

When I mentioned the possibility of doing this hack I was surprised at the amount of interest in it. As you all are well aware, the graphics capability of the 2600 is what you might call less than impressive, and having separate A/V outputs does not help this much. However, since so many people asked me about it I went ahead with it.

Those of you that read the article I wrote in Digital Press on ColecoVision will notice that I have written this one very differently. The reason for this is that there so many variations on the 2600 internals that a universal set of instructions would be impossible. In ColecoVision's case, even though there are nearly as many revisions to the motherboard (MB), the basic design always stayed the same. On the 2600, you have three DRASTIC design changes and several more that are not quite as drastic, but do affect the layout of the MB somewhat. The hardware needed is essentially the same though, so wherever you got the parts for the ColecoVision hack you will probably find what you need for this one.

Basically, this article is designed to give you a good idea where to start and how to locate the raw audio and video signals. It should work with all revisions of the 2600 MB, but is not guaranteed to. Consider this the disclaimer paragraph! Neither the author nor the publisher or anyone affiliated with either of the aforesaid can be held responsible for any damages caused either directly or indirectly by performing this modification. It is intended to be done completely at your own risk. I did fry one of my 2600's by accidentally connecting a wire to something I shouldn't have connected it to so please be careful when wiring.

The following is a list of the parts you will need:

Transistor - Radio Shack Part #276-1617

Capacitor - Radio Shack Part #272-1028 (Electrolytic Type)

Capacitor - Radio Shack Part #272-121 (Ceramic Disc Type)

Resistor - 330 OHMS (Stripes - Orange, Orange, Brown, Gold)

5 Lug Tie Points - Radio Shack Part #274-688. (referred to as "terminal")

Dual Phone Jacks - Radio Shack Part #274-332

You will also need about 7 short pieces of 22-24 guage wire

Open up your Atari 2600's case. The number of screws to be removed can vary from revision to revision. Once you have the top off the case, you will need to remove the shielding. On older models it's a large thick metal box that is held on by six screws on the bottom. On newer models, Atari used a thin silver metal box that's held in place by four tabs that are twisted. Untwist them and remove the metal shielding.

The first thing you need to do is locate the RF Modulator on the MB. It's a silver box about two inches long and one inch high and on all revisions of the MB I have checked, it's located on the right side of the MB. You will notice a small section of circuit board sticking out of the left side of this box. Towards the bottom of this section of circuit board are five pins that are soldered to the MB - these are the input/output lines to the RF modulator. Only the video signal can be drawn from this location though. If you look at the MB at the point where these pins go into it, you will see either a single number "1" or a "1" and a "5" which are the numbers of the pins. In case your version of the MB does not have these numbers, they are numbered from one of five from left to right. The pin that has the raw video signal is pin four. As you can now see, there isn't much room between each of these pins and you are going to need to attach a wire to pin four somehow. What I did was to turn the MB over and "follow" the trace on the MB to find a better place to attach a wire. This is one of those places where the differences in MB revisions keep me from writing a universal article because there are many different places this trace goes depending on the revision you are working with. A rule of thumb though; attach the wire anywhere before it gets to another component. Meaning if the trace "ends" at a resistor or capacitor or something, attach the wire someplace between pin four and the component that is feeding it. You CAN attach the wire directly to pin four, but be careful not to solder any of the pins together or it's fry time!!

Next we need to locate the raw audio signal. There are three chips on the 2600 MB; two 40 pin chips and one 28 pin chip. The chip you will be using is the 40-pin chip that is furthest from the cartridge slot. In this chip (and all others for that matter) there is a small notch on one end of it. Counting from the end that the notch is on, you need to locate the 12th or 13th pin - both output the raw audio. Follow the same procedure as mentioned with the video source by tracing pin 12 or 13 to a more suitable location for attaching a wire.

The next thing you need to locate is a power source. There are a number of components on the MB that you can draw power from, but the easiest to find is a large blue 2200 uF capacitor. On all the MB revisions I checked, the positive side is clearly labeled by a "+" on etched on the MB. In case it's not labeled on yours, simply look at the capacitor itself and you will see that the negative side is labeled. Connect a wire to the positive side of the capacitor. You can also use the point the power switch itself is connected to. There are six connection points on the switch and the top left point is where you can draw power from. This should not vary from MB to MB, but it might. I suggest using a volt meter if you have one handy to make sure this is the correct point. If you don't have a volt meter it would probably be a good idea to use the capacitor lead.



This wire will be referred to as your power supply.

Lastly, you need to locate a grounding source. On older MB revisions that giant metal box that the MB is inside is a ground source so you can attach a wire to one of the two screws that hold the circuit board with all the switches on it. On newer revisions, the silver cover that covers the chips can be used as your ground source.

You can now begin to wire your terminal. There aren't any numbers printed on the terminal itself, but I will be referring to each lug by number. I have them numbered from left to right, one to five, looking at the terminal from the side that the center lug bends towards you. I will also refer to the transistors' pins by number. They are numbered from one to three, left to right also, looking at it from the curved side. The following is a list of what gets connected to each lug on the terminal:

Lug #1 - Lead #1 of the transistor.

Your power supply wire.

Lug #2 - Lead #2 of the transistor.

One lead from the Disc capacitor. (Doesn't matter which).

Lug #3 - This is the GROUND lug. One side of the resistor is connected here.

Connect your ground wire here.

Connect two pieces of wire here. These will be used as the grounds for the audio & video jacks.

Lug #4 - The negative lead of the Electrolytic capacitor. The negative lead is identified by the arrow which is pointing to the negative lead or simply by a "-" sign.

Connect one piece of wire here which will be your positive VIDEO output.

Lug #5 - Connect your audio source wire here.

Connect one piece of wire here which will be your positive AUDIO output.

You now have one lead of the transistor, one lead of the resistor, and one lead of each capacitor just hanging there right? Connect all of these together, but do not connect them to any of the lugs. Just sort of let them hang there, but make sure not to touch them to any other component on the MB OR what you have just built. It would probably be a good idea to tape this "junction" up once you have soldered it together so it doesn't touch something when you put the system back together.

You now need to find a suitable location to mount this contraption. Luckily, the 2600's case is much larger than it needed to be so there is plenty of room in there. I suggest drilling a hole somewhere and using a small nut & bolt to securely fasten it. One thing to consider when picking a location is that your audio and video output wires do not like to be placed near each other or any other wires or components as they will accept a lot of interference from anything near them. Try routing them to your A/V jacks so that they are as isolated as possible.

The Dual Phono Jacks are now ready to be mounted. Again, because there is plenty of space inside the 2600's case you have a number of choices. You will have to cut out a small square out of the case roughly one inch by one half inch. Once you have your square cut out place the phono jack on the case from the outside and using four small screws securely fasten it to the 2600's case. Now you can connect all your wires to the phono jacks. Each of the outside posts on the phono jack gets a ground wire, and the two inside posts will get an audio or video wire.

That's basically all there is to it. A couple of minor problems that I have noticed though. First, the regular output wire that you would normally connect to your TV/Game switch seems to be slightly upset that you have added the A/V outputs and some interference is noticeable. If you plan on using your A/V outputs exclusively you can just remove this wire before you put the system back together. But if you would like the ability to use the old output wire and the interference bothers you, you can install a toggle switch between the power supply wire and the terminal. The second problem I had was getting color output through the video jack. This seems to be a problem with the ground. If you find you are only getting black and white output find another place to connect your ground wire and make sure it's making a good connection.