

TROUBLESHOOTING!

A Guide To Home Joystick Repair

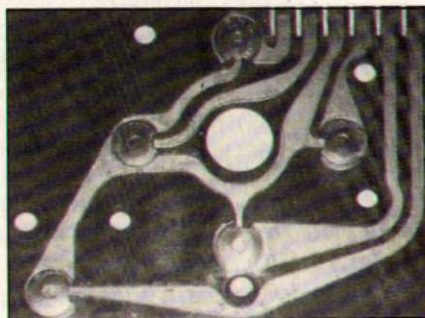
By Bob Guerra

Over twelve million Atari 2600s have found their way into homes all across the country, and with them, over twenty four million joysticks. This easily makes the standard VCS joystick the most used controller in the industry. Most people, however, have no idea how this joystick is made, how it works, or, more important, what to do when it doesn't.

With many VCS compatible joysticks available for between \$10 and \$20 (some even less), a malfunctioning joystick, to many, simply means it's time to buy another one. The choices are many, the prices are right, and many models include features not currently found on standard 2600 sticks.

If, on the other hand, you've developed a certain affection for this old work-horse, you may want to try your hand at fixing it yourself the next time it's in need of repair. If you are so inclined, the first step should be assembling your own joystick repair kit. Here are the items you will need:

1. A small Phillips head screw-driver.
2. A pair of wire cutters.
3. A pair of needlenose pliers.
4. Some insulated wire, ie # 22 or thinner.
5. Electrical tape.
6. *EarthWorld*, *Berserk*, or any other cartridge which allows you to leave the on-screen figure in one position indefinitely without



The exposed circuit board for an Atari 2600 joystick.

losing a game life. It should also make some use of the action button (firing, changing screens, etc.).

Although the VCS joystick is fairly small and light, it is sturdy and usually holds up well under normal use. Therefore, most of the problems you encounter will be of an electrical nature. If the joystick won't allow you to move the on-screen object in a certain direction, or if the action button ceases to function, the problem can usually be diagnosed and corrected in less than an hour, through a few simple tests.

To begin, set up your game system as usual, and slip *Earth World* into the cartridge slot. (If you use *Berserk*, select game number twelve and, using a working joystick, shoot all the robots. You can now stay in the room indefinitely since there's no Evil Otto in this version).

Plug the malfunctioning joystick into the left controller jack, then remove the four screws from the

base. Lift off the top portion of the stick but be sure not to drop the red action button or the small spring it rests on. The spring should be taped in place inside the button, and this should be put aside until you're ready to reassemble the joystick. The top of the joystick can also be put aside; all that you're left with is the base containing the rectangular circuit board.

The circuit board is nothing more than five "bubble" type switches connected by a specific pattern of metallic printing. The four switches surrounding the large hole in the center of the board correspond to the on-screen movements up, down, left, and right. The switch in the top left corner is activated by the action button.

Press each of the bubbles while watching the TV screen. If the game reacts appropriately, then the problem may have been that the white plastic insert was improperly aligned (in the case of a direction problem), or the spring wasn't providing enough tension.

If the problem is with the insert, make sure the tabs that depress the switches are in the proper position, then reassemble the stick. The spring can be replaced, if necessary, with the spring from a ball-point pen. Use wire cutters to cut it to length (about 5/16"). Also, keep this in mind should the spring accidentally be misplaced.

In the event that the bubbles don't all operate correctly when activated

by hand, chances are there's a loose connection where the cord attaches to the circuit board. Check the bottom right side of the board to see if all six insulated wires from the cord are attached properly. If any have come loose, just slide the loose wire back into its metal clip and close it tight with needlenose pliers. Loose clips can be tightened in similar fashion. Now test each of the switches again. Don't be discouraged if the problem persists. You'll just have to dig a little deeper.

It's the function of each of the five switches to momentarily connect two of the six wires. Therefore, you can bypass any given switch by connecting the two appropriate wires with a short length of your own insulated wire. (Strip about 1/4" of insulation off of each end). To determine which wires correspond to the inoperative function, refer below:

<i>Problem</i>	<i>Wires*</i>
<i>Action Button Won't Work</i>	3-6
<i>On-Screen Object Won't Move Up</i>	3-2
<i>On-Screen Object Won't Move Right</i>	3-1
<i>On-Screen object won't move down</i>	3-4
<i>On-Screen Object Won't Move Left</i>	3-5

[* Wire # 1 connects directly below the right bubble switch. The rest are numbered down in sequence with # 6 connecting at the bottom right corner of the board.]

Now, snugly insert one end of your test wire into clip # 3, from the circuit board side. Touch the other end of the test wire to the appropriate corresponding clip and check the screen to see if the function is working properly. If so, retighten the clips and wires until the bubble switch can be operated manually. Then reassemble the joystick.

If bypassing the switch with the test wire fails to affect the game, there's probably a break somewhere on the wire. Finally, if bypassing the switch works, but retightening the slip fails to restore function to the bubble, the switch itself may be worn-out.

To positively determine whether or not the switch is malfunctioning, remove its wire (other than # 3) from the circuit board and replace it with any wire from a working function. If the switch is good, it should now operate the new function. This would indicate that the problem is a break somewhere in the original wire. If the switch is bad, the circuit board will have to be replaced. (More on replacement parts later).

Locating a break may be the most difficult part of repairing your joystick. Once you've determined which wire has a break in it (if it's # 3, none of the joystick functions will work), start by checking that

The next time your mobile cannon suddenly becomes immobile, fix your joystick yourself. You'll learn alot and the money saved can be spent on that hot new cartridge you've been thinking of buying.


part of the wire between the end of the black casing that houses all six wires, and the circuit board. The break will look like a sharp bend or crease in the wire.

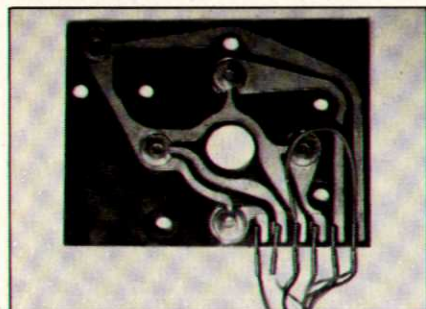
If there is no obvious break in this part of the wire, attach the test wire

to the two appropriate clips, and watch the TV screen as you gently bend the cord. Work your way from the base of the joystick to the plug testing the cord at about one-inch intervals. When you locate the break, your on-screen figure will begin to move. Test the cord a few more times at this location in order to exactly pinpoint the break.

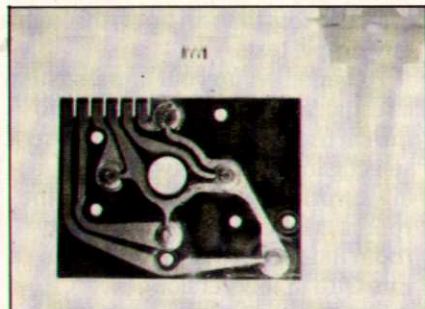
This done, carefully strip off about an inch of black casing surrounding the break. Then, using wire cutters, split the colored insulation of the broken wire and strip 1/4" of insulation from each end. Cross the exposed ends of the wires and twist them together. Fold the twisted end over so it lies flat against the other wires and wrap the entire one-inch section with electrical tape. Remove the test wire, reassemble the joystick, and you're ready to continue your Quest for the Sword.

Problems such as broken inserts or worn-out switches require the purchase of replacement parts. A complete "Atari Joystick Repair Kit" is available from the Atari Game Club, 1700 Walnut Street, Philadelphia, PA 19103. The price of the Kit is \$4.50, and it contains one plastic insert, one spring, one circuit board, plus simple instructions. Many authorized Atari service centers, mail-order houses, and video game stores also sell these parts.

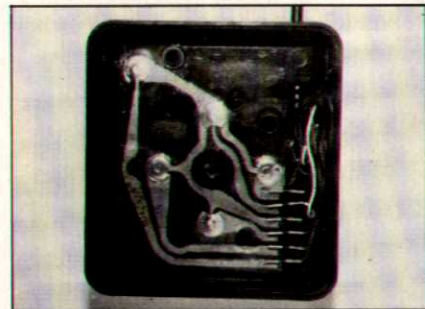
So the next time your horizontally-mobile laser cannon suddenly becomes immobile, or your photon torpedoes get stuck in the hold, fix it yourself. You'll learn a lot, and the money you save can be spent on that hot new cartridge you've been thinking of buying. 



Circuit board with yellow test wire in place to check firing problem.



The contents of an Atari joystick repair kit, including circuit board.



The circuit board in position in the base of the Atari joystick.