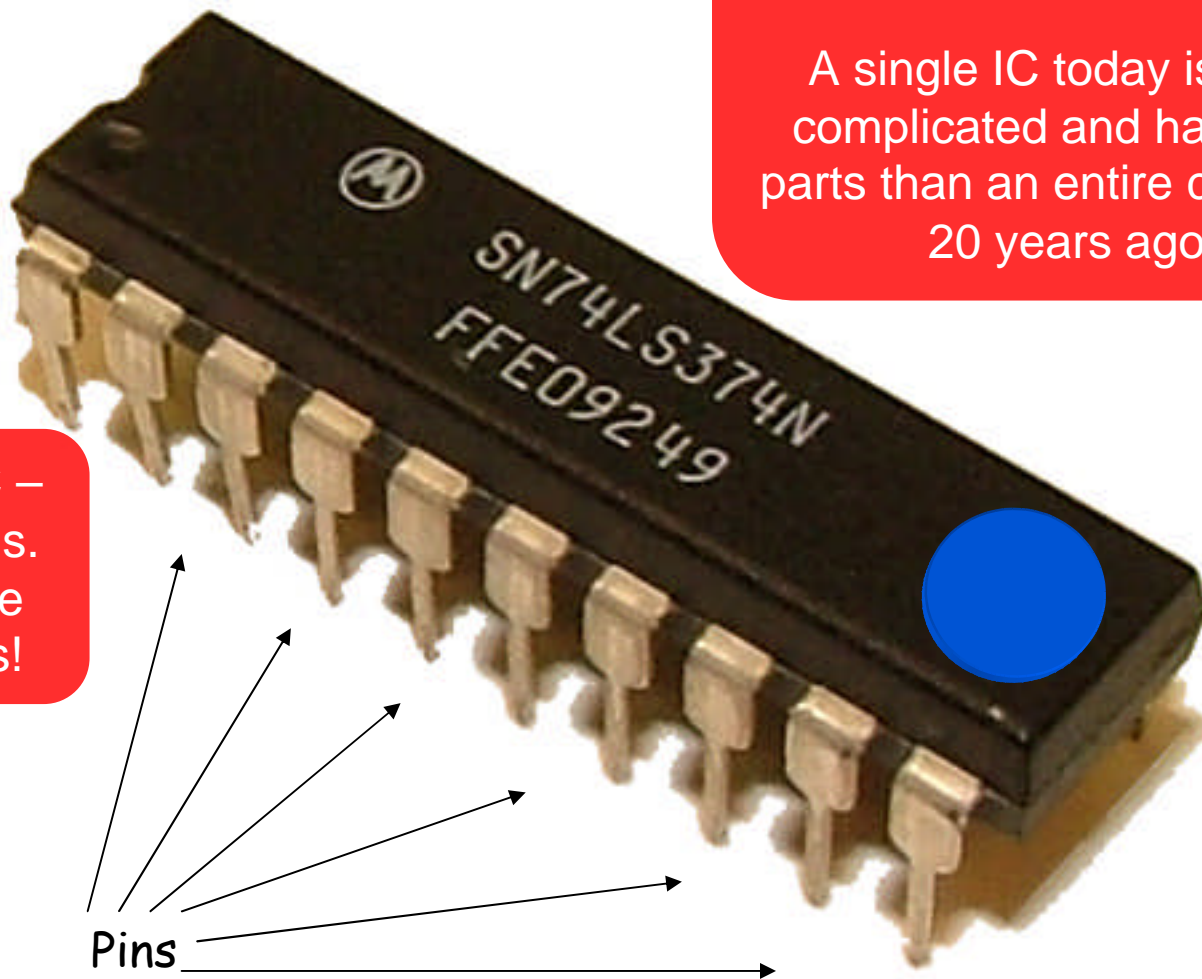
Integrated Circuit or "IC"

Inside an IC are thousands or millions of shrunken-down transistors!

A single IC today is more complicated and has more parts than an entire computer 20 years ago!



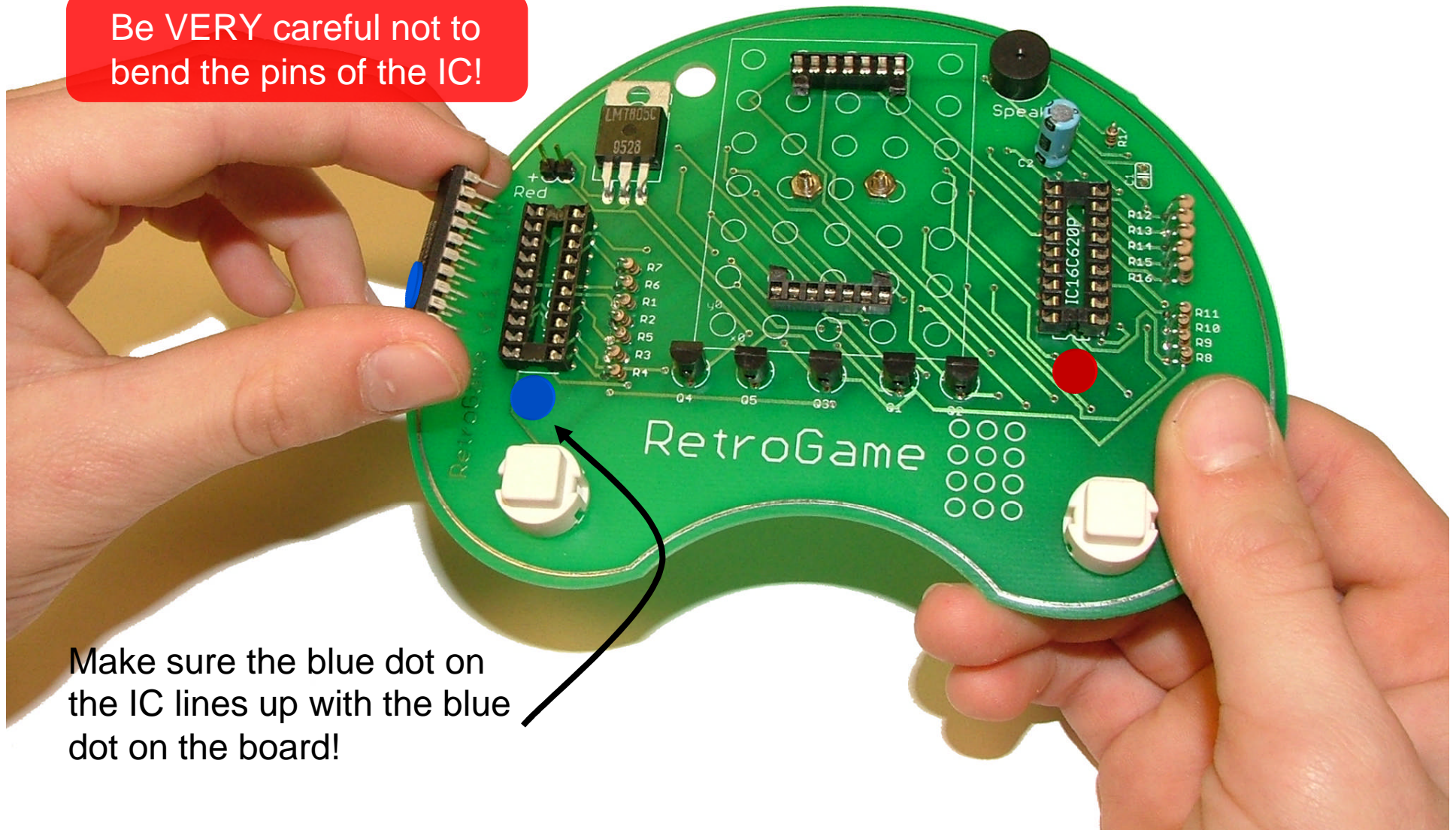
This is a small IC – it only has 20 pins. A big IC will have hundreds of pins!



Pins

Step2: Insert the Blue-dot IC

Be VERY careful not to bend the pins of the IC!



Make sure the blue dot on the IC lines up with the blue dot on the board!

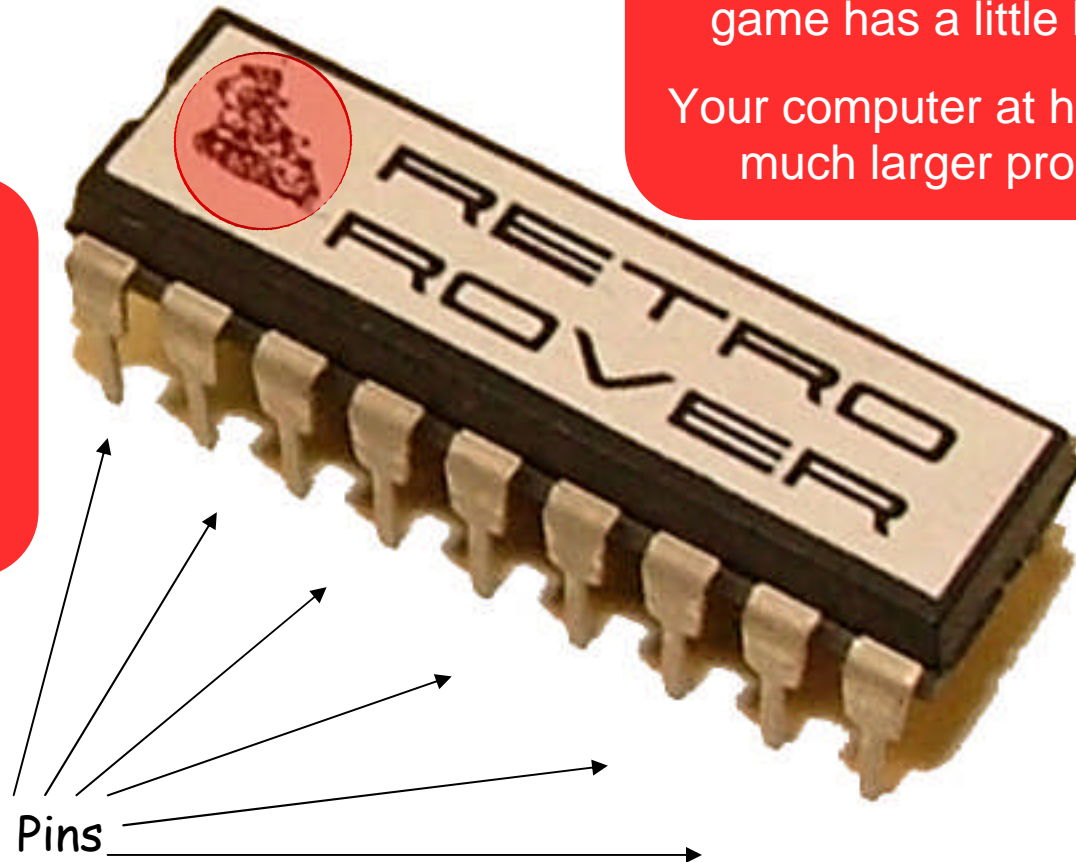
Processor IC

Do you know how we measure how “big” a processor is?

Electronic video games have a “brain” called a PROCESSOR. Our video game has a little brain. 😊

Your computer at home has a much larger processor.

Our little processor also has MEMORY which stores a PROGRAM that makes the game work.



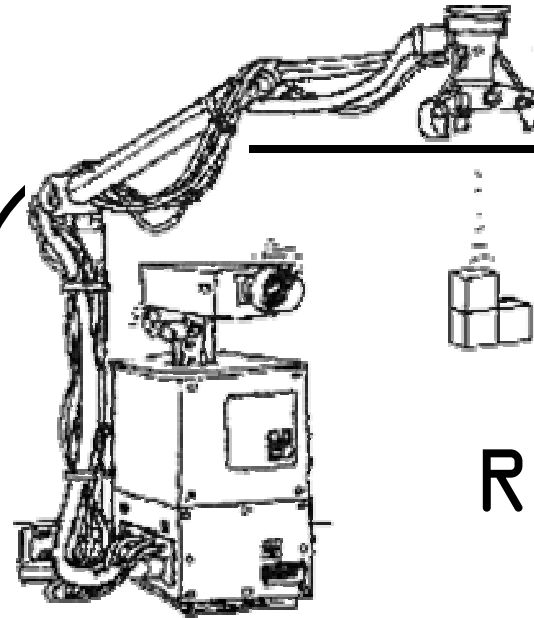
Pins

Two Different Games(memories)



Imagine you're driving your new P-38 silicon-track active-nuclear lunar rover on the moon. You need to get the moon base as soon as you can. But in your way are bumps and hills, walls and traps. Can you make it to the moon base?

Where is the PROGRAM MEMORY for your Game Boy? PSP?

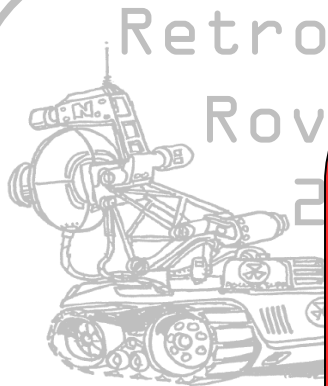


The Retris robot is out to defeat you! It knows one thing, and one thing only, how to drop pieces on you! Can you defend yourself? Sure you can! But for how long? Show the Retris-bot who is boss!

GameBoy ProgramMemory



Two Different Games(memories)



Retro
Rov

Imagine you're on a silicon-track and you're on the moon. You have a moon base as your way are blocked by and traps. Can you reach the moon base?

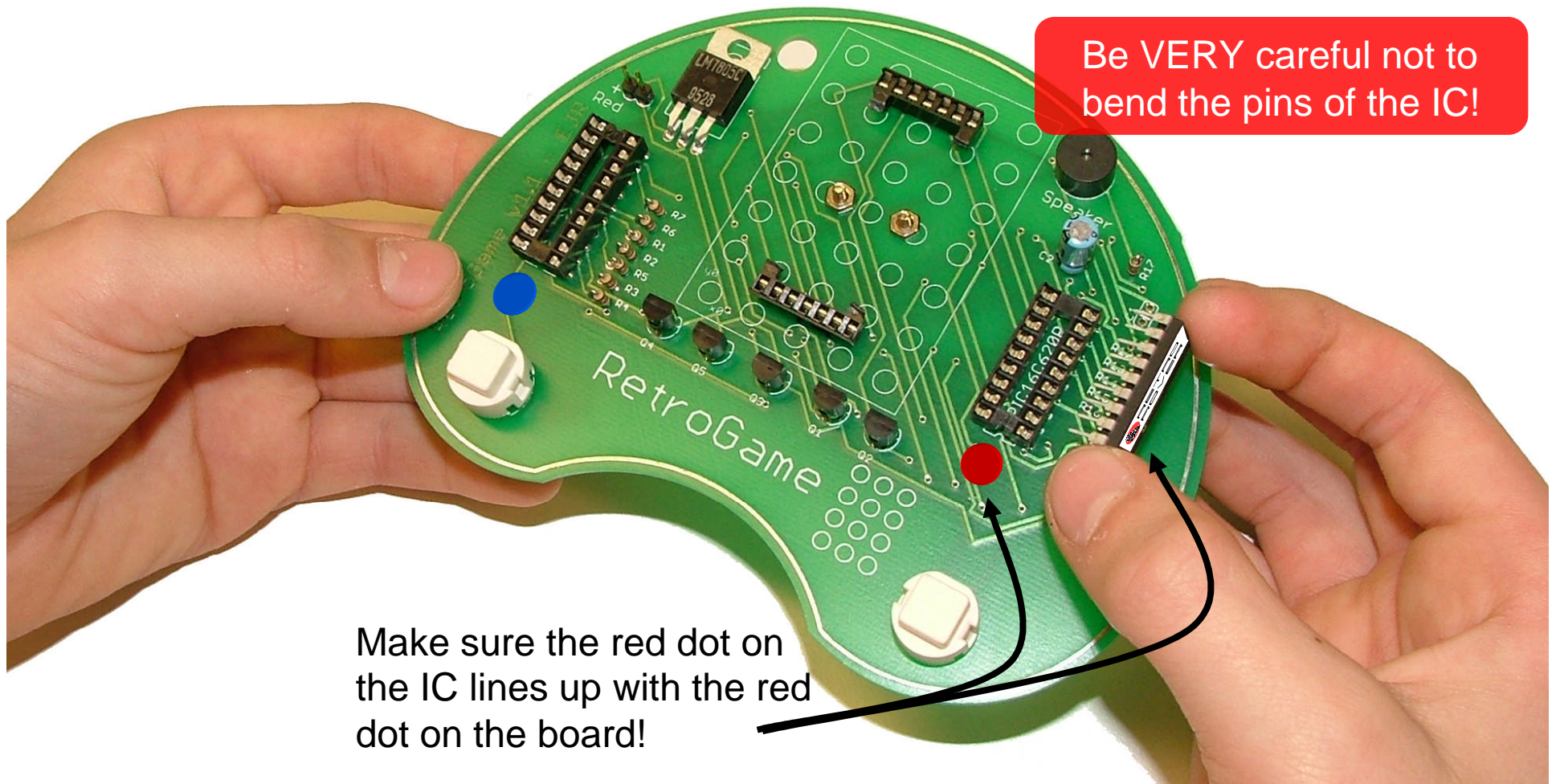
Be sure to check out the manual that comes with your game!

tris
007

Can you defeat you! The only thing only, how to drop pieces on you! Can you defend yourself? Sure you can! But for how long? Show the Retris-bot who is boss!

Where is the PROGRAM MEMORY for your Game Boy? PSP?

Step3: Install the Processor IC



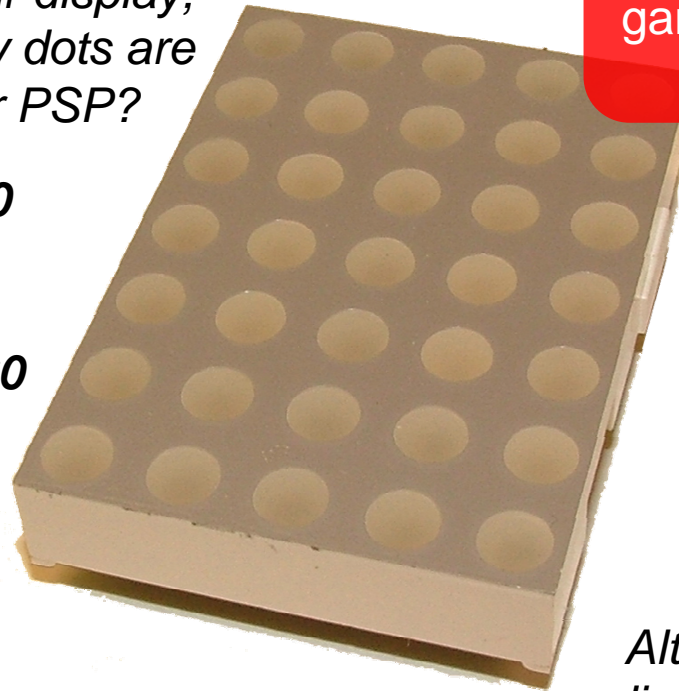
LED Display

We have 35 dots on our display, do you know how many dots are in the display of your PSP?

$$320 \times 240 = \mathbf{76,800}$$

or

$$480 \times 272 = \mathbf{130,560}$$



All video games have a DISPLAY which shows the game. Our game uses a 5X7 rectangle of red LEDs.

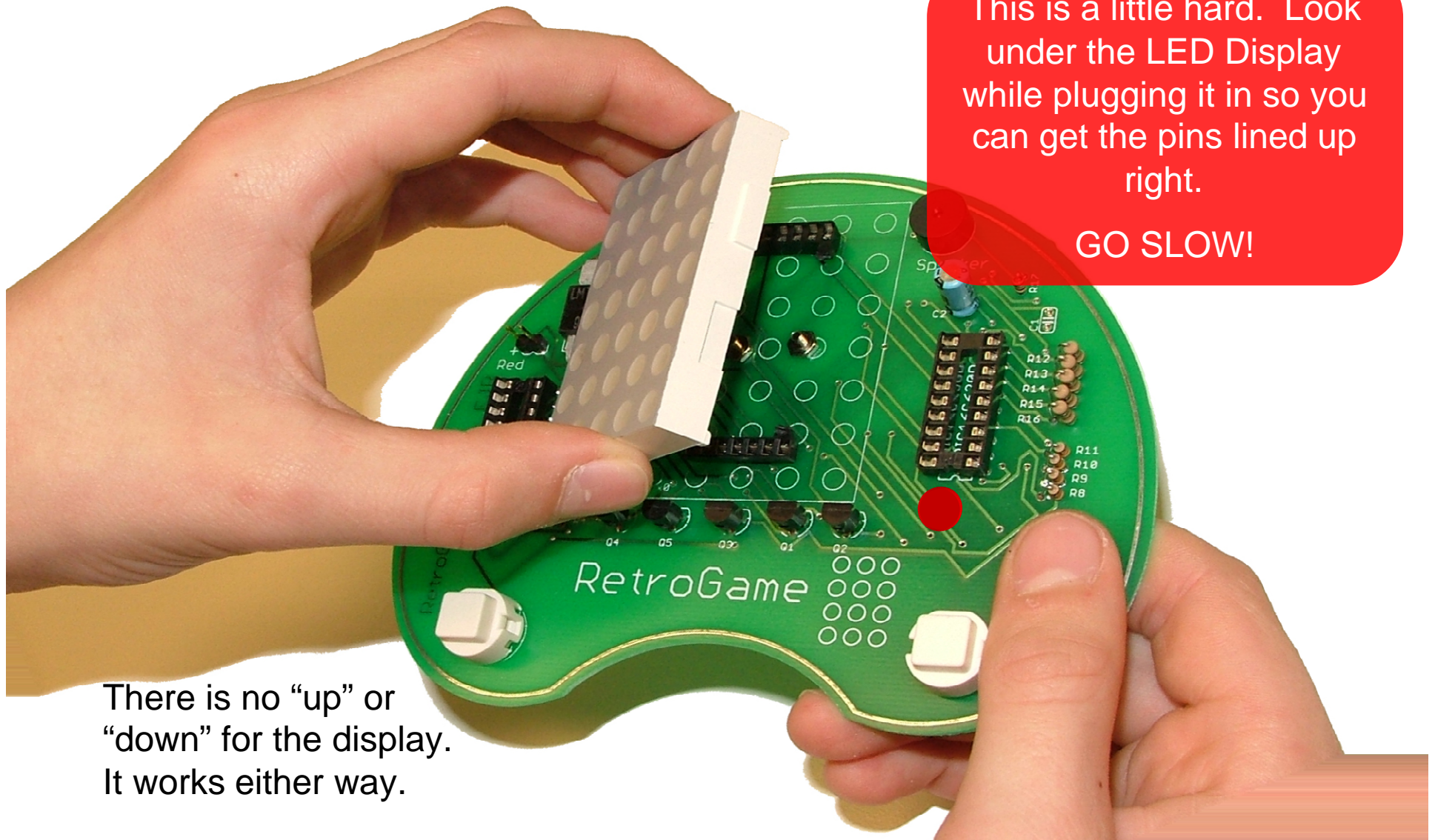
Although our game can only display red, do you know how many colors the old Game Boy Color could display?

32,768

Step4: Plug-inthe LEDDisplay

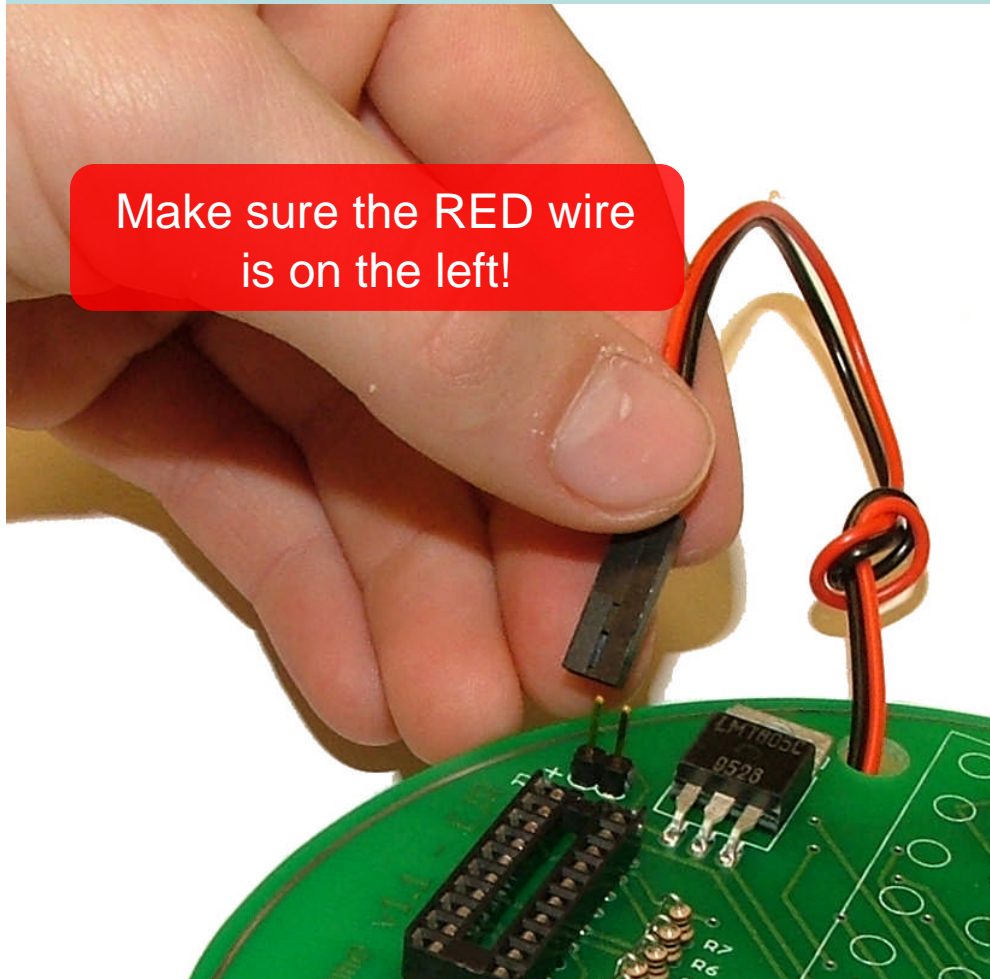
This is a little hard. Look under the LED Display while plugging it in so you can get the pins lined up right.

GO SLOW!



There is no “up” or “down” for the display. It works either way.

Step5: Turnit "ON"



Make sure the RED wire is on the left!

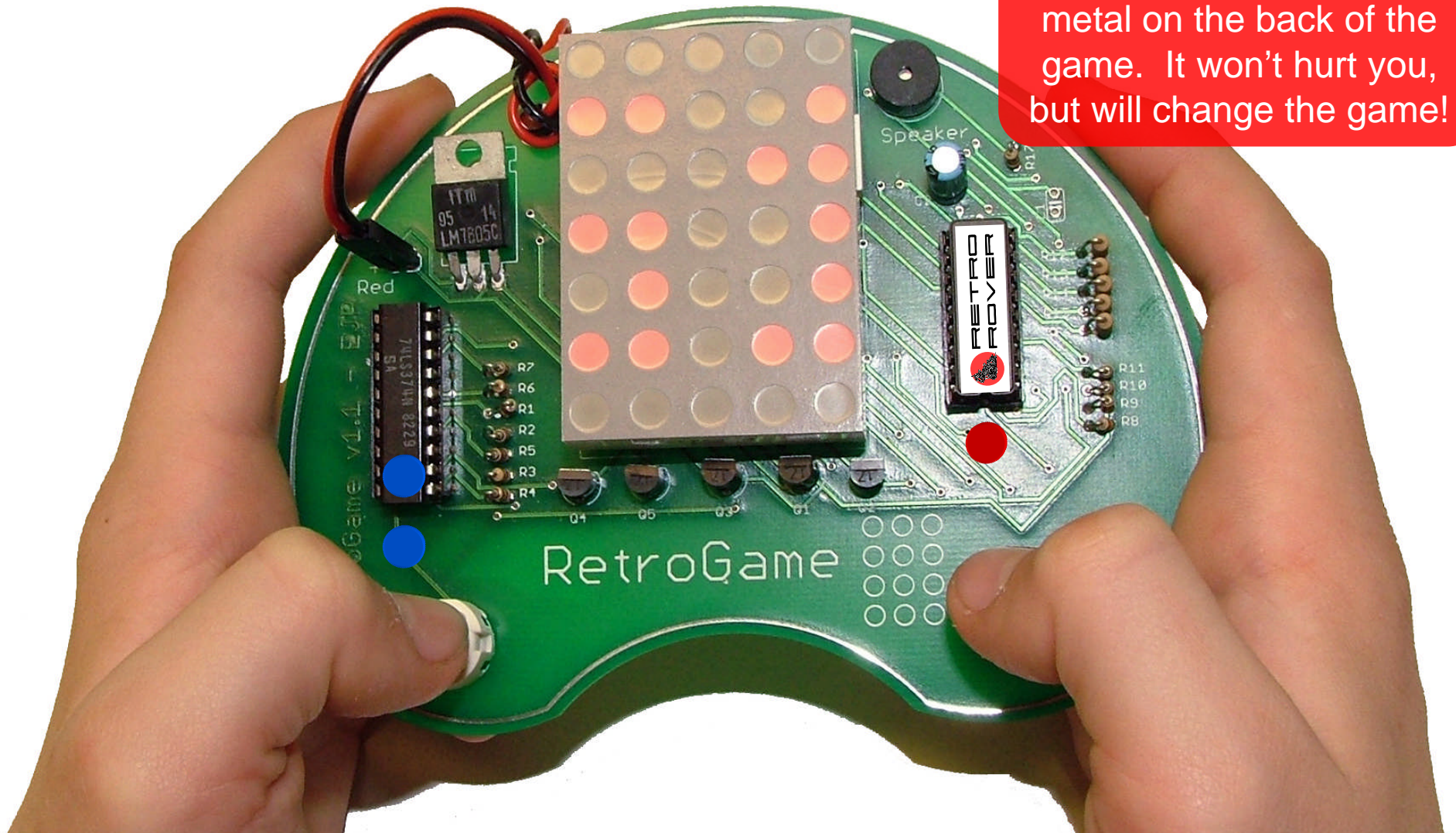
You'll notice that there is NO POWER SWITCH!

To turn on the game, you have to plug in the battery connector.

You won't damage the game if you accidentally reverse the red and black wires...it just won't work!

Step6: Playthe Game!

Try NOT to touch the metal on the back of the game. It won't hurt you, but will change the game!



An Experiment

Try this:
While playing the game,
touch your finger to the top of the
resistor marked **R8**...

And **DON'T WORRY!**
You can touch anything on the
game without getting hurt or
getting a **SHOCK!**



Changing the Game

Insert the screwdriver between the socket and IC.

Then twist the screwdriver popping the IC up just a bit.

Repeat on the other side of the IC

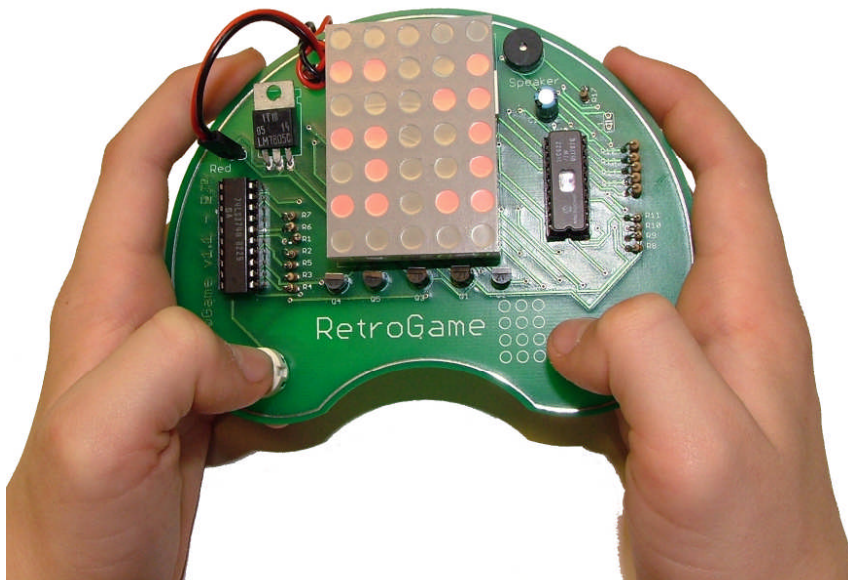


Be VERY CAREFUL when doing this!

It might make sense for an adult to help out.

WrapUp

- Remember – You Built This Game!
- Know that there are only 65 of these games ON THE PLANET!
- And YOU HAVE ONE!



SpecialThanks To

