

Add a second fire button to your Atari 2600 joystick

Version 1.6



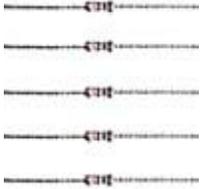
There are some amazing 2-button games (hacks and homebrews) created by the members of AtariAge (atariage.com) for use on the Atari 2600. These games allow the use of a Sega Genesis controller for play with 2 fire buttons. However, you aren't limited to just a Sega Genesis controller. If you can solder wires together, then you can easily add a second fire button to most any joystick that works on the 2600. Here is how I added a second fire button to a standard Atari CX40.

Materials needed:

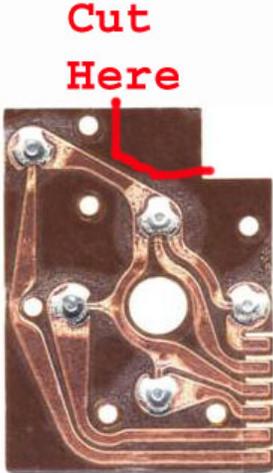
- Joystick cable with all 9 pins wired straight through.
- Momentary contact switch/button.
- A resistor below 1K ohms (I have experienced success with those in the range of 330 to 680 ohms).

I recommend using a joystick cable from a Sega Genesis controller. These controllers are a good source for cables because all 9 pins are wired straight through and they can be found cheaply on the internet.

I went to my local Radio Shack to pick up a momentary contact button, and 330 ohm resistor pack:

	<p>Red Button SPST Pushbutton Switch Model: 275-646 Catalog #: 275-646 \$2.49</p>
	<p>330 ohm 1/4W 5% Carbon Film Resistor pk/5 Model: 271-1315 Catalog #: 271-1315 \$.99</p>

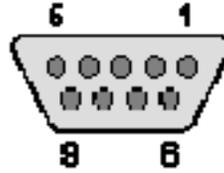
Next I opened up the CX40 and took out the PC board and cut out some room for the 2nd fire button:

	<p>Atari created various designs of the CX40 board, so yours may not look exactly like the board in the picture on the left. Also, you may want to place your 2nd button in a different spot than the one I used. So, feel free to cut anywhere as long as you don't cut the electrical traces on the board.</p>
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Cut a hole in the CX40 plastic case and install the 2nd fire button.

Run the new joystick cable through the plastic base of the CX40, and hook up the new cable wires to all of the standard CX40 board connections (according to the table below). Leave pins 5, 7 and 9 unconnected for now. Of course it is possible that the wire colors on your new cable do not match any in the table below, so you might want to check the pin-outs using an ohm meter, or be prepared for some trial and error.

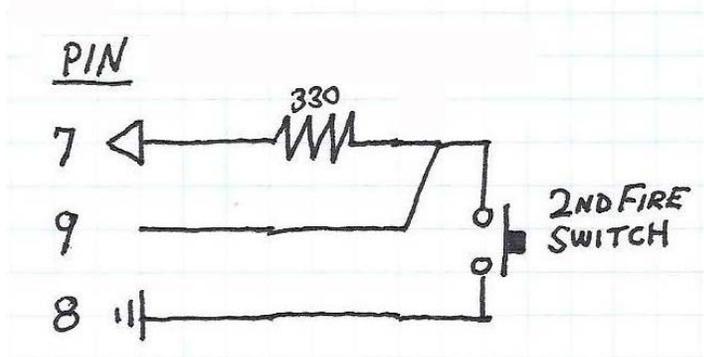
The 9-pin female connector at the end of the joystick cable.



Atari CX40 cable		Sega Genesis cable		3 rd party Genesis cable	
1	WHT- Up	1	BRN- Up	1	WHT- Up
2	BLU- Down	2	RED- Down	2	BLU- Down
3	GRN- Left	3	ORG- Left	3	GRN- Left
4	BRN- Right	4	YLW- Right	4	BRN- Right
5		5	GRN	5	YLW
6	ORG- Button	6	BLU- Button	6	ORG- Button
7		7	GRY- +5V	7	RED- +5V
8	BLK- Ground(-)	8	BLK- Ground(-)	8	BLK- Ground(-)
9		9	WHT	9	GRY

You are now left with three unconnected wires (pins 5, 7 and 9). The 2600 sends +5V over pin 7, and reads the first paddle on pin 5, and the second paddle on pin 9. Games that utilize the 2nd button send information over pin 9. So we need to trick the 2600 into thinking that paddles are present so that pin 9 will be read. Here is what to do...

Attach a 330 ohm resistor (or some other value below 1K ohms) to the wire for pin 7. Then connect the wires for pins 7 and 9 together. Connect them to one end of the button, and connect the other end of the button to pin 8 (which is ground) on the PC board. This diagram should help:



Pin 5 is not needed so you don't have to bother connecting it. With pin 5 not connected, an added benefit is that one does not need to hold down the 1st fire button when booting with a Harmony cartridge.

By the way, you can open any Genesis controller, disconnect pin 5 and still have both fire buttons working on the 2600 (plus eliminate the need to hold down the 1st fire button when booting up the Harmony). Of course you would need to re-connect pin 5 before attempting to use the controller again with a Sega Genesis system.

Now, put the CX40 case back together. Be very careful to not catch any of the wires between the top and bottom of the CX40 case. Hook it up and away you go!

Now you know how to add a second fire button to other 2600 controllers as well! My favorite is modifying the Radica Space Invaders controller so that it plays 2 button games on the Atari 2600. You don't even need to add a second button because it is already there.



Thanks to everyone at AtariAge, especially those who create hacks and homebrews for the 2600 which utilize the 2nd fire button.



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