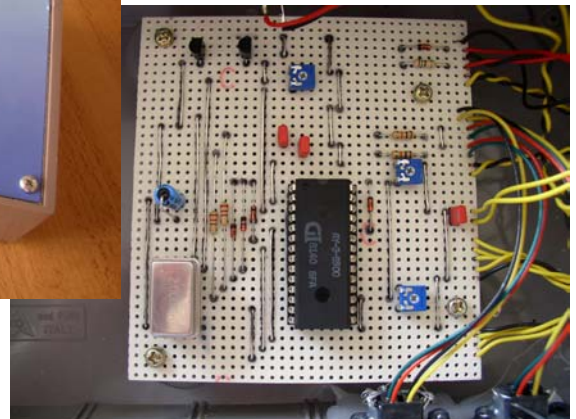
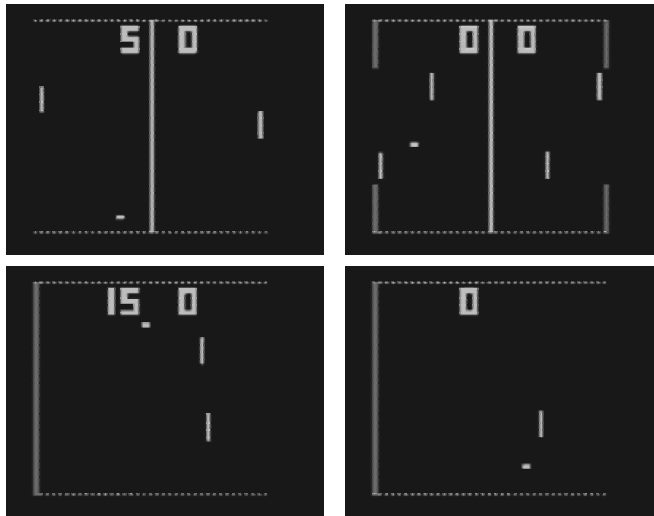


# PONG

Do it yourself:  
a historic  
game console



PONG do-it-yourself  
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# PONG

## Do it yourself

Who doesn't know the Original? Most PONG consoles since 1976 base on a chip of General Instruments, the AY-3-8500. And even if the chip is not produced anymore, you can buy it for a low price.

For example, I got my chip for around 7 \$ each. And around the chip, you only need a few extra parts to complete your own PONG.

I made some improvements compared to the original consoles to improve the picture quality:

### 1. No RF modulator:

Because in our days almost every TV has direct inputs for video and sound signal, there is no need for it anymore. Therefore the output signals are delivered through scart connectors.

### 2. Stable clock signal:

Instead of the original LC-oscillator we can now use a more reliable 2 MHz quartz-oscillator. The clock and the picture are much more stable.

### 3. Voltage supply:

The circuit delivers 5 V to the oscillator and 6 V to the AY-3-8500 with integrated voltage regulators. Looks a bit like luxury, but it's worth the result...

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## Build and adjust

Building the circuit:

First you have to cut the board into the right size and cut some of the connections on the back side.

The next step is to mount the wire connections and so on and so on...

Adjusting:

Before you start, set all trimmers to center position. Then connect the (accurately checked) board to the TV and switch it on. Now you should see an almost black picture.

Now turn the video level up until you can see a white pattern. The picture might be unstable, because the sync-level is wrong. Adjust the sync until the picture is stable. If needed, readjust the video level and that's it...

Finally, start a game and adjust the sound level.

You have 4 games to select:

Tennis, Soccer, Squash and Training.

I have not implemented the 2 lightgun games, because they would not work with modern TVs anyway (100Hz, LCD, Plasma etc.)

The level of difficulty can be varied:

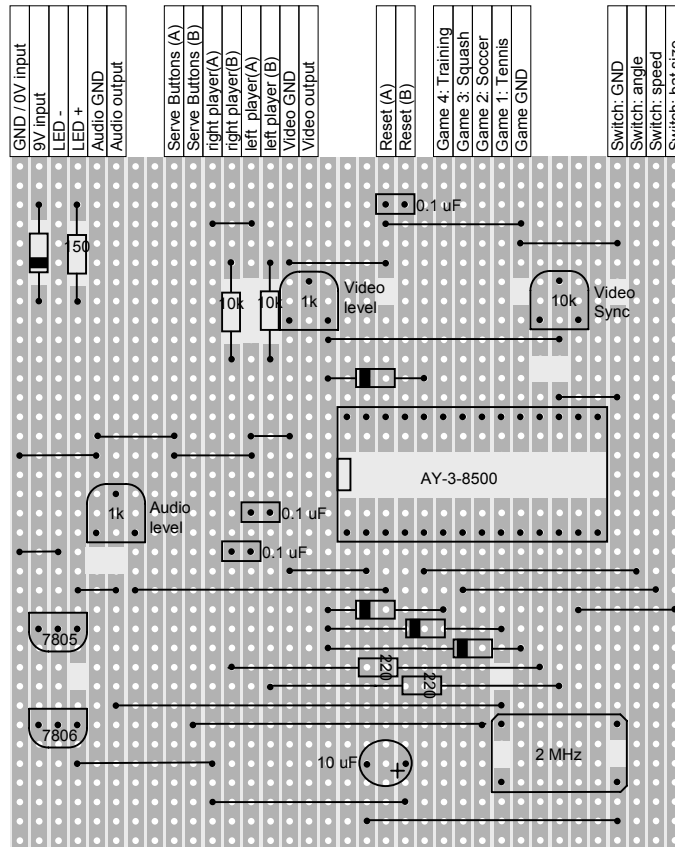
Ball speed (slow or fast)

Ball angle (20° or 20°/40°)

Bat size (large or small)

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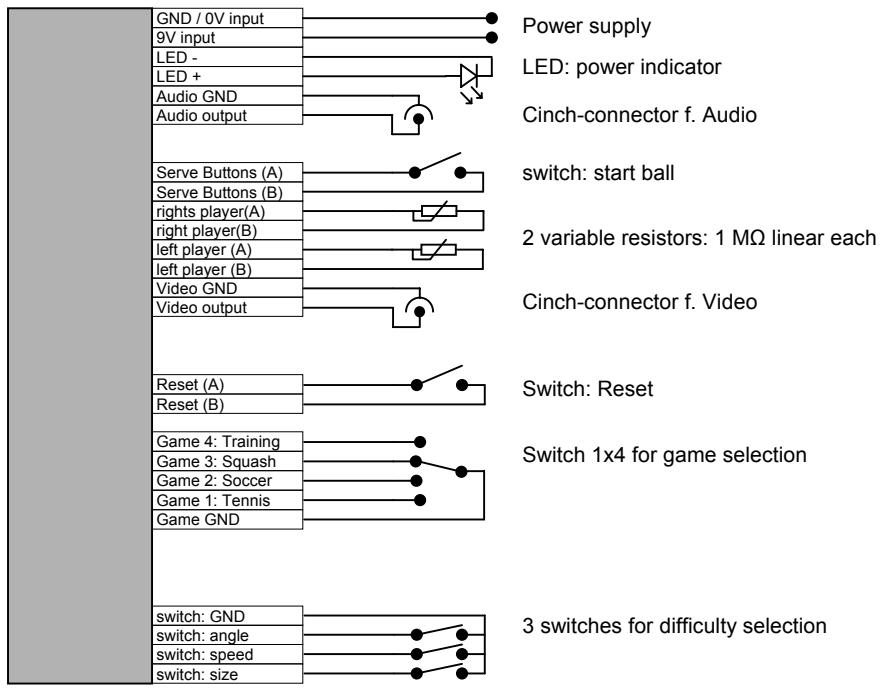
## The circuit board



The circuit should be built on a standard experimental board. The picture above shows the board from the part side.

On the soldering side you must cut some connections (light grey).

# PONG switches etc.



# PONG

## Parts list

Experimental circuit board .....	1
AY-3-8500 (PONG-chip) .....	1
78L05 (voltage regulator 5V) .....	1
78L06 (voltage regulator 6V) .....	1
Quartzoscillator 2MHz .....	1
variable resistor 1 k $\Omega$ linear .....	2
variable resistor 10 k $\Omega$ linear.....	1
variable resistor 1 M $\Omega$ linear .....	2
resistor 150 $\Omega$ .....	1
resistor 220 $\Omega$ .....	2
resistor 10 k $\Omega$ .....	2
diode 1N4148 .....	5
condensator 0,1 $\mu$ F .....	3
condensator 10 $\mu$ F .....	1
switch 1 x on (pushbutton) .....	2
switch 1 x on .....	3
switch 1x4 .....	1
Cinch-connectors .....	2
connector f. power supply .....	1
LED 5mm red, 20 mA .....	1

other parts:

enclosure f. game console

enclosures f. player controls

cables f. player controls

buttons for resistors and switches

power supply 9 V

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## Remarks

This circuit bases on original reference designs from General Instruments. But there is a lot of additional work included in this project. Therefore please disitribute this document only in its original and unchanged form.

The circuit itself is quite simple, but you should build it carefully and check everything twice before you apply voltage to it. It would be not woth it to hurry building it and to risk being hurt or to kill the PONG-chip...

If you have ideas, improvements or anything else that could be interesting for me, please contact me directly.

**And finally:  
If you built your own pong using this document,  
please send me some pictures of it!!!**

My email-address is at the bottom of the page...

## Have fun!