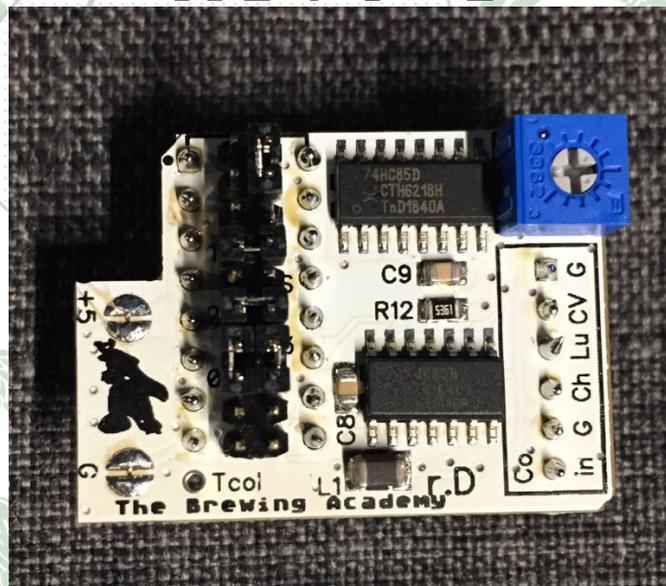


The Brewing Academy

presents

Bryan's
**Ultimate
Atari
Video**
Rev. D

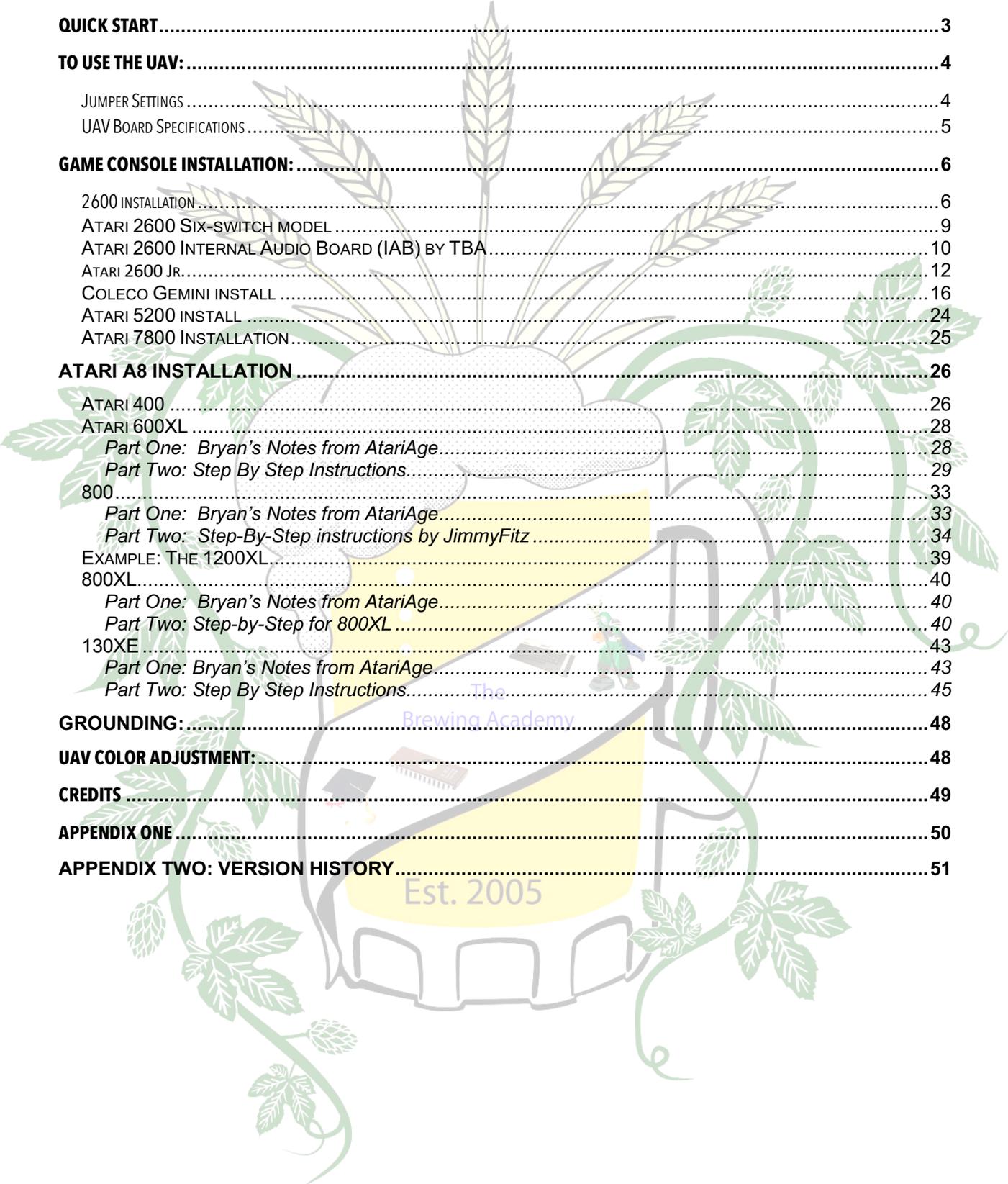


Instruction Manual

Revision 1.94

23 Mar 21

Video upgrade for Atari 800/XL/XE (A8), Atari
2600/5200/7800 and stock video equipment for
the 1088XEL & 1088XLD



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Introduction:

Folks, in 2016, Bryan Edewaard created the Ultimate Atari Video board. It brought much sharper colors and pictures to Atari machines everywhere. In late 2016, he updated the UAV to revision D. It was a runaway hit. It got installed into just about every Atari console and 8-bit home computer known to humankind. It even got built into the 1088XEL and XLD computers invented by MyTekControls and produced by The Brewing Academy. In early 2019, Bryan agreed to sell the rights to the UAV rev. D. to The Brewing Academy and we started producing it for sale. This manual is a **beginning** at a collection of all of installation materials created by Bryan and many other AtariAge users over the years on how to install a UAV into an Atari 400/800/XL/XE/XEL/XLD machine (shortened hereafter as "A8 machines") or Atari 2600s, 5200s, & 7800s!

If you see an error, know of something that should be included or of a link that would be helpful, feel free to drop us a line at macrorie@thebrewingacademy.com or "PM" MacRorie via AtariAge. Enjoy!

Quick Start

We know there's a million upgrades out there, but the good ones are mostly based on tweaks to the original Atari circuit, and the bad ones are haphazardly designed.

1st, the real problems with the Atari circuit(s): The video circuits in most A8s are not sufficiently decoupled from the digital noise in the system. Video power and ground are often shared with very noisy components like DRAM and this causes vertical bars to appear in the picture. For example, you can often see the refresh cycles on the left side of the screen. Crude DACs like the one made from the CD4050 have no ability to reject power supply noise and will superimpose it on the picture. No tweaking of the video buffers will remove it. Atari actually put components in some XLs to blur the image in an attempt to clear up the lines.

That's not to say the buffers didn't need tweaking. They frequently deviated from the 75-ohm impedance standard that that meant the picture quality could be unreliable (shadows, smearing & ghosting), especially with longer cables. At video speeds, you only get maximum transfer when everything is the right impedance. In addition, some of the chroma circuits produced highly distorted sine-waves which contributed to noise in the image.

So, to solve these problems, The Ultimate Atari Video board:

1. Has an on-board regulator to create a clean video power source.
2. Has a 3-channel video amplifier designed for 75 ohm loads.
3. Has a pixel re-clocking circuit to remove skew and better align the 4 luminance signals into a perfect pixel edge.
4. Has a carefully designed chroma-shaping circuit which allows a ~40-45ns shift in the relative Chroma/Luma phase.
5. All inputs now have current limiting resistors. This reduced noise slightly and makes the board a bit more goof-proof.
6. The NCS2563 amp is intended for high-def purposes and doesn't have the 8MHz NTSC filter. All filtering is now done on the board and it looks a bit better. In our opinion, the new composite output now approaches the look of "stock" S-Video on a good monitor.
7. There is a spare pad on the board for attaching the TIA input on the 7800 (Tcol).

In addition, there's an adjustable pot on the board which controls the phase between the chroma and luma signals. A nice side-effect of this that you can change the artifact colors. There's also a jumper to invert the chroma which swaps the positions of the artifact colors. The board plugs into the CD4050 socket for easy installation on most machines. It can be used in place of the original circuit or alongside it.

To use the UAV:

The UAV comes in three flavors:

Plug-in: Jumpers are pre-configured with all headers and pins soldered in place. A socket is included for you to either solder on top of the existing CD4050 ****OR**** desolder the CD4050 and replace it with the socket. A wire for video input is included. There are plug-in versions for the A8, XLD, XEL, 2600, & 5200.

Basic: This is a board where you provide all of the wiring. A manual is provided.

Kit: All headers are provided, but not soldered in place. Socket & wire is included. Jumpers provided, but not installed.

Installation will vary according to the flavor of UAV you purchased and the machine you are installing it in. We have tried to provide pictures and instructions, but your situation may vary. **REMEMBER:** UAV is static-sensitive (as are all electronics) and should be handled with care. If you have questions, please feel free to email @ macrorie@thebrewingacademy.com

Jumper Settings

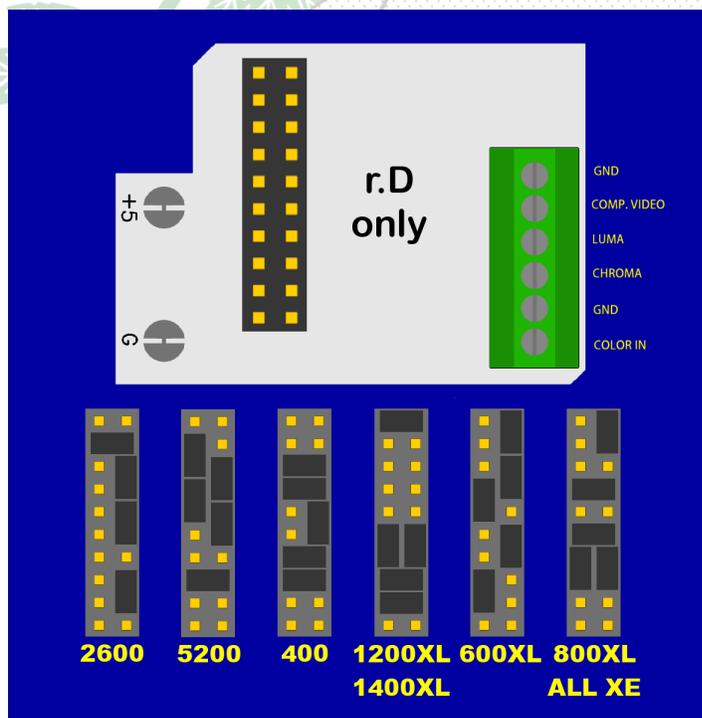


Figure 1: Jumper settings for UAV rev. D

UAV Board Specifications

PLEASE NOTE ORIENTATION for insertion into socket! The Pin 1 indication should align with the same indicator on the machine you are installing

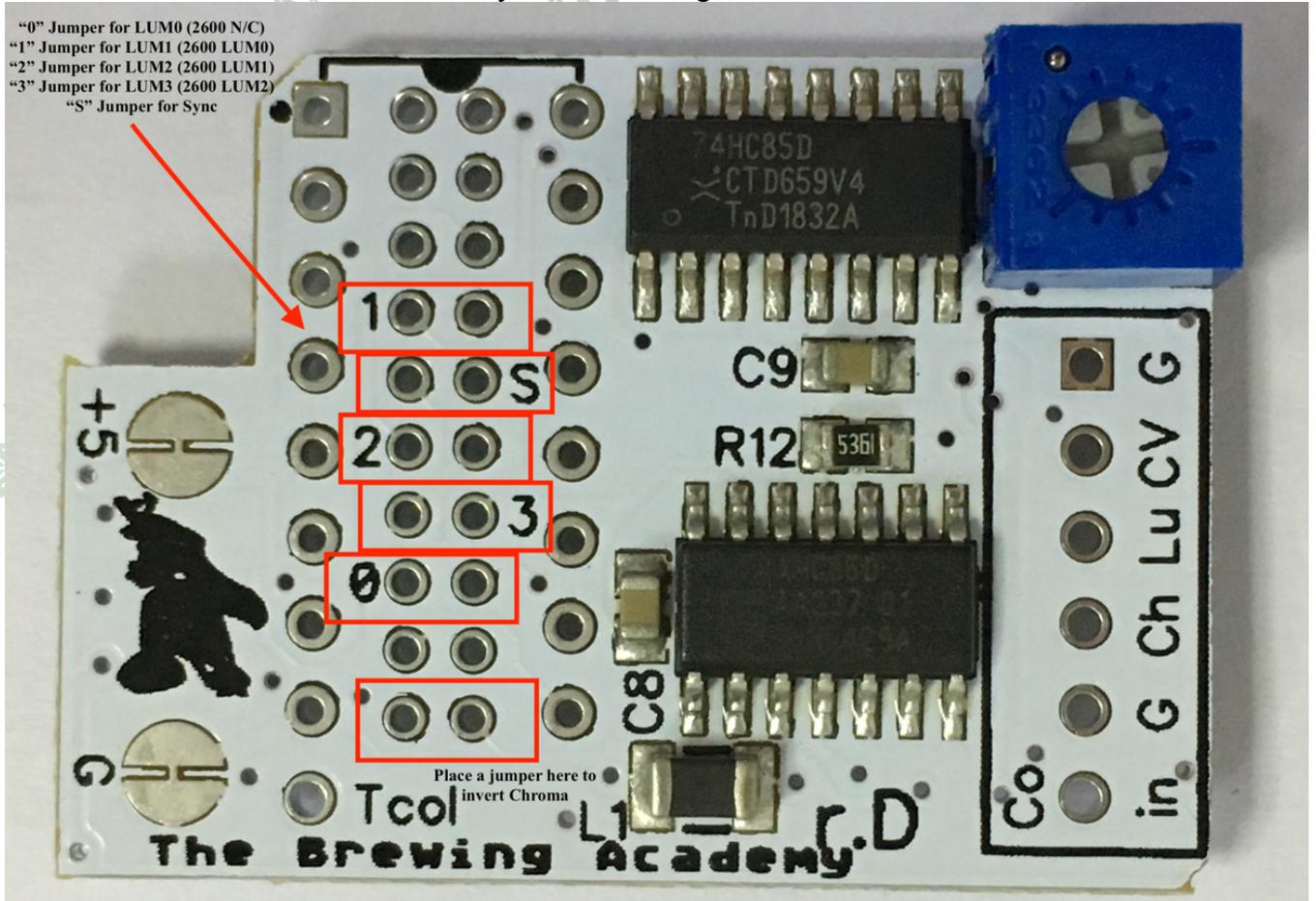
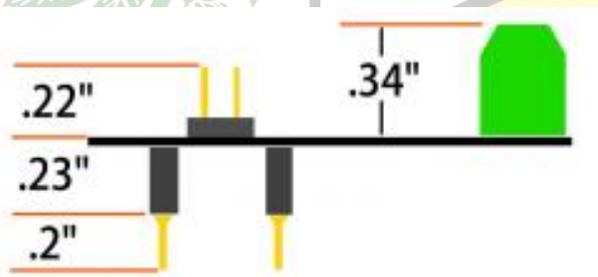


Figure 2: UAV Board specifications & 2600 connections



Game Console installation:

2600 installation

Some quick notes about 2600s...

If you have this sixer board:



or this 2600 Jr. board:



...you should be able to use the plug-in board.

For the 2600 Jr. Color In can be picked up from a via *just* under R28. Here is a picture (yellow wire):



4-switch units typically eliminate the CD4050. I had to lift the chroma mixing cap in my 4-switch because the heavy load on this signal distorted the signal too much (UAV needs chroma as a decent looking square wave). I'm sure there's a way to preserve the RF signal though, even if we just send UAV's output into the modulator. For reference, here's the typical 4-switch board:



Some rev's of the 2600 have saturation boosting circuits and some don't. The saturation boosting circuit causes problems but it can be modified or disabled. If your 2600 has a trace from pin 6 to an 820 ohm resistor, you have the saturation boost. This circuit reduces the level of the colorburst so the TV sets the color gain higher. It also makes the color waveform too distorted for UAV. Lifting pin 6 (if TIA is socketed) or one end of the resistor will eliminate the problem.

Saturation boost:

2600 (6-sw) - Yes

2600A rev 1-15 - No

2600A rev 16+ - Yes

2600jr - No

It can be added back in at another point in the circuit and it won't affect UAV.

COLOR is open collector and has a 1K pull-up that makes it toggle between logic levels (roughly). BLANK is also open collector and is tied to COLOR through a 820 ohm resistor. When BLANK pulls down (this includes colorburst time), you effectively have a 1K pull up and an 820 ohm pull down and the amplitude of the color waveform drops in half (with a big, obnoxious DC step too). UAV doesn't handle this well and the color goes wonky.

After that, the color signal goes through a 47pF cap and we can tie BLANK to this point instead, but another capacitor is needed in line with the 820 ohm resistor (.1uF is fine). Also, the resistor value can be varied to adjust the amount of saturation. This only affects the RF picture, though.

Atari 2600 Six-switch model

The 6-switch 2600 usually has socketed chips, but a soldered in 4050. This isn't a problem though because there's enough room in the shield for a top-mounted socket, and the 4050 is also used to buffer the joystick triggers for some reason (later 2600 revisions don't do this).

1. Position the main PCB with the cartridge slot toward the back.
2. Connect a wire to the left side of R231. This will be power to the UAV. The 4050's power pin is connected to an inline resistor and won't properly power the UAV.
3. Connect a wire to the right side of R212. This is Color-In.

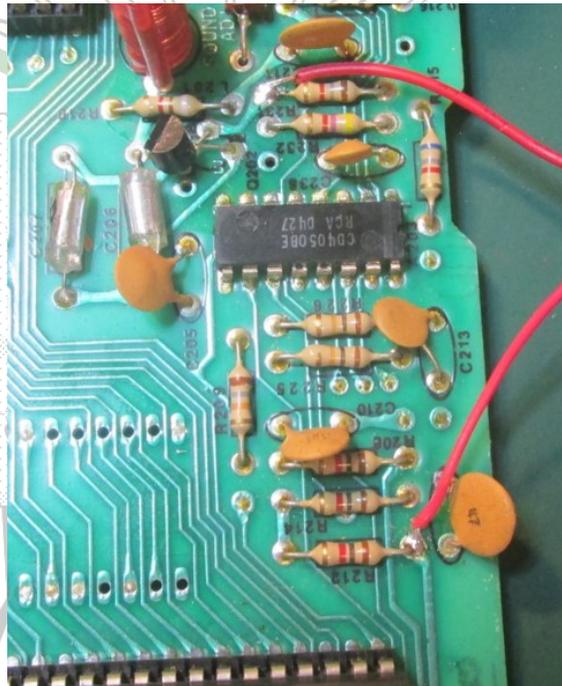
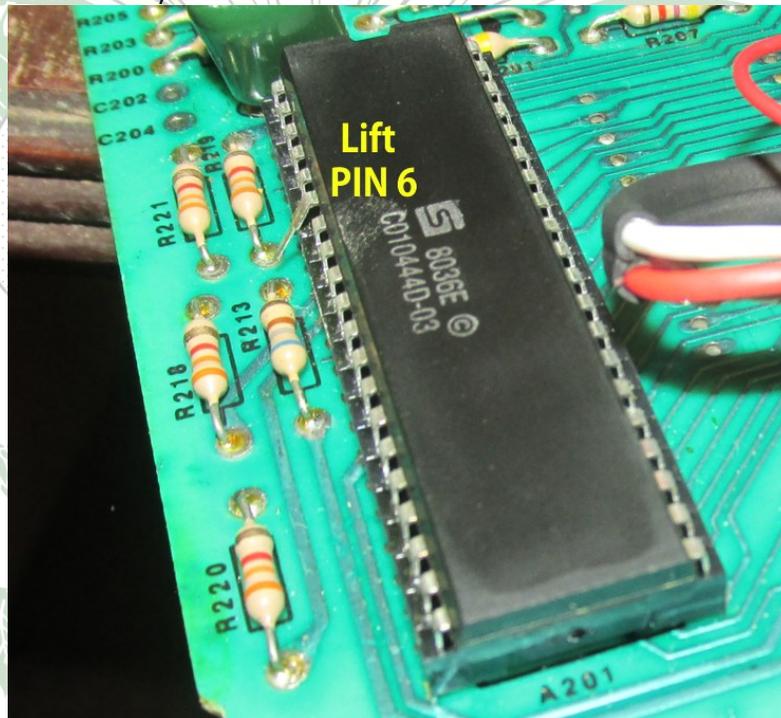


Figure 3: Power & Color In locations

4. Cut pin 1 off the socket. This will break the power connection. If this pin is not removed, it will be necessary to cut the 5V pad on the UAV.



6. Solder the socket onto the 4050. It'll be tight working around the other components, but it's only necessary to solder the pins used by the UAV (3, 5, 8, 11 and 14).
7. Make sure the UAV jumpers are set for the 2600 and install it in the socket. The green terminal should be facing you.
8. Solder the power wire to the 5V pad (left side of the pad if the pad is cut - this is the side next to the UAV logo).
9. Put the Color-In wire in the leftmost terminal.
10. Pull out the TIA (C010444) and bend pin 6 out of the socket. If the TIA is soldered in, then lift one end of R213 out of the board.

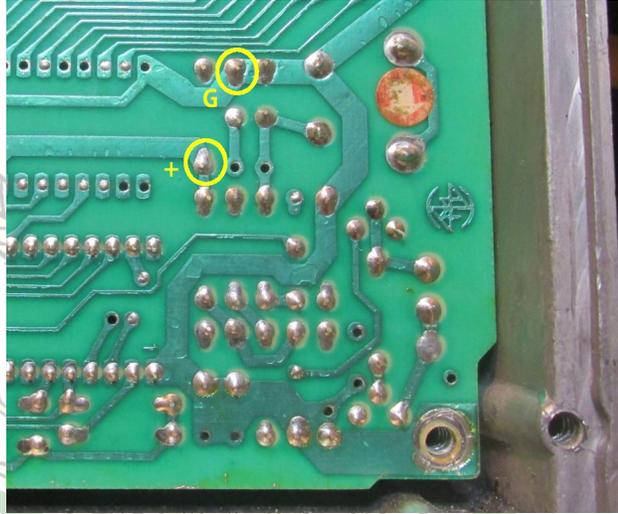


11. Attach your video cables to the UAV. The remaining terminals are Ground, Chroma, Luma, Composite, and a 2nd Ground.

Atari 2600 Internal Audio Board (IAB) by TBA

1. Flip the board over with the cartridge slot still toward the back.

Locate the power and ground pads shown.



2. Using a dupont connector wire (or something similar), connect one end of the wire to pin 3 on the IAB and the other end to The ground point noted by "G," above.
3. Take another dupont connector and connect one end to pin 4 on the IAB and the other end to the "+" location noted above.
4. Attach a wire from TIA pin 12 to either pin 1 or pin 2 on the IAB
5. Attach your audio out wire to Pin 5
6. Attach audio ground (on your RCA jack) to the ground trace near the AC board.



Carefully check your work against the pictures before powering the system. Route cables carefully out of the shielding during reassembly.

Atari 2600 Jr.

(Originally written by Bryan and modified by TBA)

Recommended board: **Kit**

Instructions are for the NTSC 3-chip version. We don't have access to a unicorn/1-chip or PAL version. Please contact us if you're willing to help expand these instructions.

This is one of the more difficult installs. There just isn't much room in the 2600jr and removing the 4050 isn't an option as it's used by the reset circuit. Soldering and de-soldering are required. The Jr's case seems to be very brittle so use caution when taking the screws out so the internal posts don't snap off. Lift the left side of the top case first so you can unplug the flex cable going to the switches. The board is held in by snap levers on the left and right edge. Again, be careful not to break these. Once the board is out, you can straighten the tabs on the bottom of the shield and remove it.

If your Jr. didn't have anything holding the regulator down it means it isn't making use of the large cooling pad on the PCB. We'd advise soldering the tab down or putting a screw through the board.

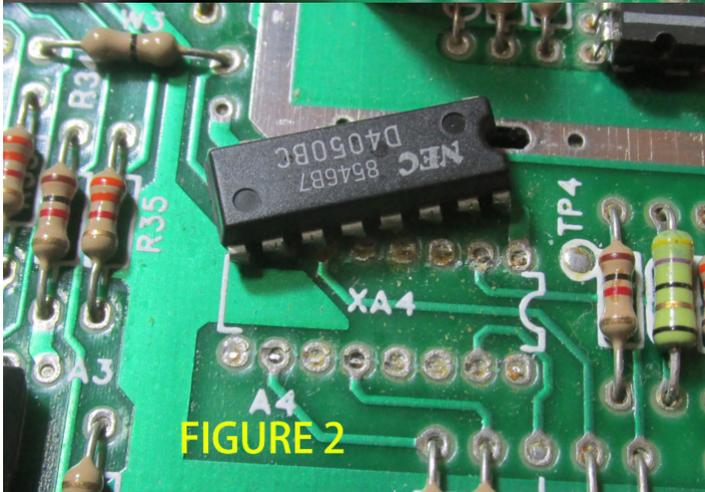
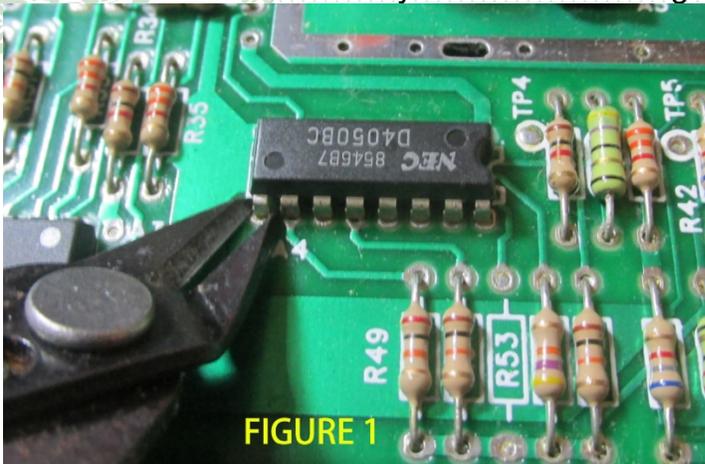
To install the UAV, you're going to need to remove the 4050 or run wires to it and mount it outside the shield (which can be done with a Basic Board). These instructions deal with installing it under the shield.

1. Using the components in the Kit, install the configuration jumpers and the round socket pins. Do not install the green terminal.
2. Desolder the 4050.
 - a. This can most easily done by clipping the legs off and then clearing the pad holes individually.
 - b. Hold on to the 4050 as we'll be using it later (Fig. 1, 2).
3. The internal shielding is required for a good RF picture.
 - a. If you don't plan on using the RF output, you can omit the shielding and install the UAV in a socket as shown in Fig. 3.
 - b. Otherwise, solder the UAV directly into the board as shown in Fig. 4.
4. Install the 4050 on the bottom of the board (Fig. 5). This part is tricky.
 - a. Trim the leads flush with the bottom of the IC and place in the middle of the UAV pins.
 - b. The 4050 must be upside down, and pin 1 must be oriented toward the middle of the PCB.
 - c. It may be necessary to bend the UAV pins slightly outwards.
 - d. Solder each pin carefully and make sure nothing will contact the bottom shield (if used).
5. Lift the back leg of R54 and solder the Color pick-up wire to the exposed pad.
6. Solder the other end to the Color In pad on the UAV (Fig. 6).
7. If the RF jack isn't going to be used, it can be re-purposed as a Composite or Audio jack. To do this, lift the right side of R19 and solder the desired signal to the exposed pad (Fig. 6).
8. Set the jumpers as shown in Figure 6.

Installing an Internal Audio Board

1. Install desired AV jacks and connect the wires to the appropriate output pads on the UAV (Composite, Chroma, Luma, Ground).
2. Locate C12 and, using a dupont connector wire (or something similar), connect one end of the wire to pin 3 on the IAB and the other end to the right side of C12 (the side where you see "L2" just below it).
3. Take another dupont connector and connect one end to pin 4 on the IAB and the other end to the LEFT side of C12.
4. Take a third dupont connector and connect one end to pin 1 or 2 on the IAB and the other end to the front pad of R34 (I used the connected via just in front of it in Fig 8).
5. Attach audio ground (on your RCA jack) to any nearby ground point on the PCB. This isn't needed if you use the RF jack.

Carefully check your work against the pictures before powering the system.
Route cables carefully out of the shielding during reassembly.



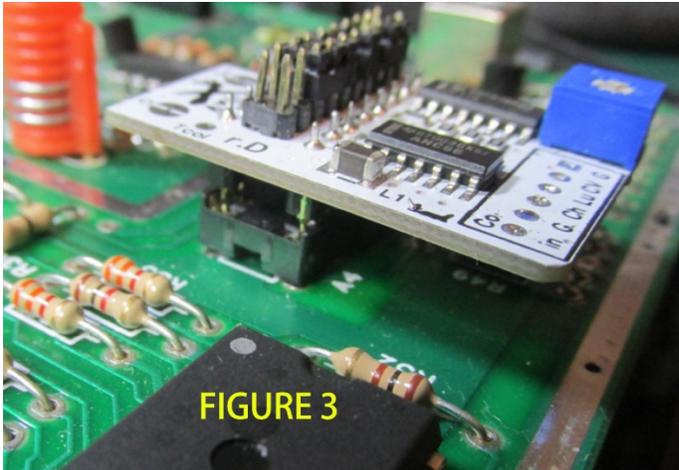


FIGURE 3

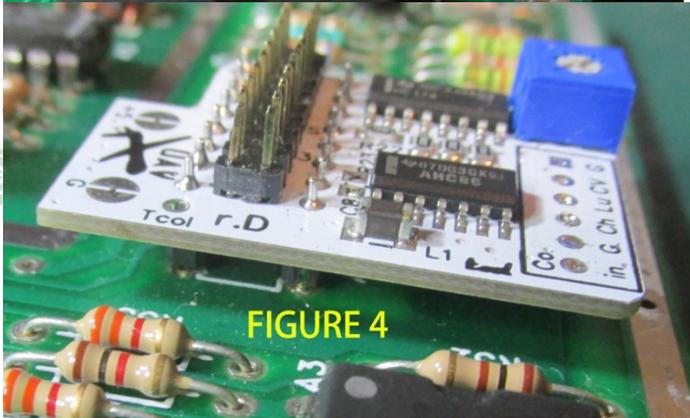


FIGURE 4

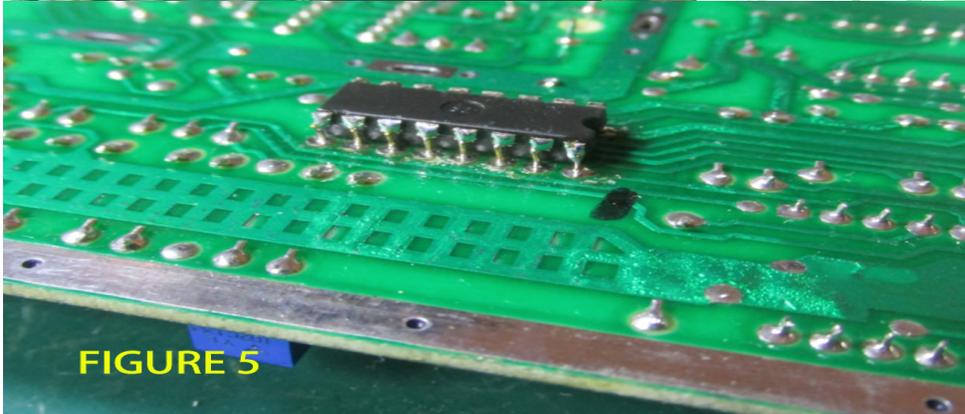
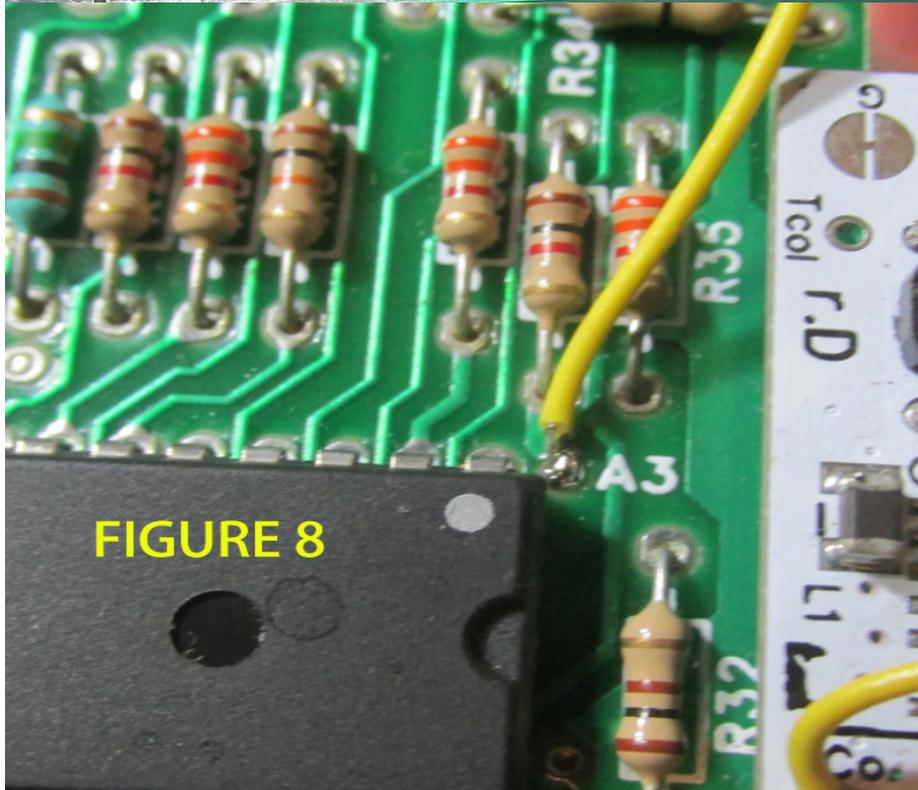
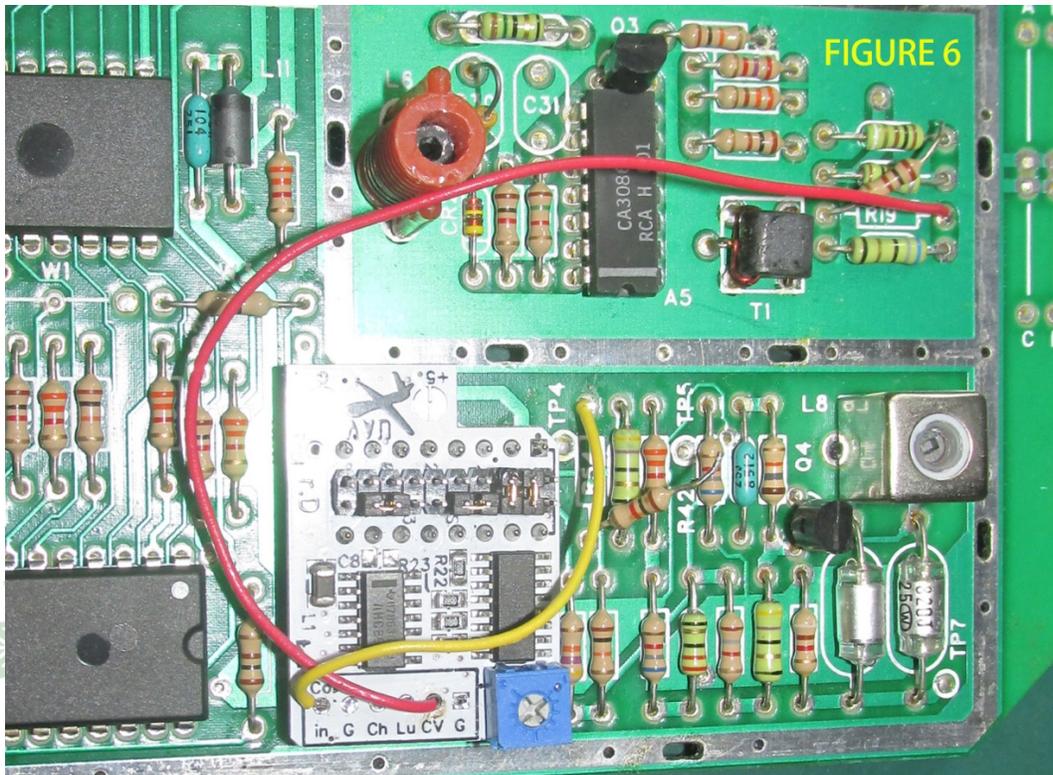


FIGURE 5



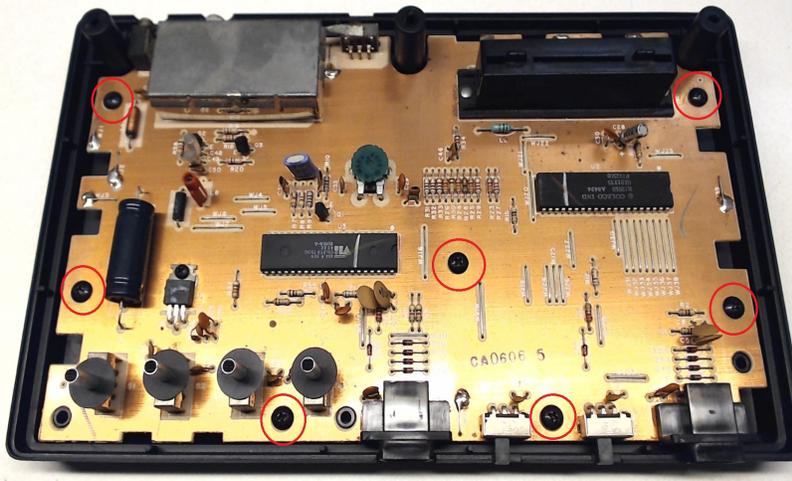
Coleco Gemini install

AtariAge user AwesomeOgre created a GREAT step-by-step for installing a UAV into a Coleco Gemini (2600 clone). Here it is. All credit goes to AwesomeOgre!

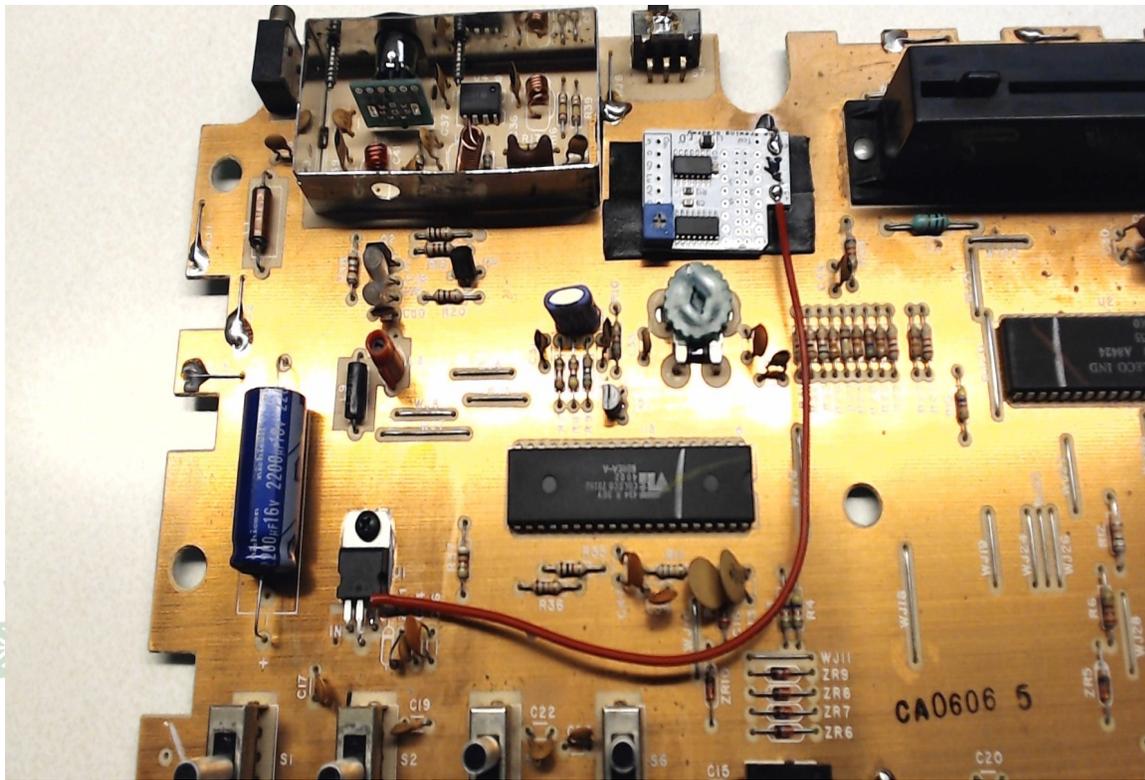
Step 1: Unscrew the 6 screws from the bottom of the console.



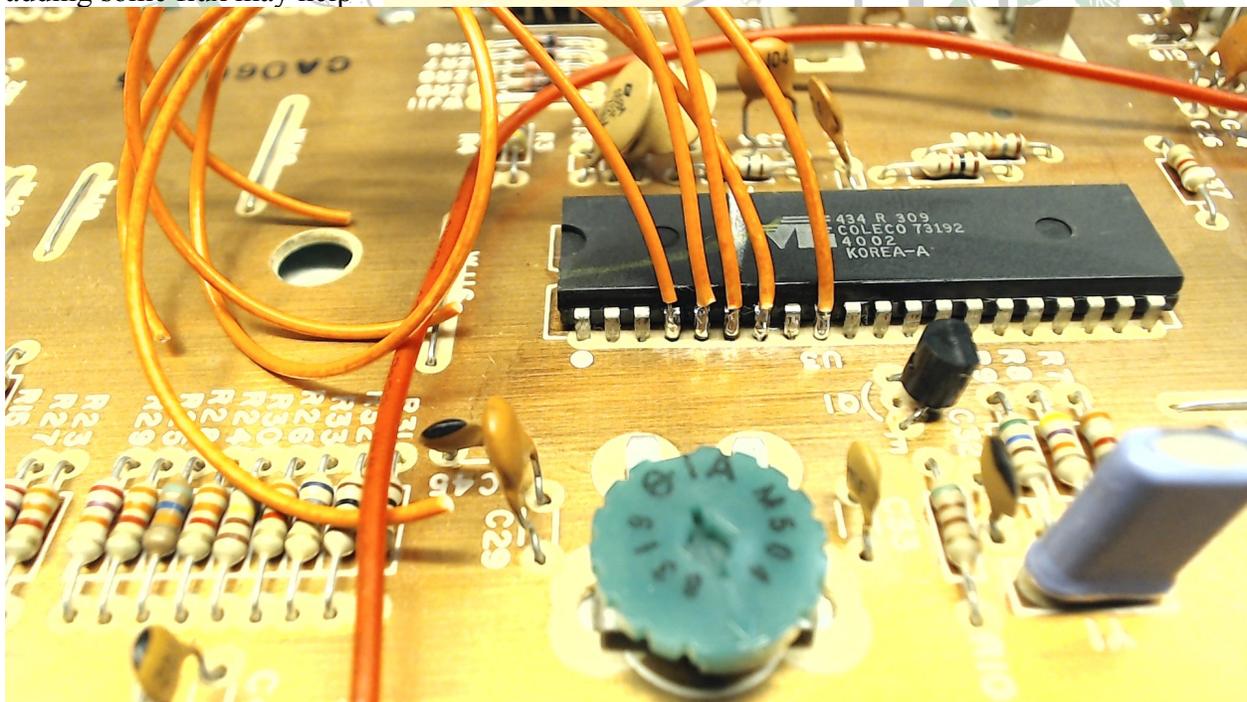
Step 2: Remove the 7 screws holding the motherboard in place.



Step 3: Place some two sided tape on the Gemini motherboard to secure the UAV mod. Connect +5volt & ground



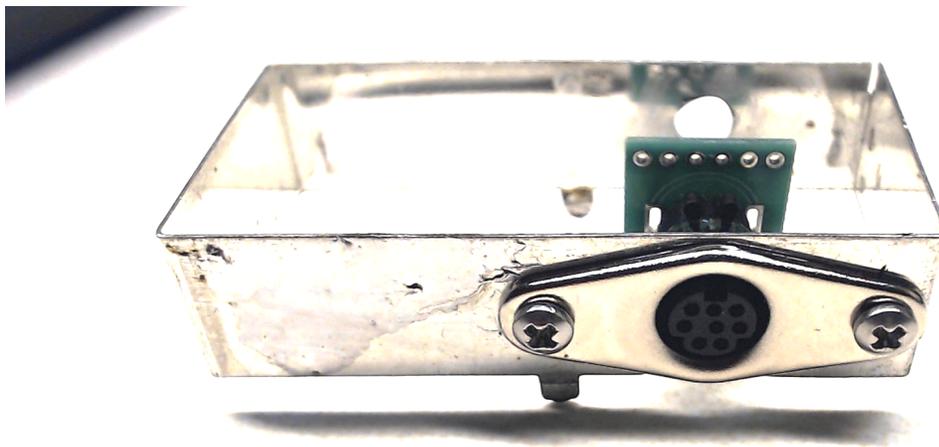
Step 4: Add solder to pins 4, 5, 6, 7, & 9 of the Coleco TIA clone E4002. Then attach wires. adding some flux may help

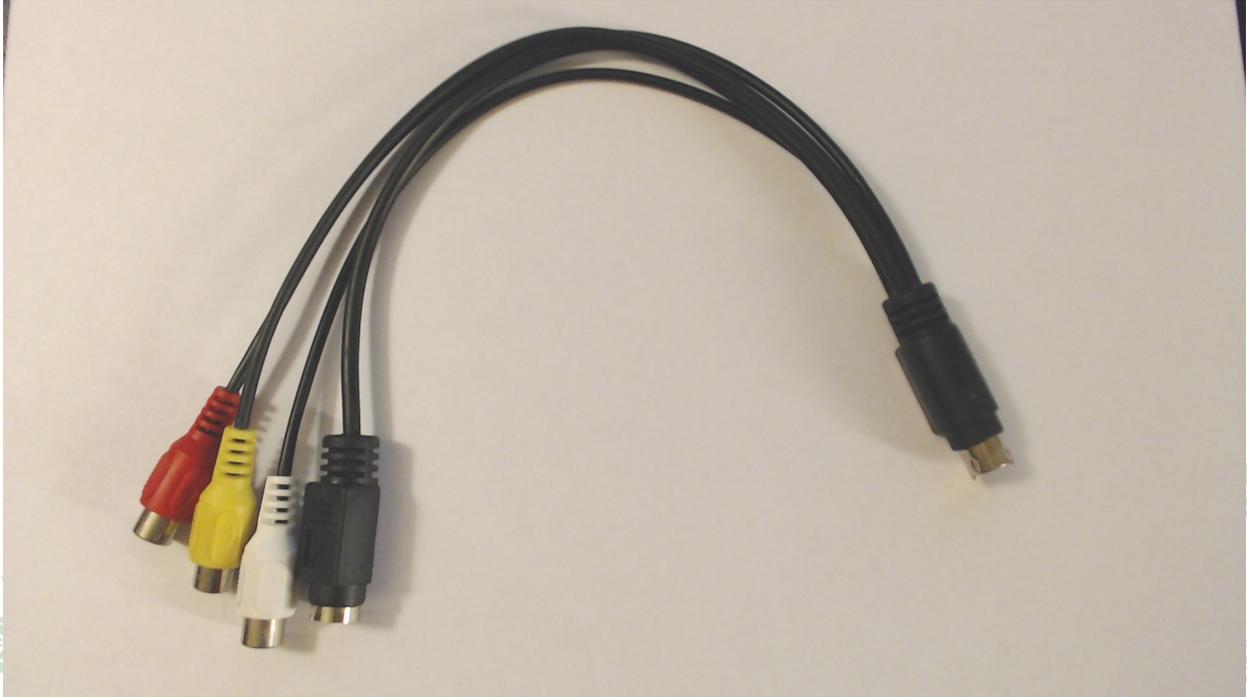


Step 5: Attach wires from the pins of the E4002 to the UAV mod board

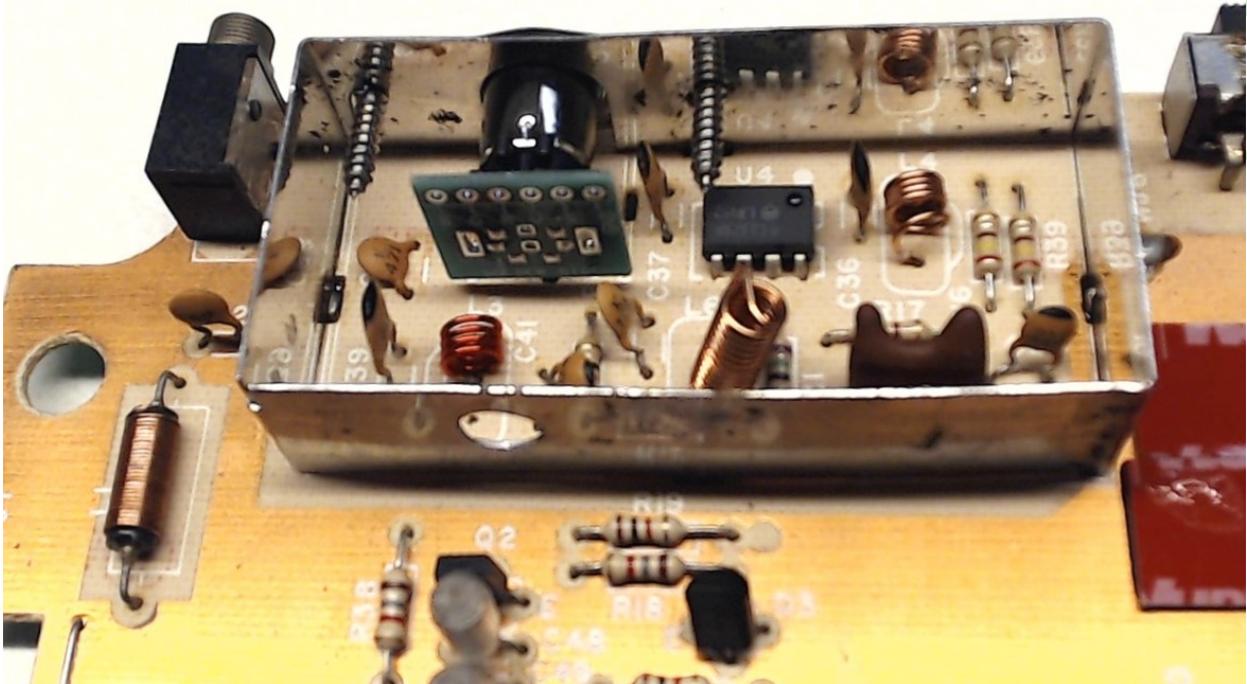
Step 6: Video output. It's really up to you if you want to drill extra holes into your console, it's easier & faster to use RCA jacks.

I chose not to drill into the console shell and went with a 8 pin mini din connector to be fitted where RF out used to be.

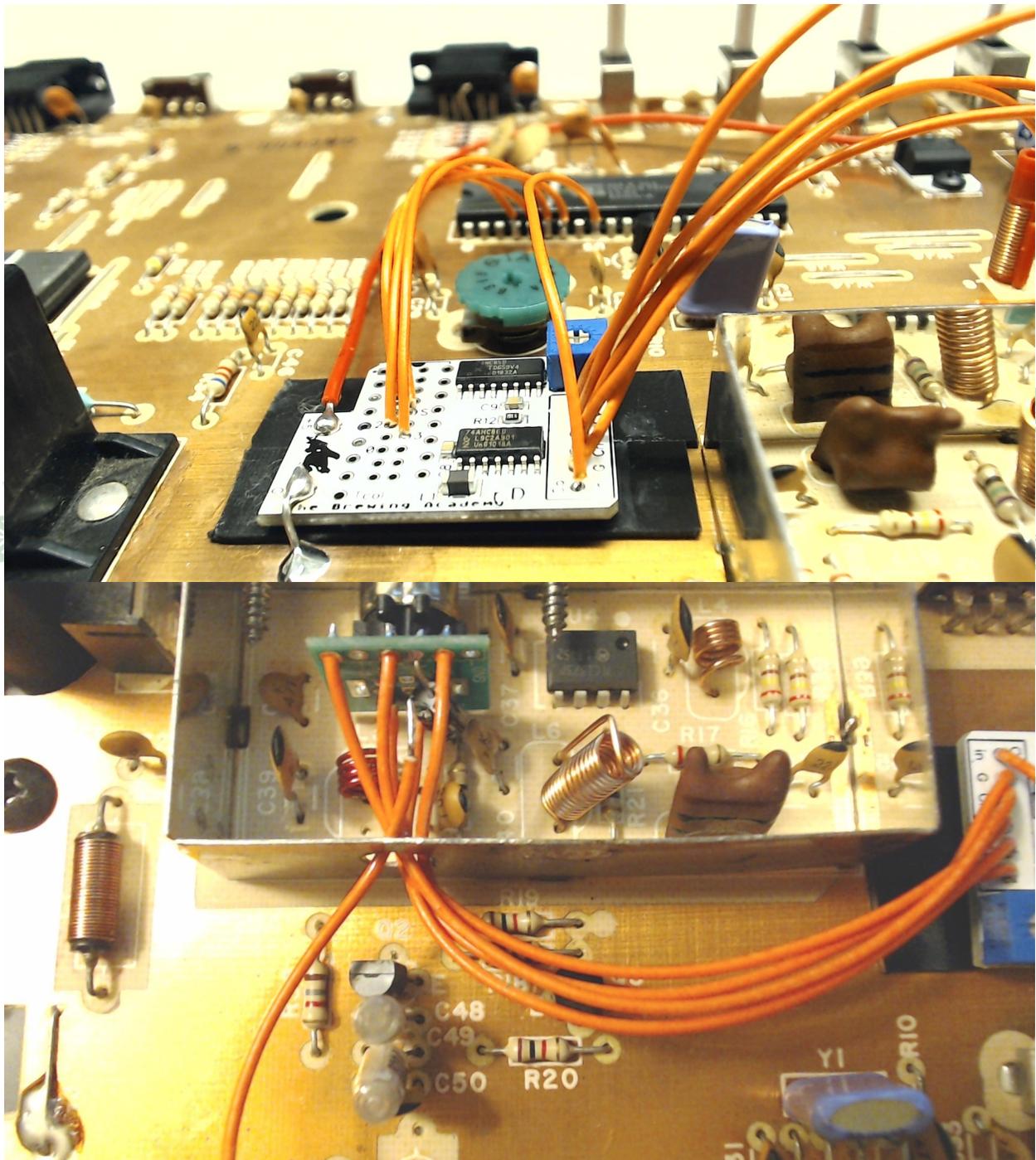




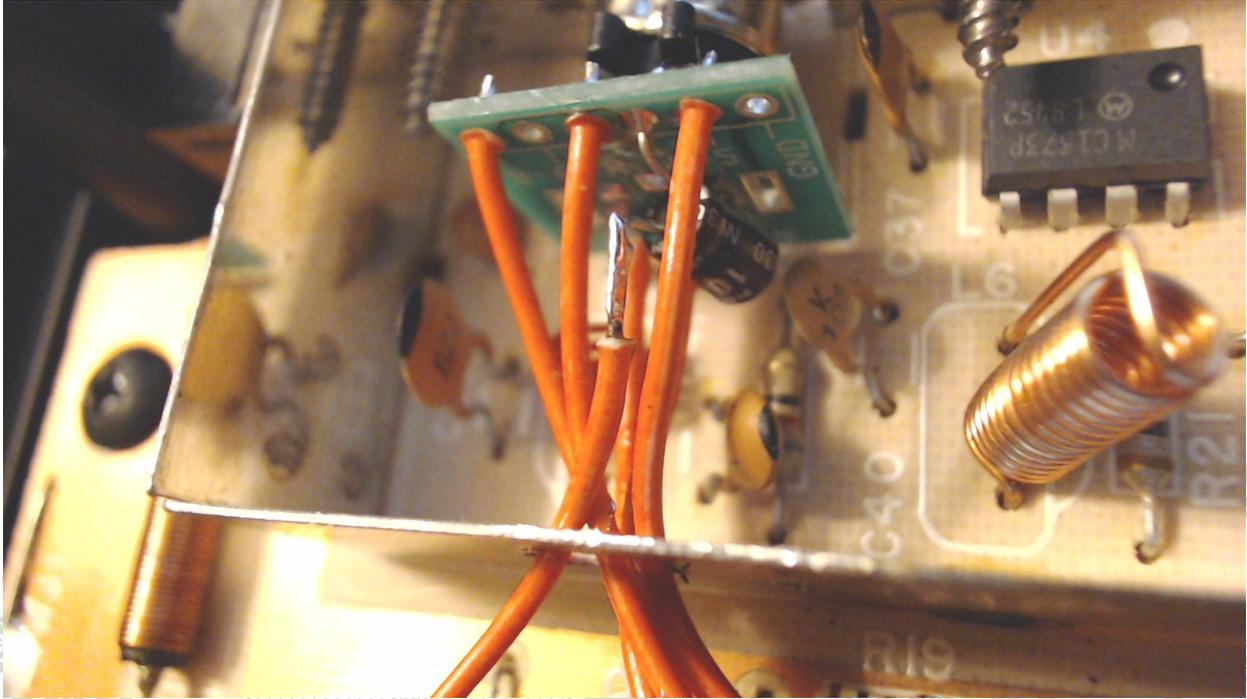
The RF is tough to desolder. It's not for the faint of heart but will result in a nice clean looking unit with no holes drilled into the case.



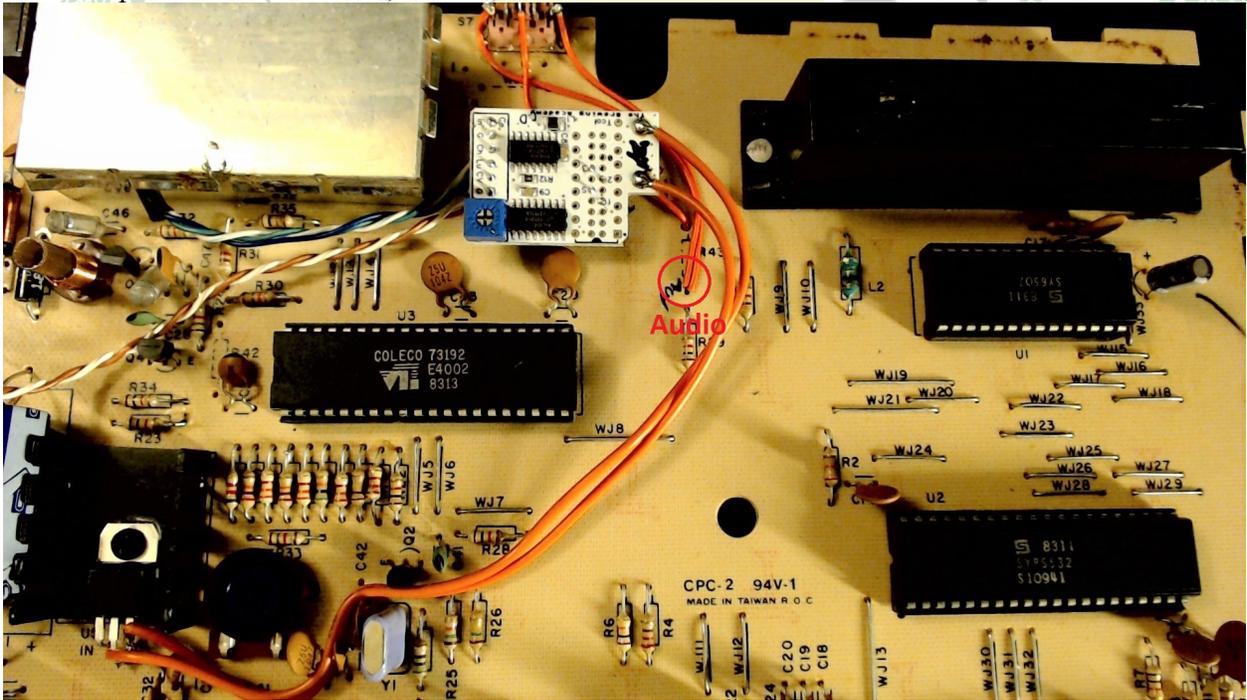
Solder your wires from the UAV board to your video output connector of choice.



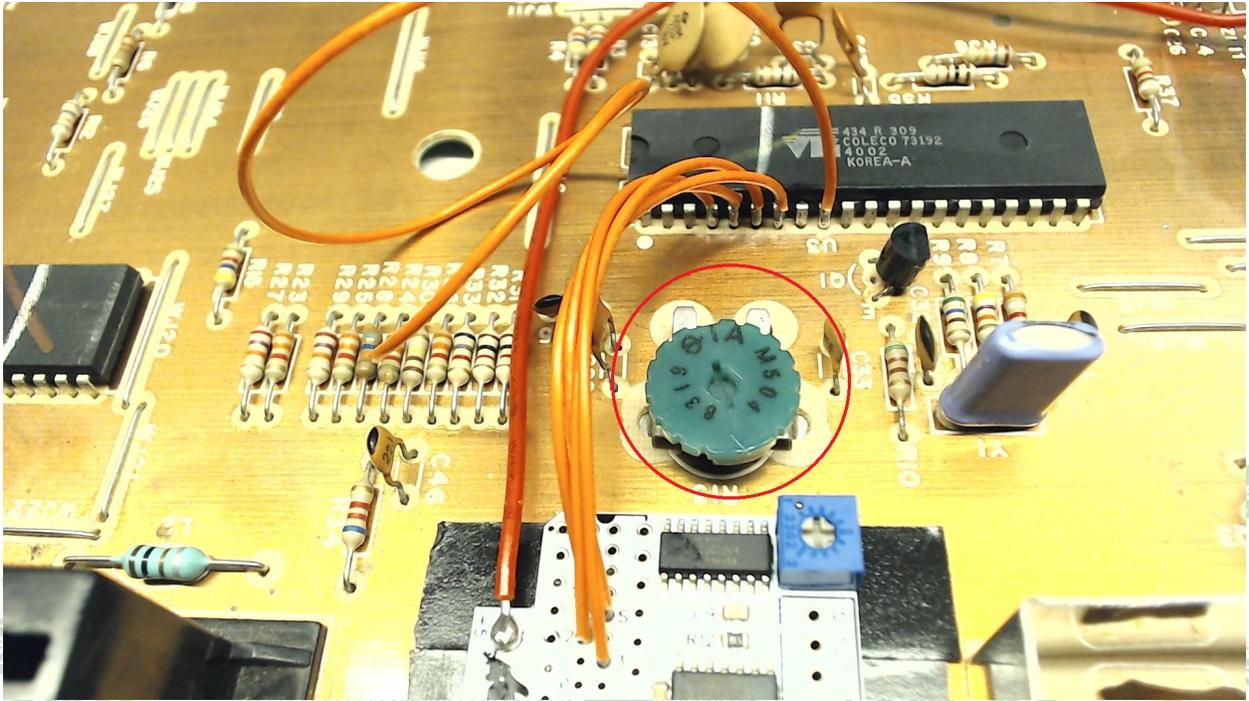
Step 7: Audio comes from C47 just remove the ceramic disk capacitor and add a wire to the via closest to the E4002. Be sure to add a filtering capacitor for the audio, 10uf 16volts will be fine. Solder the audio wire to the positive side of the 10uf capacitor & the negative lead of the capacitor to the audio output connector of choice.



There is another revision of the Coleco Gemini that has a different audio solder point. You can pull Audio from R43, the side closest to R29.



After everything is connected, test it on your display & audio, make sure the colors are correct. If the colors are off you can adjust the potentiometer on the Gemini motherboard til its correct.



After the color is correct & sound reassemble and enjoy:)



Atari 5200 install

AtariAge user -^Cro\$Bow^ created a GREAT 5200 2-port installation manual. You can access it here:

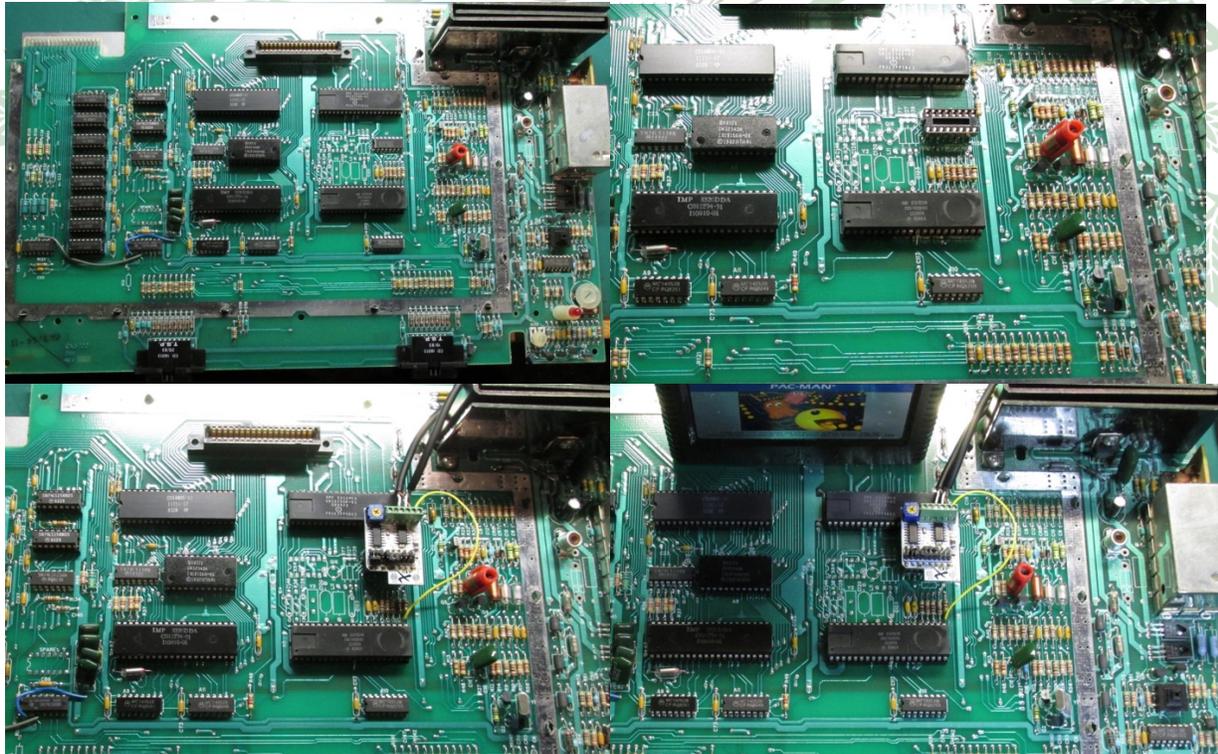
<https://tinyurl.com/vy6ldg6>

OR a video

https://youtu.be/U_lqvt_xr8k

NOTE: If you have a 4-port 5200, you will probably have to keep the 4050 electrically installed. That may be accomplished in a number of ways. This video may be helpful: <https://youtu.be/4-80lxzBktU>

The board fits nicely under the shield. There is a row of resistors behind GTIA. Solder the wire either directly to GTIA pin 21 or to the close end of the far right resistor. The other end goes in terminal 1 (the one closest to the corner).



Atari 7800 Installation

AtariAge user -^Cro\$Bow^- created a GREAT 7800 installation manual. You can access it here:

<https://tinyurl.com/y62kgqxb>

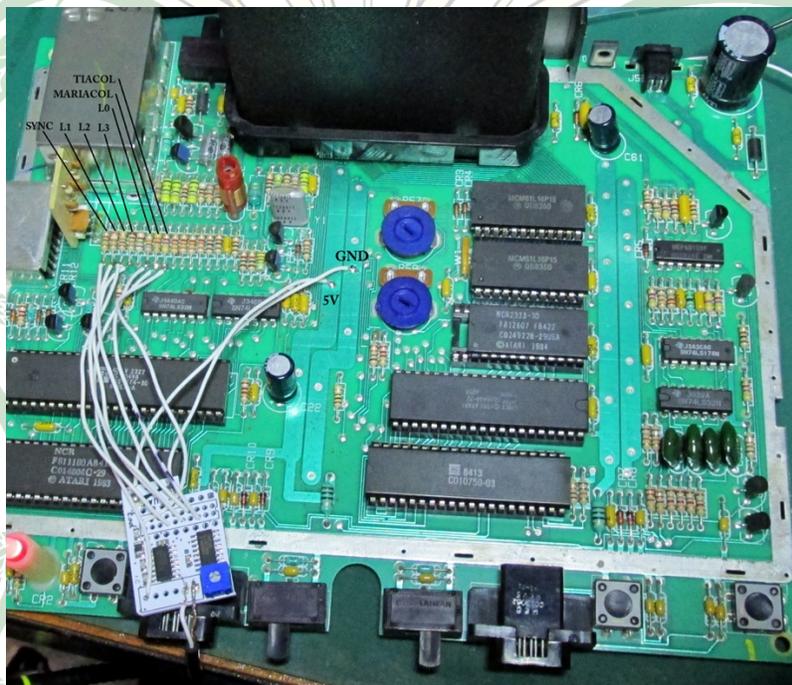
or here: http://www.thebrewingacademy.net/UAV_Installation_A7800.pdf

or

Video: <https://youtu.be/t7b3JXgZzcw>

OR

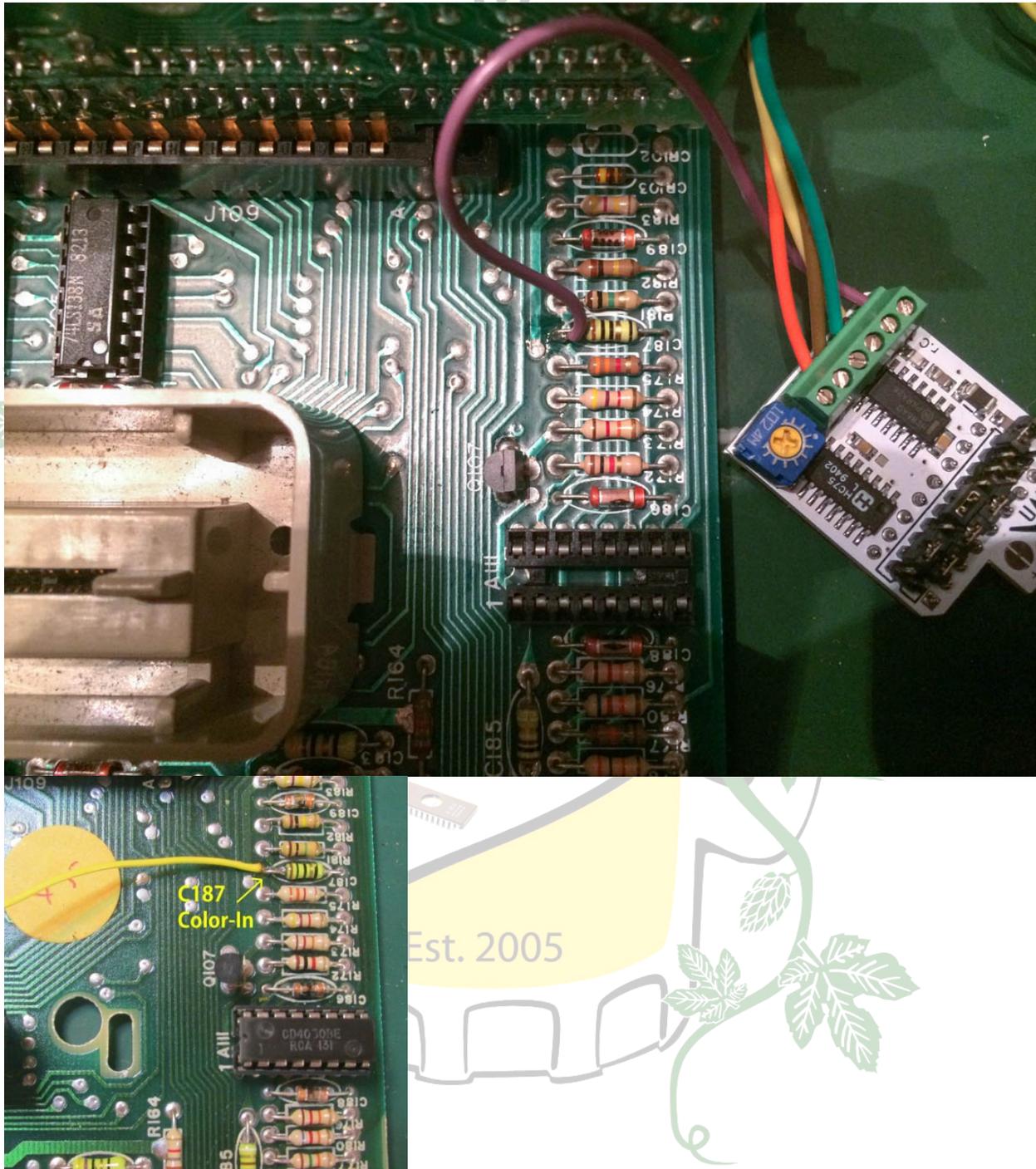
If you've got a NTSC Rev A, just follow the picture. Works great in both 2600 and 7800 modes and you don't have to cut or remove anything. RF output will still work too.



Est. 2005

Atari A8 Installation

Atari 400



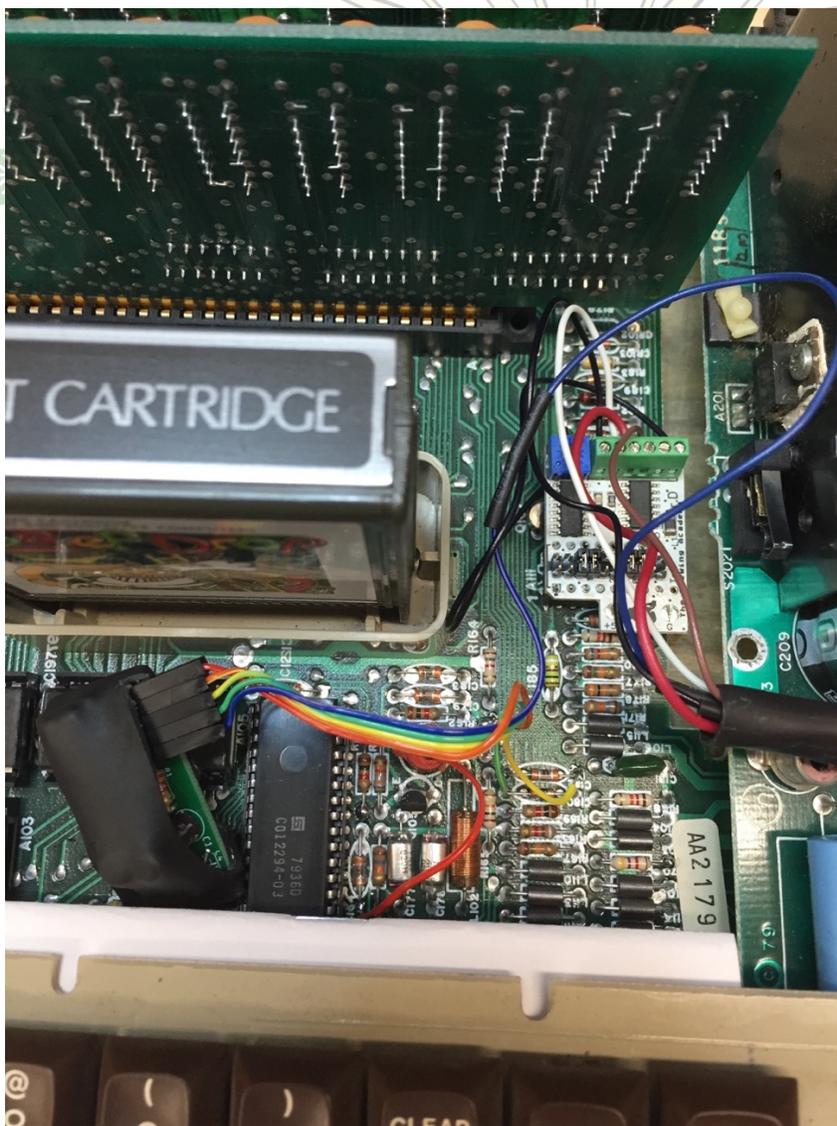
Recommended board: **Plug-In**

The 400 has socketed chips including the 4050. The easiest installation is to put the UAV in the 4050 socket, but if you want to keep the RF output, you'll need to solder the socket on top of the

4050 and then mount the UAV on top of it. These instructions should work for NTSC and PAL systems.

Position the main PCB with the CPU board slot toward the back.

1. Connect a wire to the left side of C187. This is Color-In.
2. Make sure the UAV jumpers are set for the 400 and install it in the socket. The green terminal should be facing away from you.
3. Put the Color-In wire in the right-most terminal (terminal 1 when facing the terminal openings).
4. Attach your video cables to the UAV. The remaining terminals (R to L) are Ground, Chroma, Luma, Composite, and a 2nd Ground.



Atari 600XL

Part One: Bryan's Notes from AtariAge

The first problem is that the Luminance pad (5) is shorted to ground (2) on the bottom, so be sure to cut that trace.

It looks like sound is already hooked up on pin 3.

On the top, the pads from L to R are: 1. Luma 4. Comp. Video 2. Gnd 5. Chroma 3. Audio

The only other pad that has a trace is Composite and it looks like it goes to unstuffed (missing) components.

You'll also need to run a wire from pin 21 of the GTIA chip (OR There's also a closer place to pick off GTIA pin 21 at the top of the resistor shown) to UAV 6 (color in), otherwise you'll only get black and white. Put the board in the socket (logo facing front) and attach Composite, Luma, Chroma, and Color IN to the terminals. BTW, if you remove the 4050, you lose the modulator function.

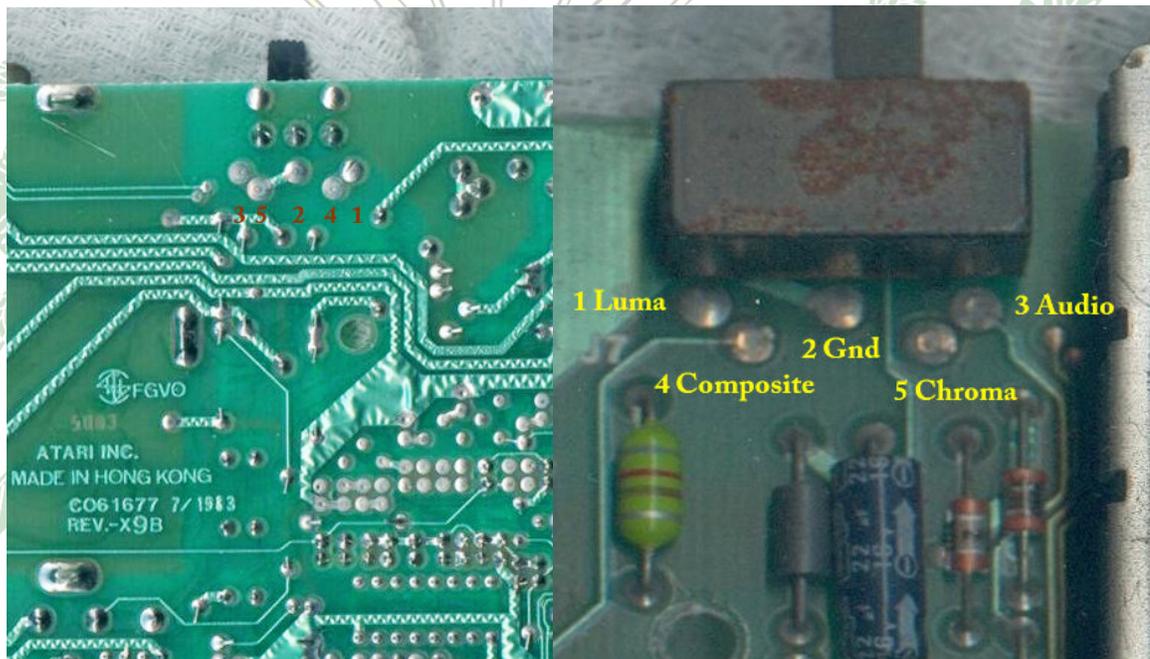


Figure 4: Solder points on 600XL M/B

Est. 2005

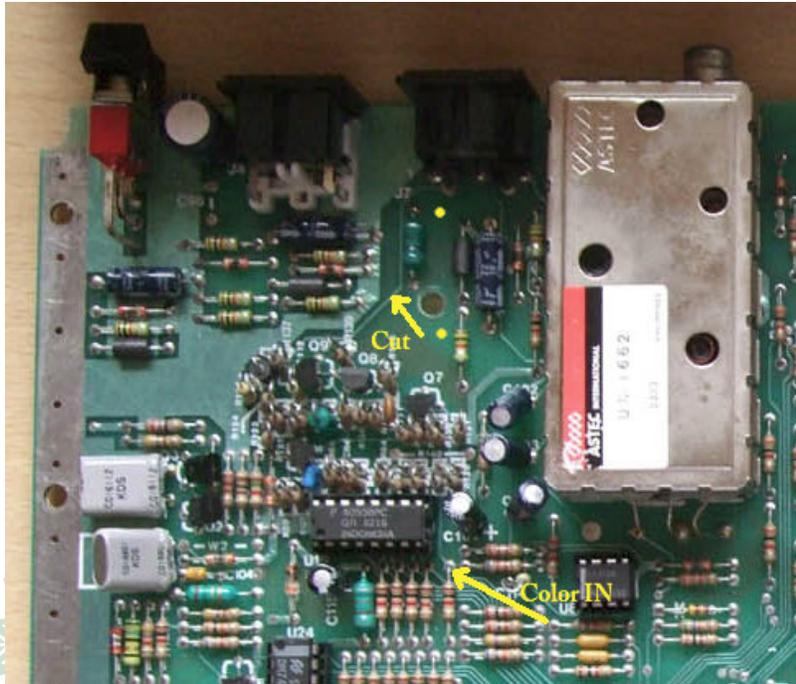


Figure 5: Color-in & trace cut in 600XL

Directing UAV's output to the 5-pin monitor jack

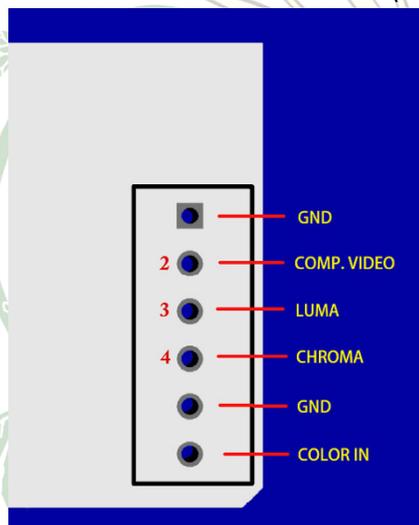
1. Install UAV either by soldering all the input wires to a Basic board and securing it somewhere, or pulling out the 4050 and putting the UAV in its place, or by soldering a socket onto the 4050 and plugging the UAV in on top. The presence or absence of the 4050 doesn't matter because we're not going to be using the built-in video
2. When internal signals are routed to a port, there is usually some kind of filter to reduce the likelihood of RF leakage. This component can be lifted to break the path back to the original video circuits.

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Part Two: Step By Step Instructions

1. Purchase a Plug-in version of the UAV & set the jumpers per **Figure 1: Jumper settings for UAV rev. D** (page 3)
2. Acquire a 5 pin DIN connector
3. Remove the TV channel switch selector on the mother board
 - a. Remove solder from points in **Figure 4: Solder points on 600XL M/B**
 - b. Drill two small holes for the case ground/DIN
 - c. See Figures 5-7 (below) for details
4. Cut trace that labelled "cut" in **Figure 5: Color-in & trace cut in 600XL**
5. Cut the fat trace between pins 2 and 5 one the **UNDERSIDE** of the motherboard
6. Install 5 pin din in now empty solder holes
 - a. Solder all five pins
 - b. Solder DIN case grounds and flow some solder to the old channel switch case grounds
7. Remove 4050 (to the left of C101) and install UAV in socket

- a. Match pin one (indent in top of chip) to pin one on UAV (see **Figure 2: UAV Board specifications & 2600 connections** for a similar mark on top of UAV)
 - b. You may want to install a machine pin socket in this socket so that it clears the upright resistors here.
 - c. You could also install a socket on TOP of the 4050 so that the RF regulator still works, but it is NOT necessary.
8. Solder the following wires to the pins on the motherboard and connect them to the UAV
- a. Motherboard 1 to UAV terminal 3
 - b. Motherboard 4 to UAV terminal 2
 - c. Motherboard 5 to UAV terminal 4
 - d. Motherboard Color-in resistor (see Figure 3) to UAV terminal 6



Please note: Make sure you have a cable that will put the signals on all of the cables. Some cables being sold on eBay route ground to one of the cables. This will not work for this install.

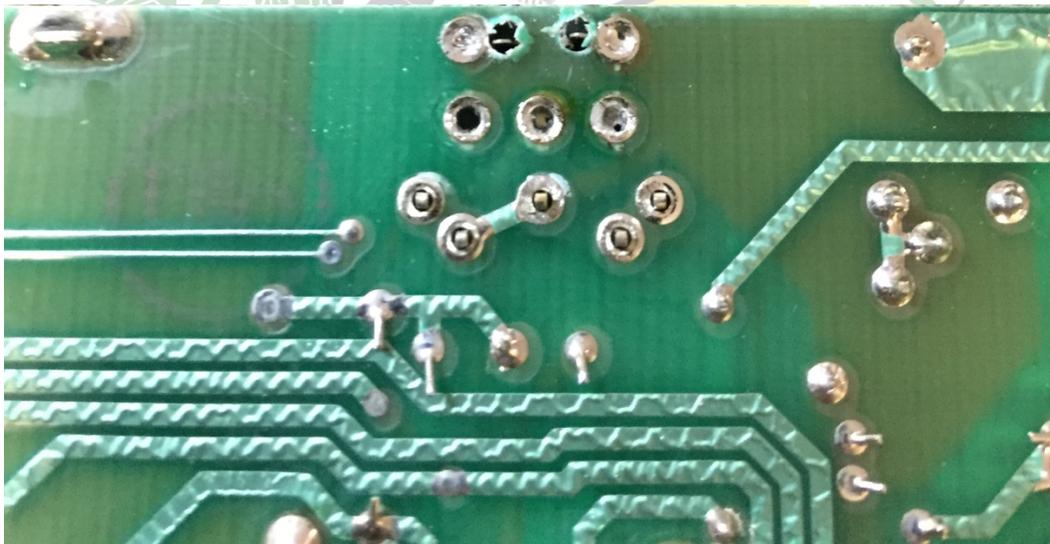
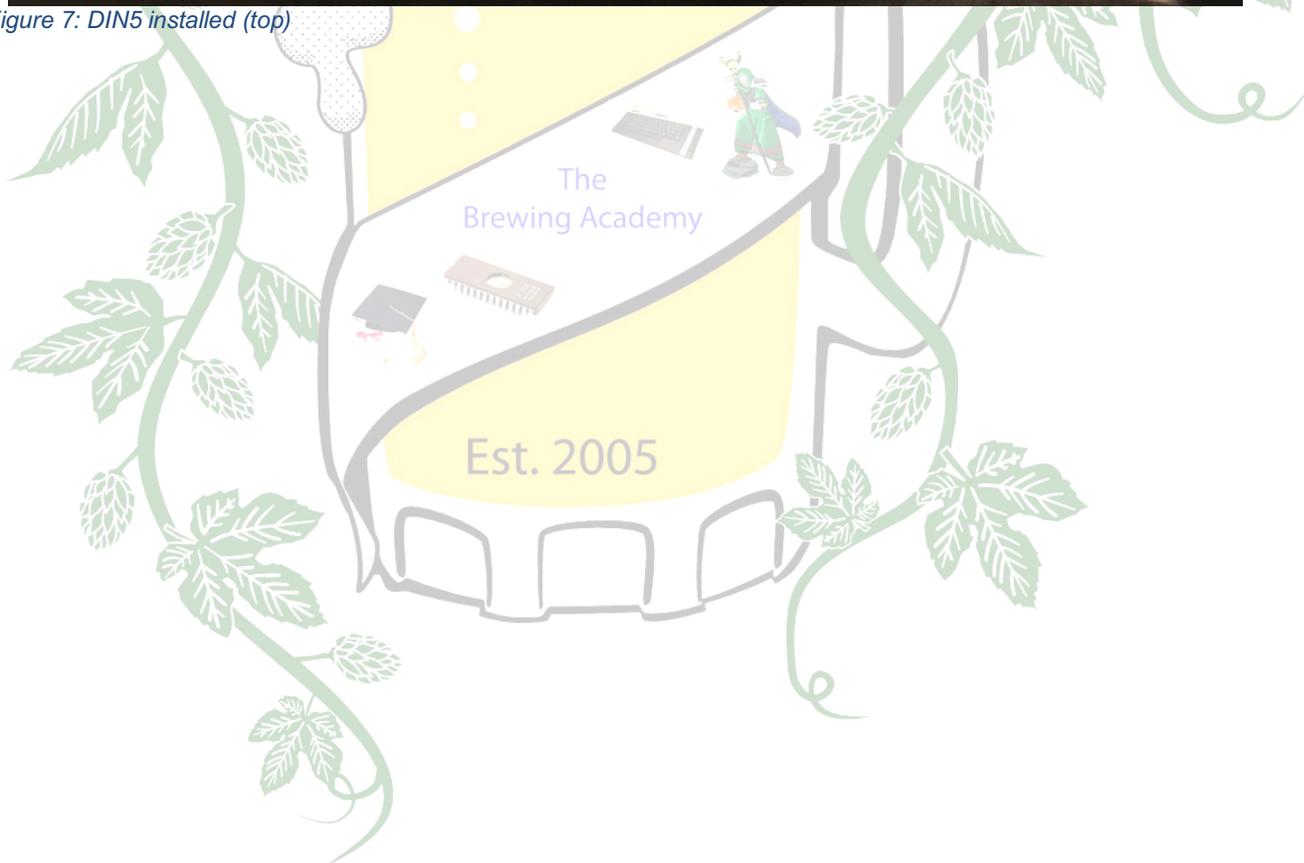


Figure 6: Motherboard with DIN5 installed



Figure 7: DIN5 installed (top)



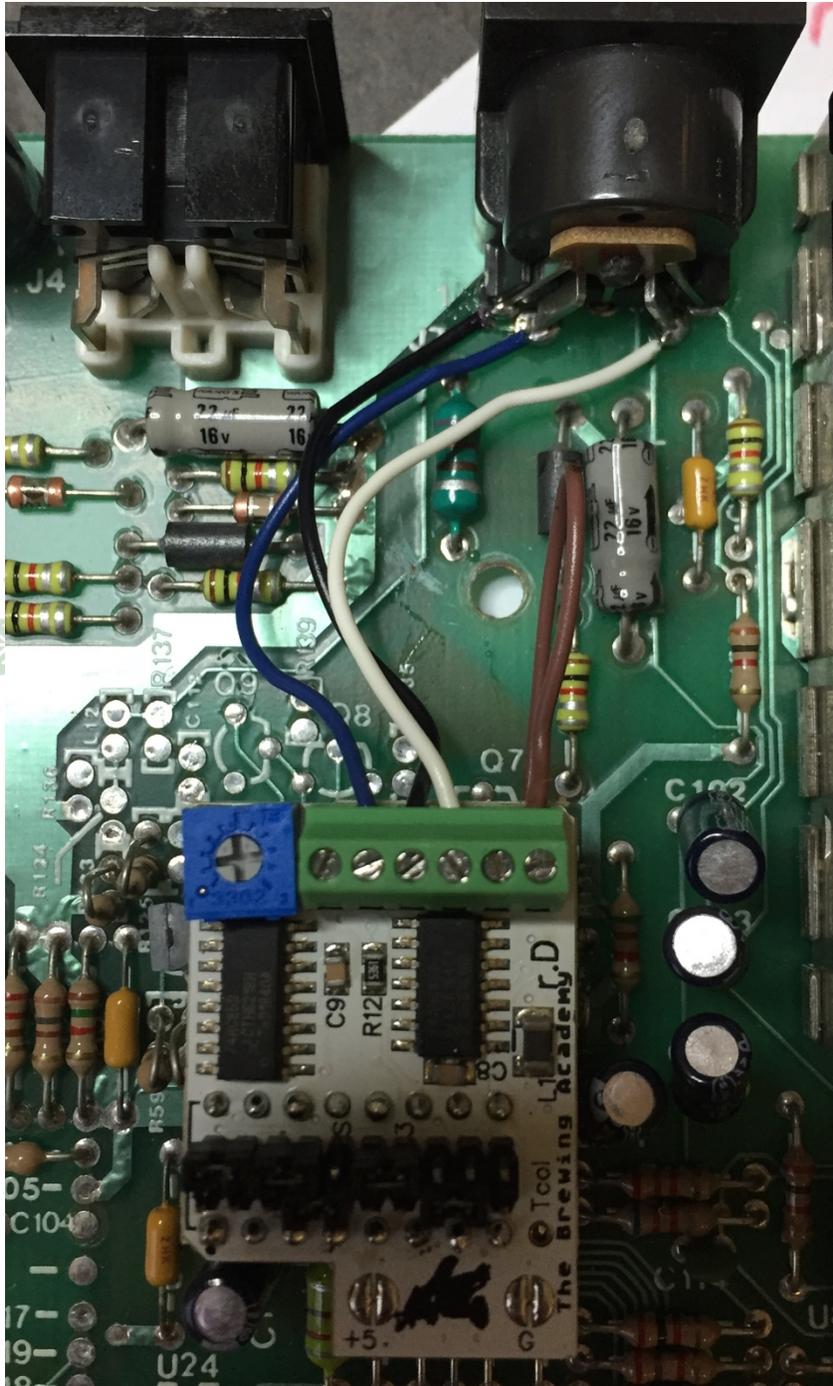


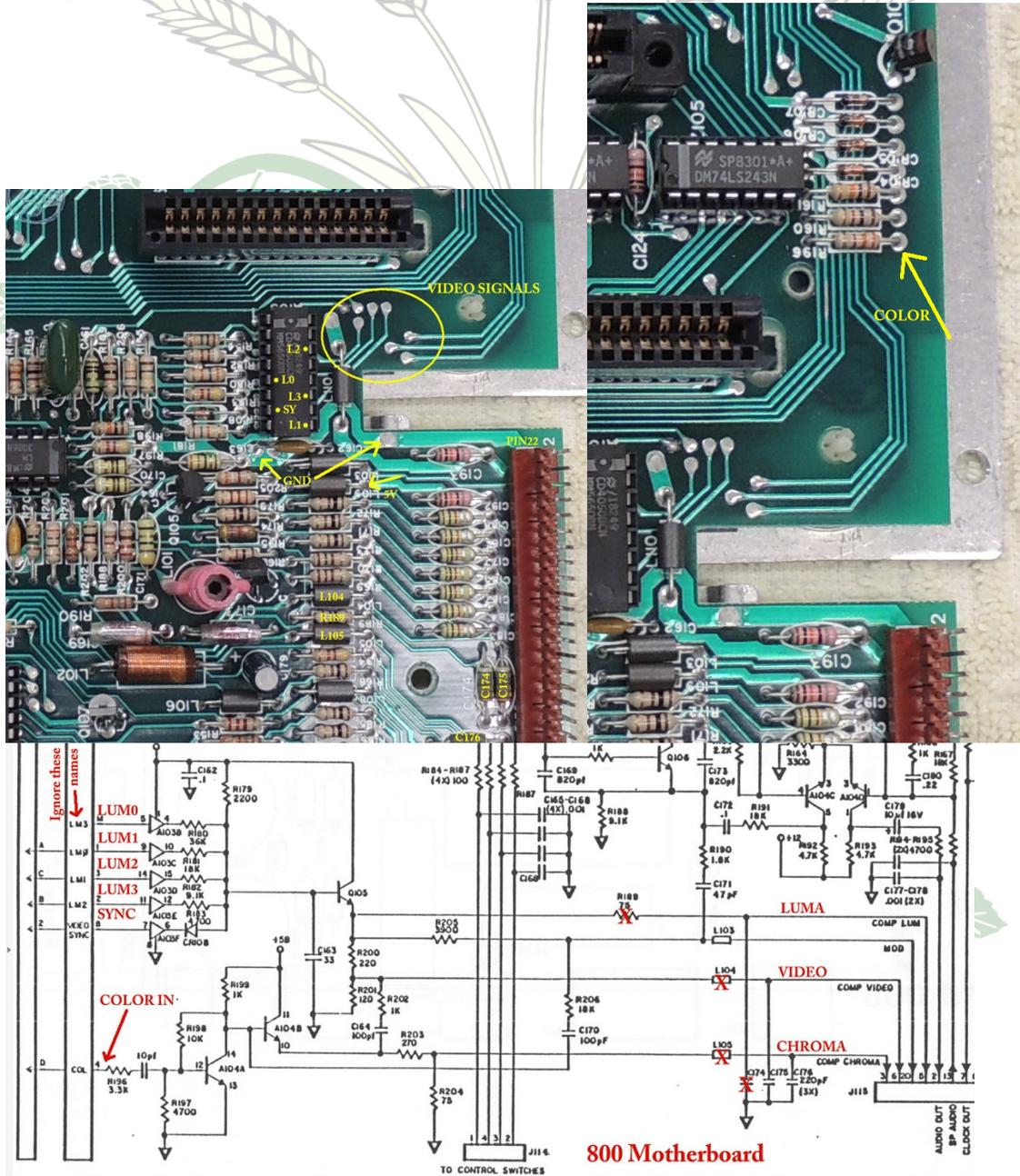
Figure 8UAV installed with monitor jack in 600XL

800

Part One: Bryan's Notes from AtariAge

Here's some pictures of the 800. If we lift R189, L104, and L105, we can then inject UAV's signals on the right side of these components. Also, C174-176 will have a softening effect, so lift one leg of each. (at least lift C174 for sharper Luma).

The on-board video will continue to feed the RF modulator as long as the 4050 is still in the socket. We can take our signals off the chip itself or from the vias to the upper right. Color is picked off at R196.



Part Two: Step-By-Step instructions by JimmyFitz

User JimmyFitz came up with Step-by-Step instructions for installing the UAV into an Atari 800 and it is an AMAZING job!

Recommended board: **Kit**

The original 800 has one of the best video outputs and included the S-video signals that later models lack. However, it is easy to install the UAV in the 800 if you believe it will make an improvement to the video on your unit. There is a major clearance issue though because the 4050 chip is located right up next to the right cartridge housing. The plug in unit will not fit in the 4050 socket. You could solder individual wires to the proper signals on the 800 board and bring them to the UAV but here is a way to simplify the installation using a jumper made from ribbon cable. The 4050 was removed, thus the RF output is disabled. If you could manage to solder this DIP plug on top of the original 4050 the RF output would also still work.



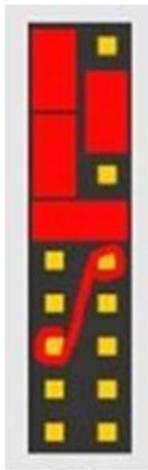
The RF shield housing on the 800 slopes downward as it goes forward underneath the keyboard. There is plenty of room at the back part near the cartridge slots where the 4050 and Pokey chips are located. The extra signals needed for the UAV Color-in and outputs are all nearby on the main board as well. The 800's monitor output jack is on the power supply board but all of the signals originate on the main board.

UAV Jumpers

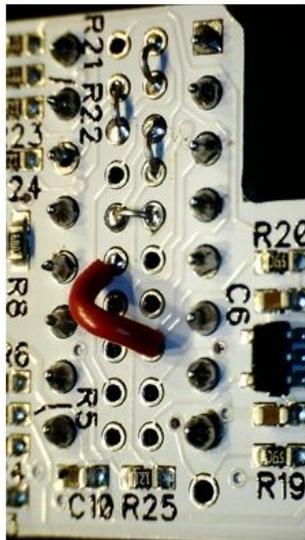
Here is the specification for the UAV jumper settings for the 800 assuming that a plug in header was used on top of the UAV. A DIP socket is going to be soldered on top of the board where the headers are assumed to go, so we need to jumper the signals on the bottom of the UAV board instead. Use the wire that comes with the kit to make some little short jumpers and solder them into the bottom side of the board as shown. Note: 1) the configuration is a mirror image of the specification and there is one jumper that has to leap diagonally over a row. That jumper is

the one pictured with red insulation. 2) “Top” means the topside of the UAV (logo side) and “Bottom” means underside of the UAV.

800 Jumper Configuration



800
Top of UAV



Bottom of UAV
(mirror image of top)

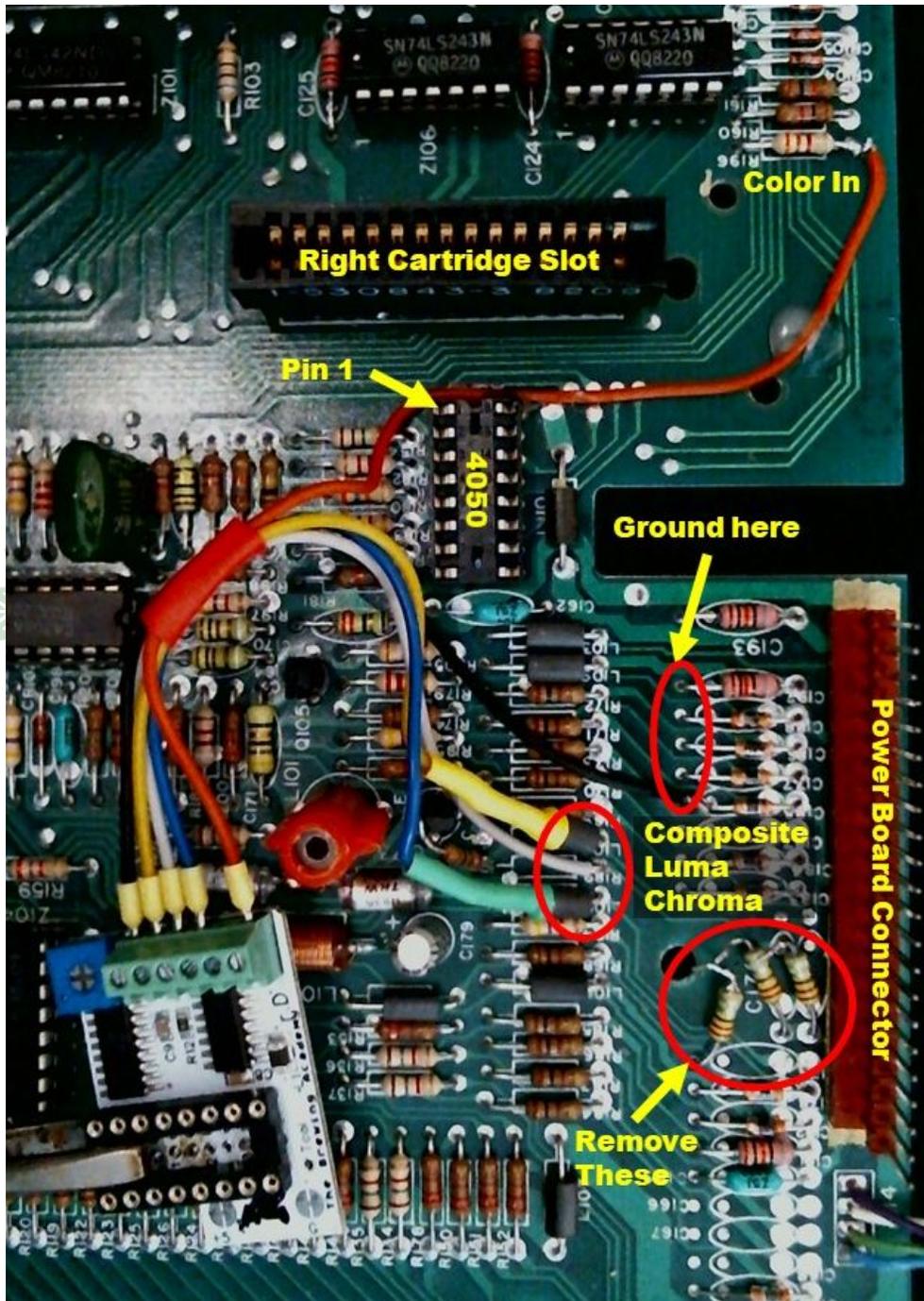
Connections

Solder the green terminal strip from the kit in its normal location on top of the UAV. The Color-In signal is present on the right side of R196 (orange wire in the photo). This signal goes to terminal 6 on the UAV terminal. Be sure to leave enough slack in this wire so that when you reinstall the 800's plastic housing around the cartridge slots and RAM you can keep the wire out from under the housing.

If we lift R189 on the right side, we can then inject UAV's Luminance signal into the empty via by soldering a wire (gray) directly in. The Luminance wire goes to terminal 4 on the UAV.

L104 and L105 are the Composite and Chroma signals. You can lift the right side of these and solder wires directly into the vias or alternately, lift the left side of each and solder to the lifted inductor lead as shown in the photo (yellow and blue wires). Composite goes to UAV terminal 2 and Chroma goes to terminal 4.

On the 800's original main board circuits C174-176 will have a softening effect. Lift one leg of each to disconnect them from the circuit. It is recommended to at least lift C174 for sharper Luma. These three capacitors could be removed entirely if desired.



Ribbon Cable Jumper

A short ribbon cable about 6 inches long will make the final connection from the 4050 socket to the UAV. The DIP plugs were pressed on to the cable such that the one on the left has pins facing up and the one on the right has pins facing down. This is to make sure that Pin 1 orientation is the same at both ends of the cable. Also, we are going to let the ribbon cable act as an insulator between the bottom of the UAV board and the Atari's main circuit board.

Ribbon Cable Assembly



Jameco Valuepro # 8200-16-R
IDC Flat Cable DIP Plug
16 Pin 0.3" Wide 0.1" Pitch
(Qty 2)

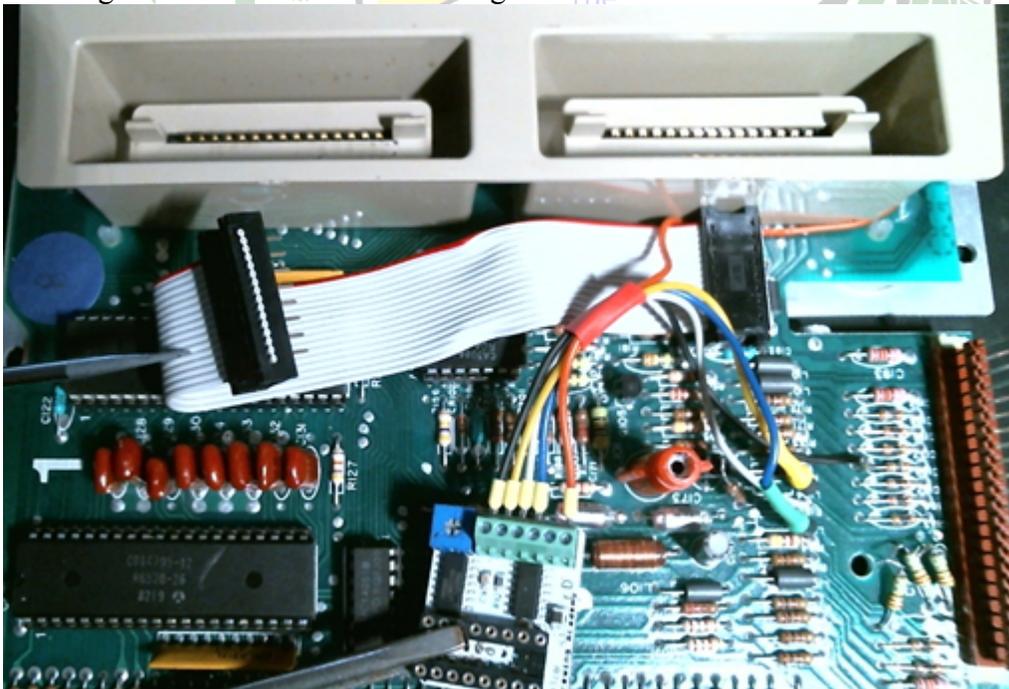


6 inch Ribbon cable, 28AWG, 16 conductor

All pins are connected straight through: pin 1-1, 2-2,...,16-16

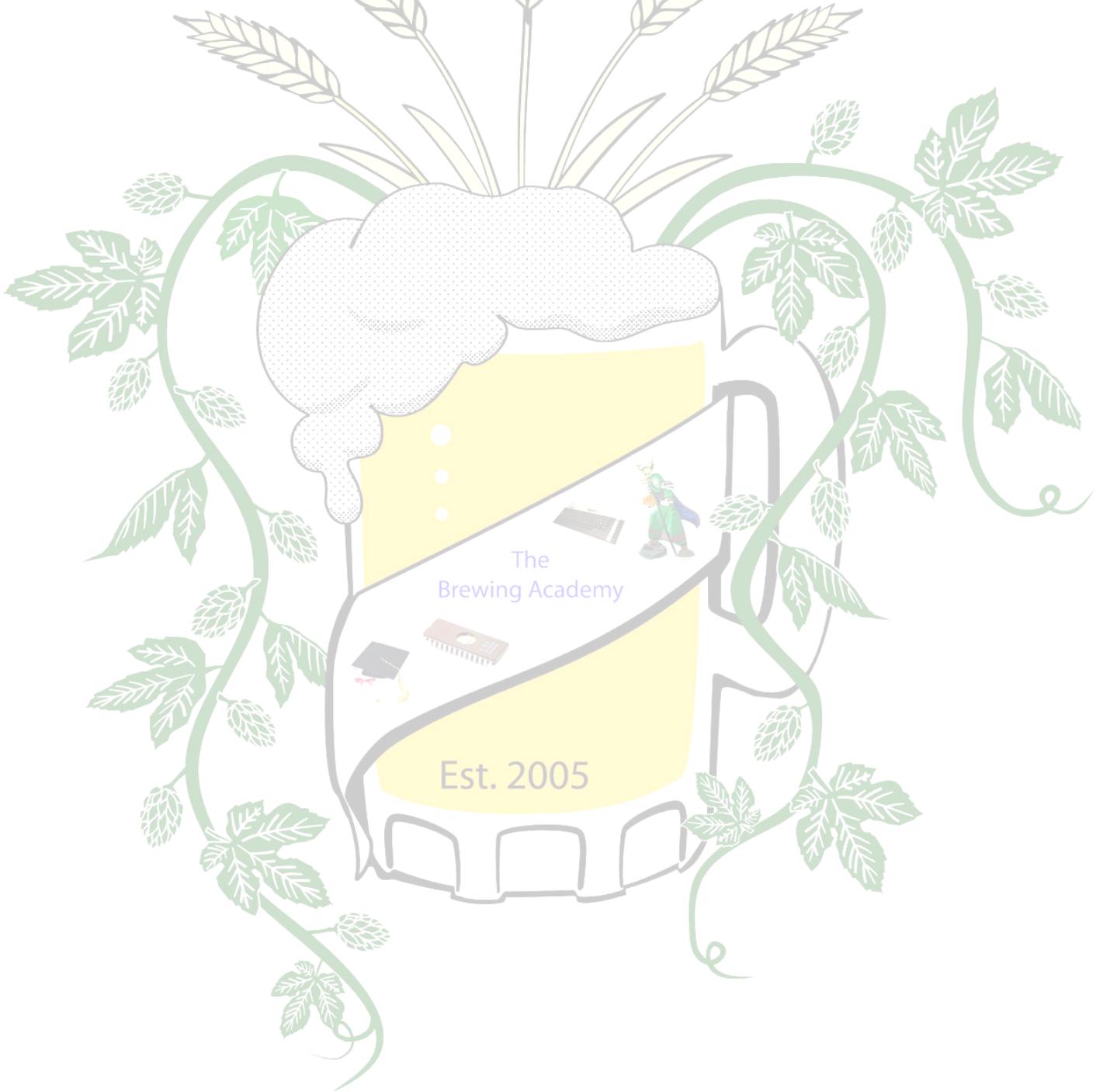
Jumper Installation

Plug the ribbon cable into the 4050's socket on the Atari 800 main board. The ribbon should exit toward the left and then curl back over on the end where it will plug into the socket on top of the UAV. Double check your pin 1 connection location is at the top left edge of the UAV board. A dab of hot glue on top of the Pokey chip will keep the ribbon cable in place. A wire tie wrapped around the ribbon cable and the UAV wiring will keep the UAV board from bouncing around inside the 800 housing.



Testing

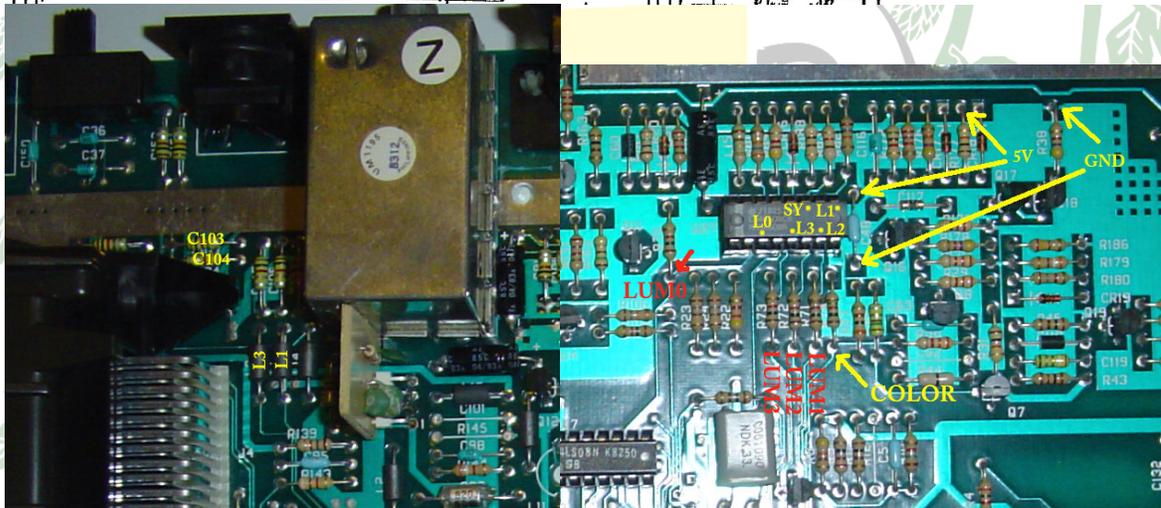
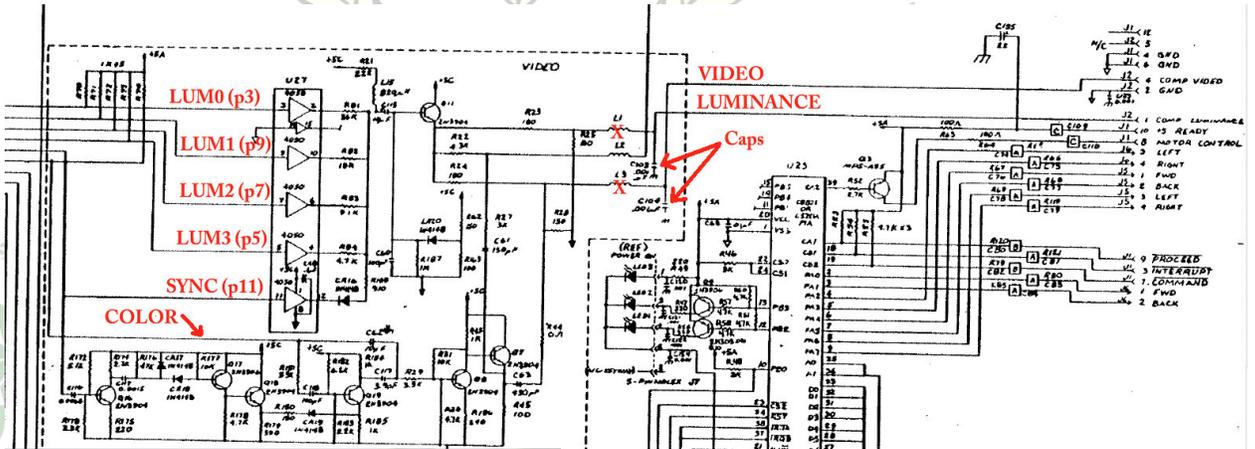
It is suggested to reassemble the 800 without the case in a minimal configuration to verify that the UAV works before fully reassembling everything in the case. At a minimum you need the main board, the CPU board, the ROM (personality) module, one 16K RAM board, and the power board. You will have to depress the switch on the power board that is usually activated by the cartridge slot lid being closed. You should get a nice blue screen and the Memo Pad mode if all is done right. Test again after full reassembly in the case.



Example: The 1200XL

In the XL series, for some reason we'll probably never know, Atari dropped Chroma support from the monitor jack. This means we only need to lift **Video** and **Luma**, and run a wire to the jack for Chroma.

Lift the back pin of L1 and L3, and connect Video and Luma to the pads on the board (Luma is L1). Also lift one side of C103 and C104.



User Tony Cervo has typed up some step-by-step instructions for the 1200XL:

<https://tinyurl.com/yxacsgdl>

or

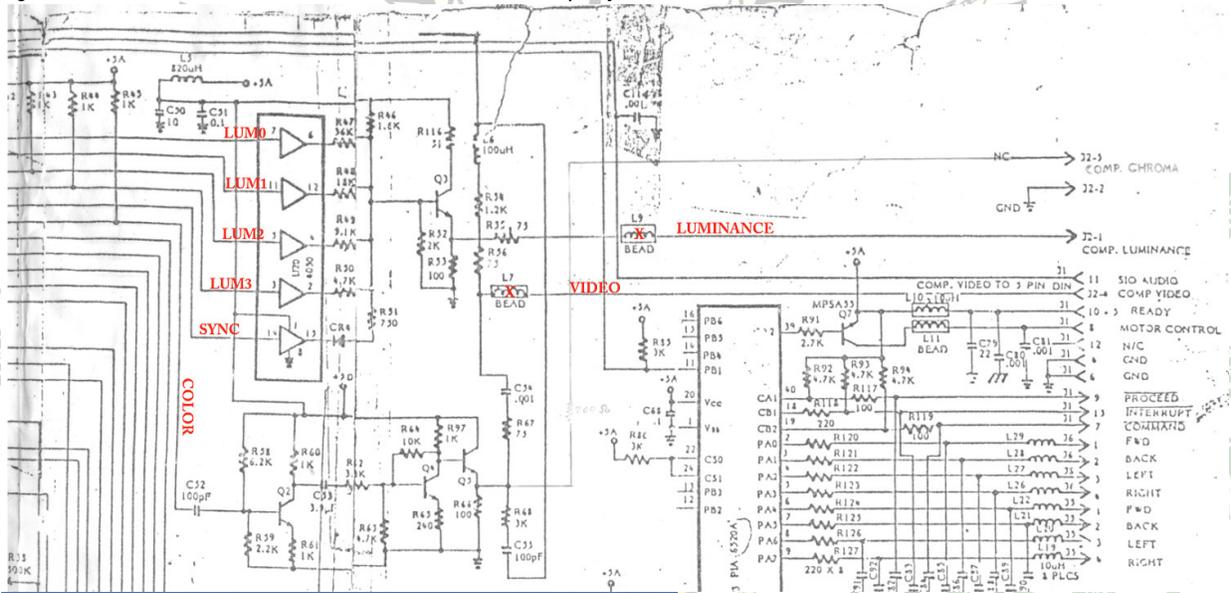
Siegfried Lenz has a write up here:

<https://atariage.com/forums/topic/291747-atari-1200xl-uav-rev-c-installation/>

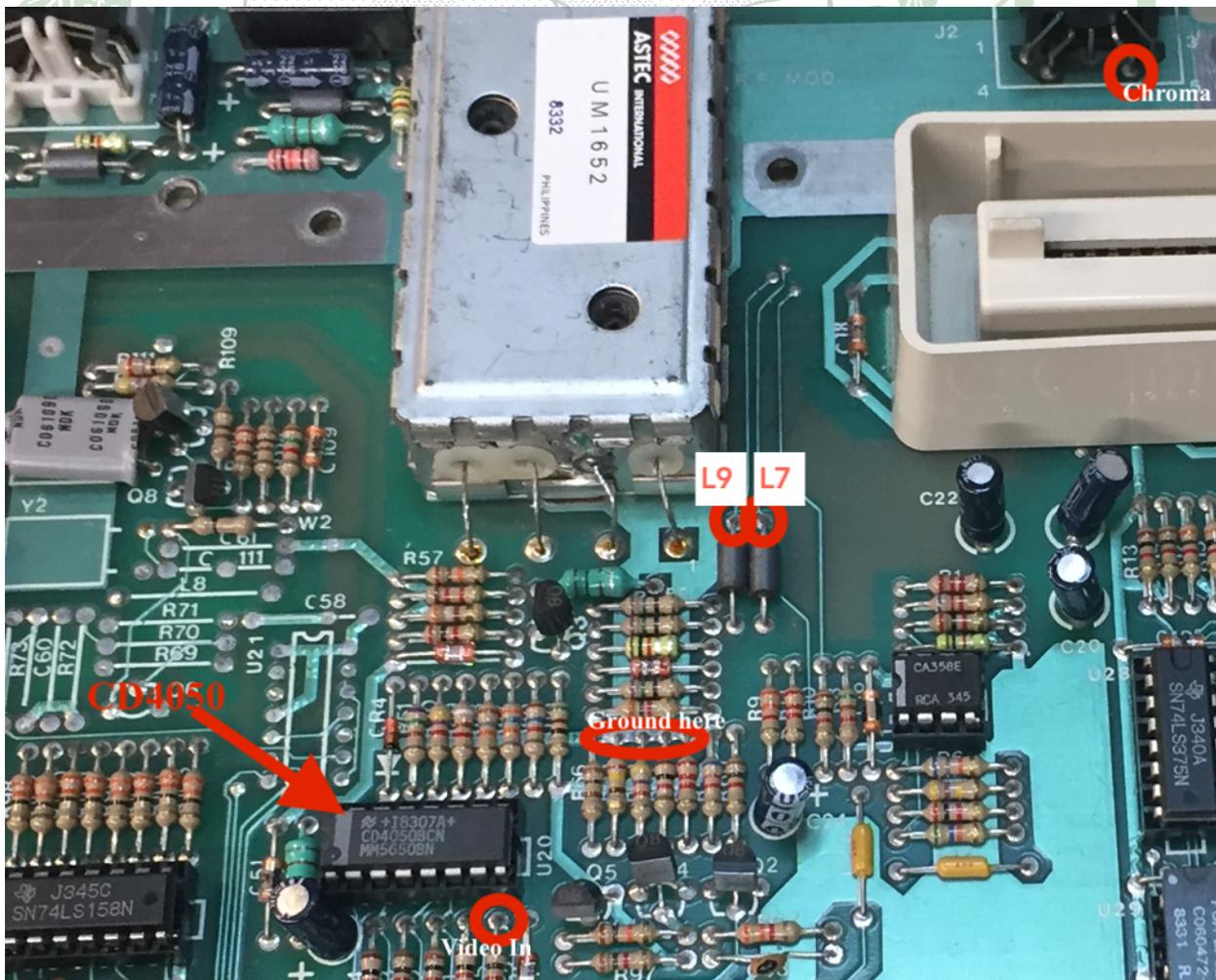
800XL

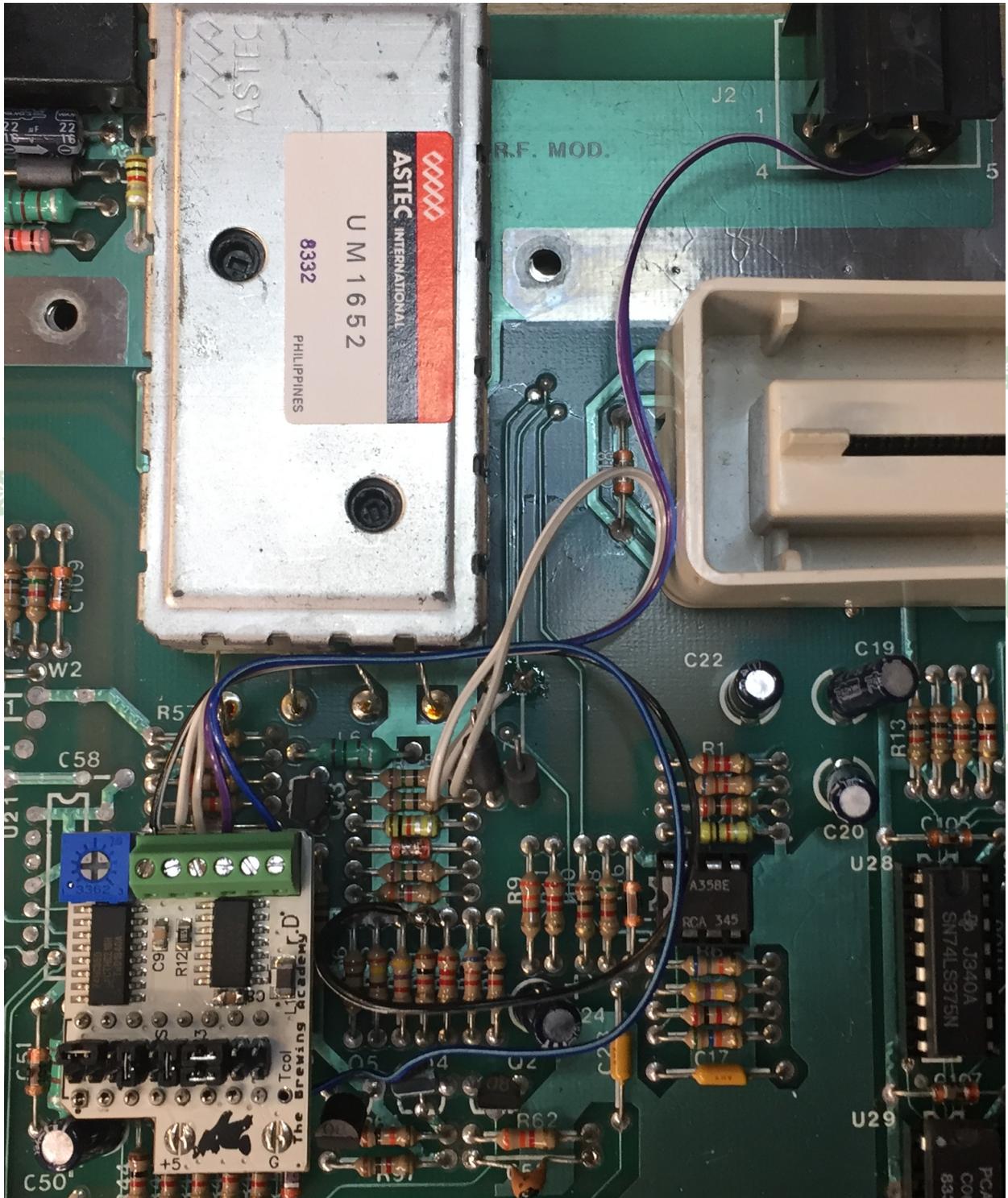
Part One: Bryan's Notes from AtariAge

There are several versions of the 800XL motherboard, but I believe the video circuits are pretty similar. Power to the video circuits tends to be affected by RAM noise. Your choice of Ground location can make a difference in the quality of the picture. The ground location shown has wide copper back to the ground plane, so it should work pretty well. The absolute best location is the ground pin of the monitor jack, or on the ground plane nearby. Again, lift the two ferrite beads (L7, L9) in the back, and put your Video and Luminance there. Run a wire for Chroma.



3. Clip the upper ends of L7 & L9
4. Connect the motherboard connection at L9 to Luma on the UAV
5. Connect the motherboard connection at L7 to Comp .Video on the UAV
6. Connect the top end of R66 (or any resistor in this block) to Ground on the UAV
7. Install UAV in the socket at U20
8. Connect a wire from Chroma to Pin 5 on the monitor port.
 - a. Alternatively install an external connector for video output.
9. Remember to combine Chroma & Luma output at the monitor if not using an external connector.



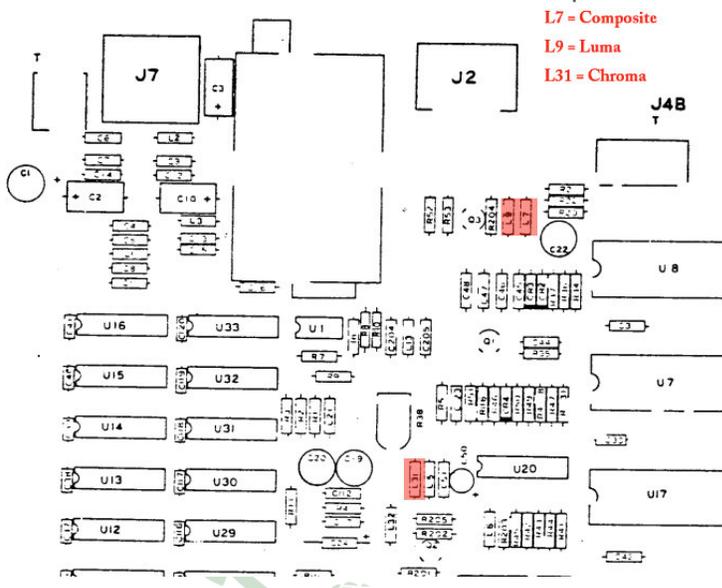
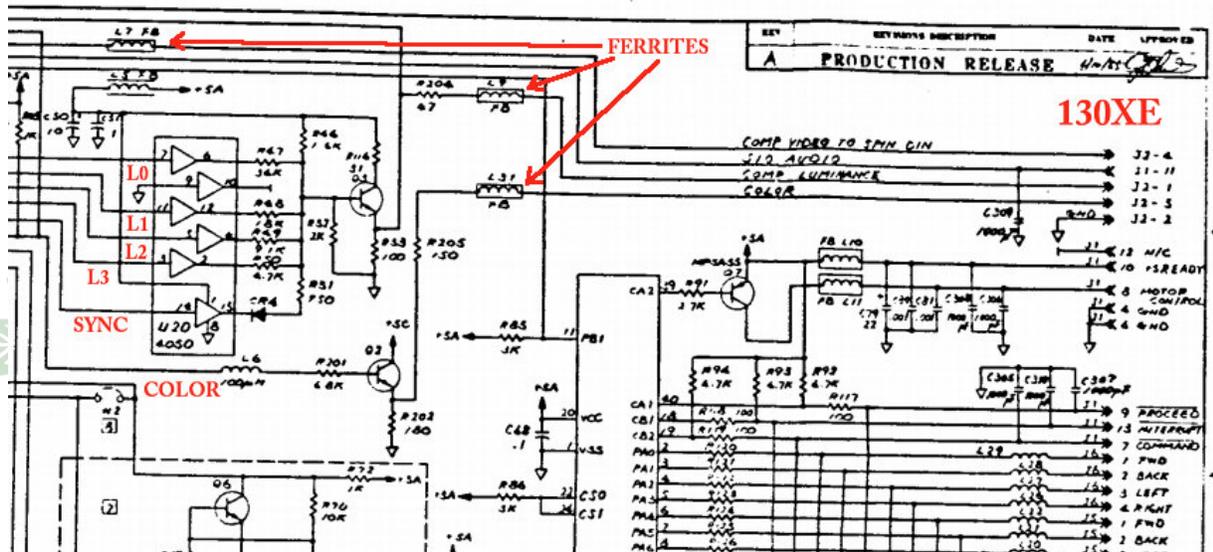


130XE

Part One: Bryan's Notes from AtariAge

Three ferrites need to be lifted to break the original connections to the DIN port: L7, L9, L31. Then you can attach these signals to the back pads for these 3 parts.

Because the 130XE tends to be noisy, run an auxiliary ground wire from the back terminals to somewhere near the DIN jack (or to the center pin itself). There's a ground via just to the right of C205 that is a good place to land this wire. If you still see any noise, cut the center of the ground split-pad on the UAV.



A 130XE install (under the shield)

This is one way to install the UAV under the shield of a 65XE/130XE which has very low clearance. This is basically a Kit with just the socket pins installed. Wire jumpers are soldered in in place of the 2mm header. I cut the ground pad, trimmed about 1mm off the socket pins, and installed a ground wire just because some of the

ground routing is pretty bad on the XE's. Solder the socket on top of the 4050. Notice that pin 1 is on the left. The important pins are 1, 3, 5, 7, 8, 11, 14.

Lift the front-most lead (bottom leg in the picture) of the 3 circled ferrite beads. You can do this by clipping the lead at the board, or by applying heat to the pad and gently pulling the lead out. Once the lead is out of the board, solder a wire to it. These 3 wires will go to the indicated terminals in the green block (Terminal 1 is closest to the adjustment pot).

Solder a wire to pin 21 of GTIA. This will go to terminal 6.

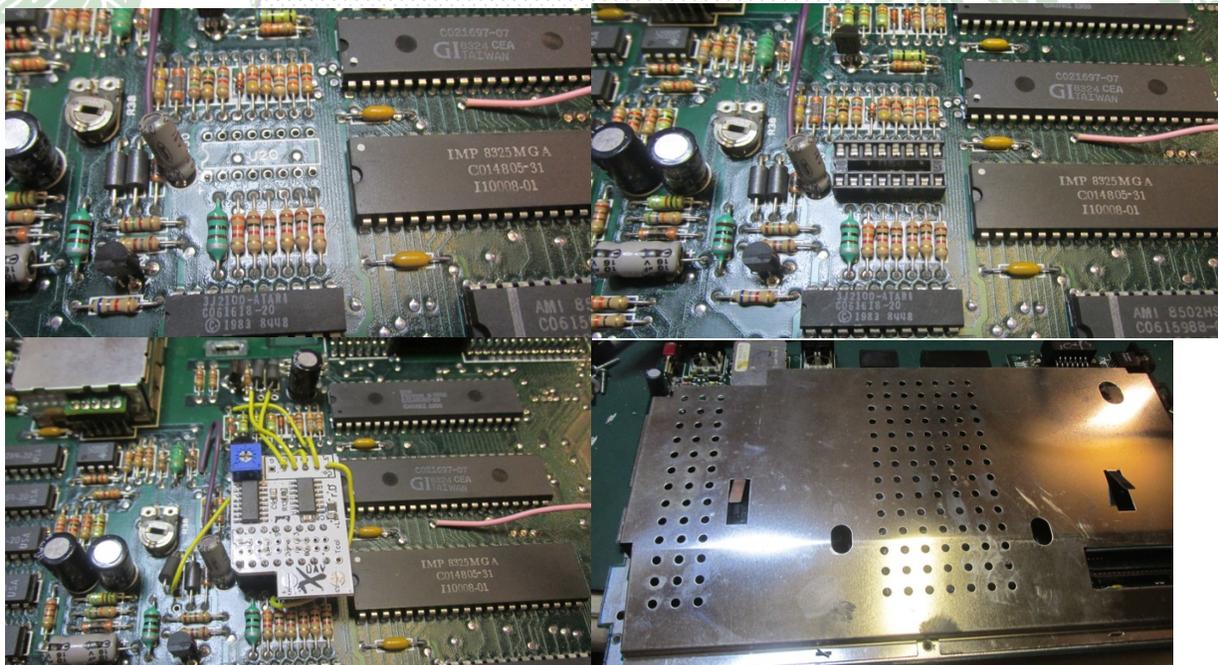
Solder a Ground wire to the top lead of R52 (left-most resistor behind the video DIN).

Make sure the jumpers are configured for the 130XE

Plug in the board with the logo toward the front. Gently push the electrolytic cap (C50) to the side if need be. Connect the terminal wires for GND, Composite, Luma, Chroma, Color-In.

Leave the pot in the default (middle) position.

Power it up and you should have video.

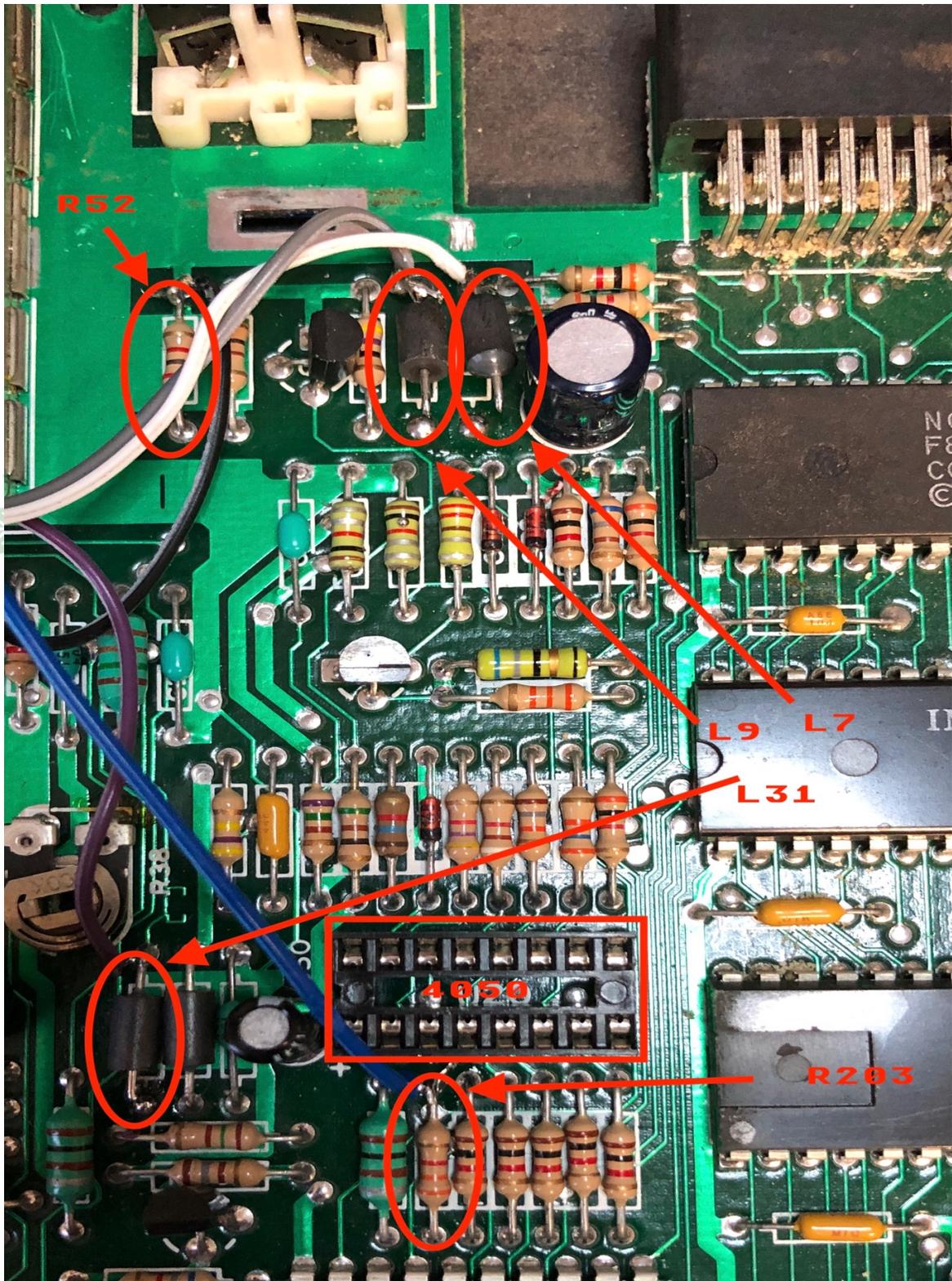


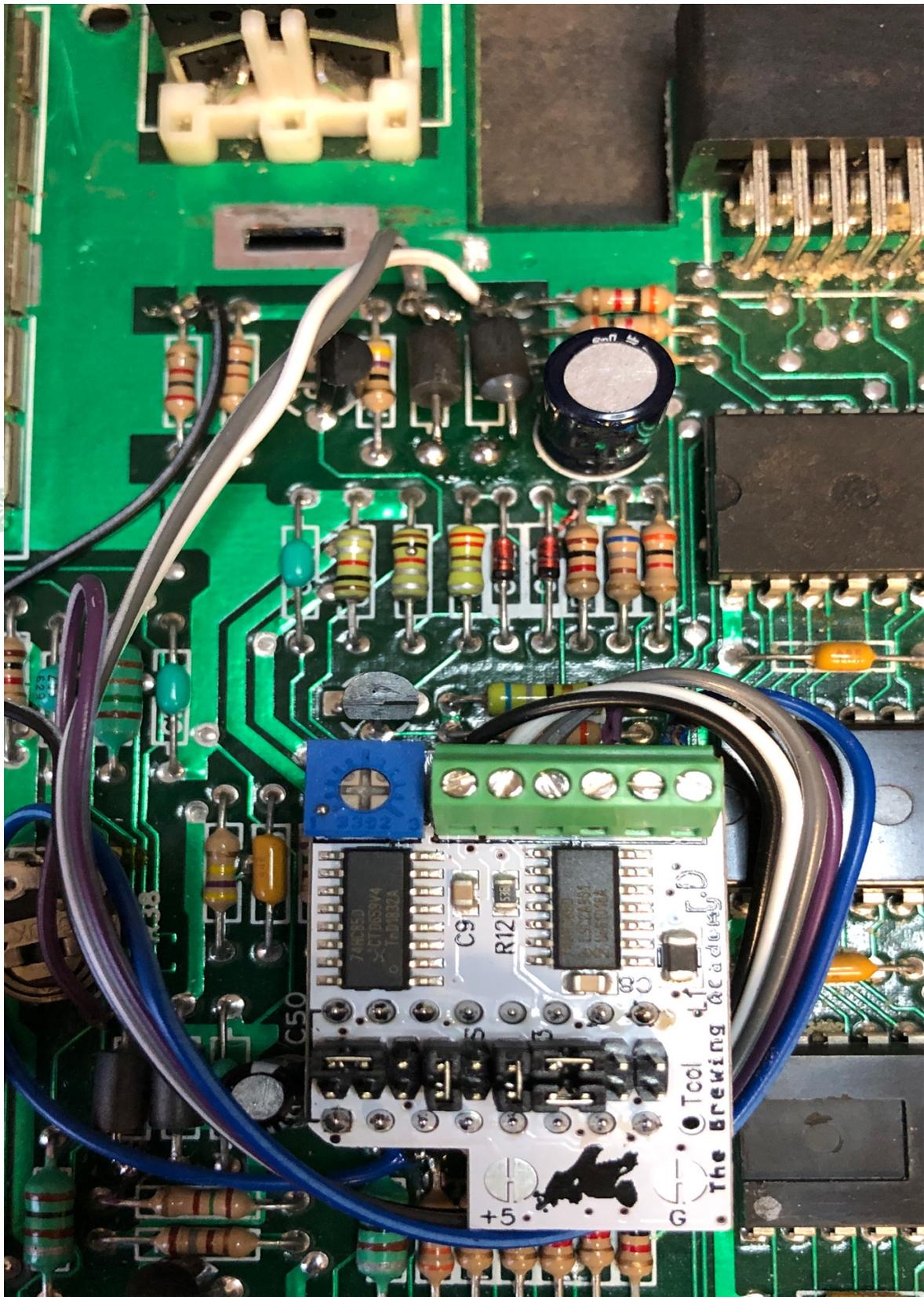
Part Two: Step By Step Instructions

Suggested Model: Plug-in for NO shield // Kit for under the shield

Overview: When I say “upper” you should look at the end nearest the ECI/Car port. Lower is the end nearest the front (keyboard). If I say “right” that means the side nearest the joystick ports. Also, when I use these directions, I mean the hole on the motherboard itself NOT the position on the component (resistor etc) Also, when I talk about pins on the UAV, I am talking about the green terminal strip or the line of pins next to the blue trim pot. Pin 1 is the closest to the trim pot and pin 6 is the closest to the edge. Also, see the pictures, next page.

1. Locate the CD4050 chip on your mother board
 - a. It is to the left of the GTIA
 - b. It is probably NOT socketed
2. Remove the 4050 and install a 16 pin socket, dual-wipe or machine
 - a. Careful to not lift a trace
 - b. Store 4050 on some antistatic foam should you ever wish to reverse the process.
3. Locate three ferrite beads: L7, L9, & L31
 - a. L7: This is almost directly in front the DIN5 monitor port It is the right hand bead.
 - i. Clip the Bottom of the bead.
 - ii. Connect a wire on the TOP of L7 for your “CV” connection on UAV (pin 2)
 - b. L9: This is almost directly in front the DIN5 monitor port It is the left hand bead.
 - i. Clip the Bottom of the bead.
 - ii. Connect a wire on the TOP of L9 for your “Lu” connection on UAV (pin 3)
 - c. L31: This is to the left of the 4050 socket you installed
 - i. Clip the Bottom of the bead.
 - ii. Connect a wire on the TOP of L31 for your “Ch” connection on UAV (pin 4)
4. Locate R203. It is in front of the 4050 socket you installed and immediately to the right of a (usually) green L6
 - a. Solder a wire on the TOP of this resistor.
 - b. Run the wire to Color In “Co. In” on the UAV (pin 6)
5. Locate R52. It is the left-most resistor directly in front of the DIN5 monitor port
 - a. Solder a wire to the Top.
 - b. Connect that wire to either “G” (ground) ports on the UAV (Pin 1 or pin 5)
6. **DOUBLE CHECK YOUR WORK**
7. Power on and you should have video!



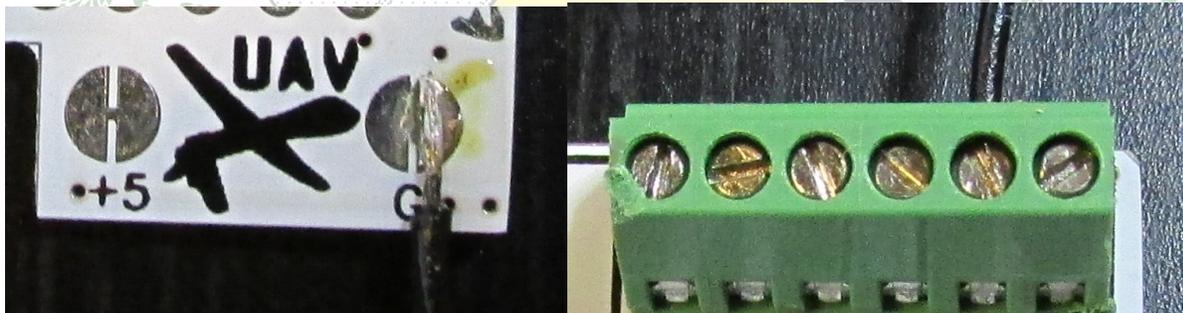


GROUNDING:

With Audio and Video circuits, one of the most important things is the ground path. Single-ended signals (those that use coax) have no ability to reject noise on the ground/shield conductor (unlike balanced/XLR connections) so care must be taken to make sure that all video circuitry and connectors share a single, low impedance ground. UAV is tolerant of noise on the 5V line because it isn't used as a reference. It IS used as a DAC reference in the original Atari circuit, however. Because many Atari boards don't have a clean ground path from the CD4050 socket back to the supply (that is, the ground trace is shared with digital components) there can still be noise after installing a UAV Plug-In board, especially when using the monitor DIN for output. This is because your monitor will see the nice, heavy ground plane under the DIN connector while the signals will be generated using the CD4050's noisier ground path which means the difference in the two grounds gets added to the signal.

When you use the DIN connector, the absolutely cleanest way to wire the UAV is to cut the center of the split pad for ground (use a razor knife, breaking the 4050 socket ground) then soldering a ground wire to a place connected to the large ground plane near the DIN port. This wire can be attached to the UAV terminal grounds in the back, **or** soldered to the RIGHT side of the 'G' split pad. This way, the UAV and the monitor DIN have an identical ground connection. I also allow a separate 5V line to be run to the other pad in case it's needed.

If you're using a Plug-In board and not wiring to an onboard video connector, then there *may* be a benefit to running an auxiliary ground wire to a heavy ground point nearby. We're just trying to avoid relying on ground traces that also feed digital components.



UAV color adjustment:

Bryan wrote a program for A8 & 5200 installations to adjust the colors. It can be found at:

https://www.thebrewingacademy.net/uav_xex.zip

In the 2nd picture, you can see the effect of too much delay- to the point where pixels are not being latched (especially LUM2 in the upper right). The best setting is to back off about $\sim 10^\circ$ from the point where pixels start dropping out of the picture. Since the Atari doesn't draw all these types of pixels with exactly the same timing and width, you'll notice some dropping out before others.

The lines on the left edge of the screen represent:

1. 2 lines of even monochrome pixels.
2. 2 lines of odd monochrome pixels.

The 2nd section below it represents the same display formed with the colors and screen data inverted:

3. 2 lines formed by a gap of background color (even pixels)

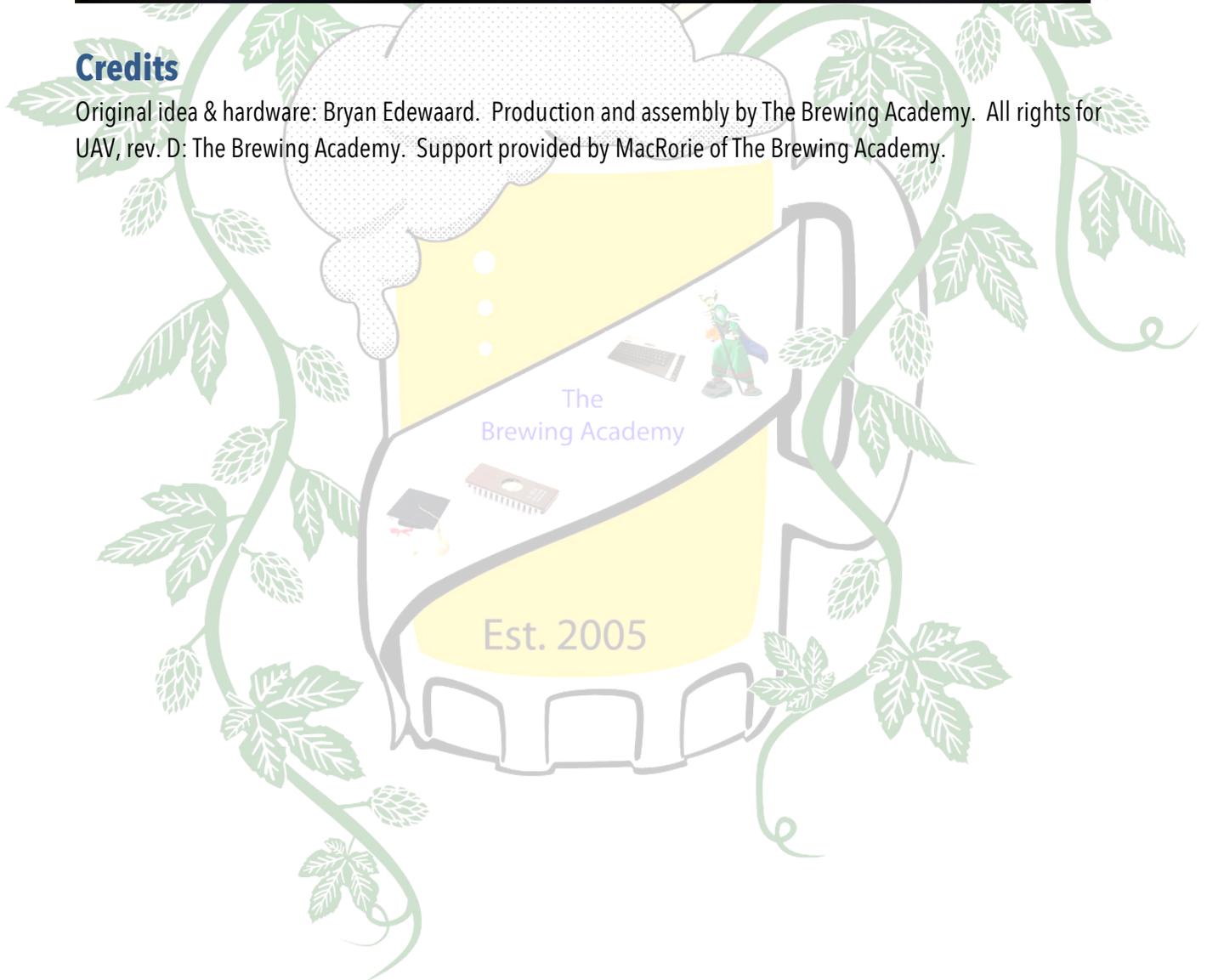
4. 2 lines formed by a gap of background color (odd pixels)

The different artifact shades represent Lumas of \$02, \$04, \$08, \$0E to test the timing of each Luma bit. Below that are bars of GTIA 9 and 11



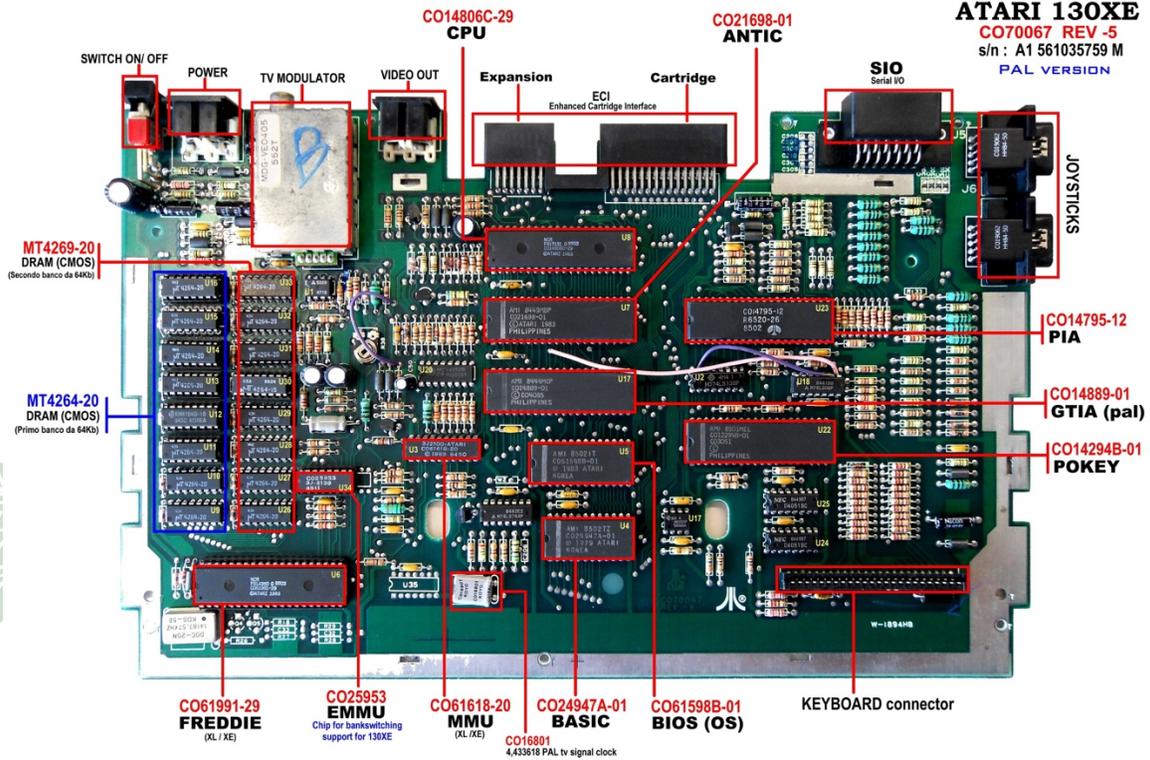
Credits

Original idea & hardware: Bryan Edewaard. Production and assembly by The Brewing Academy. All rights for UAV, rev. D: The Brewing Academy. Support provided by MacRorie of The Brewing Academy.

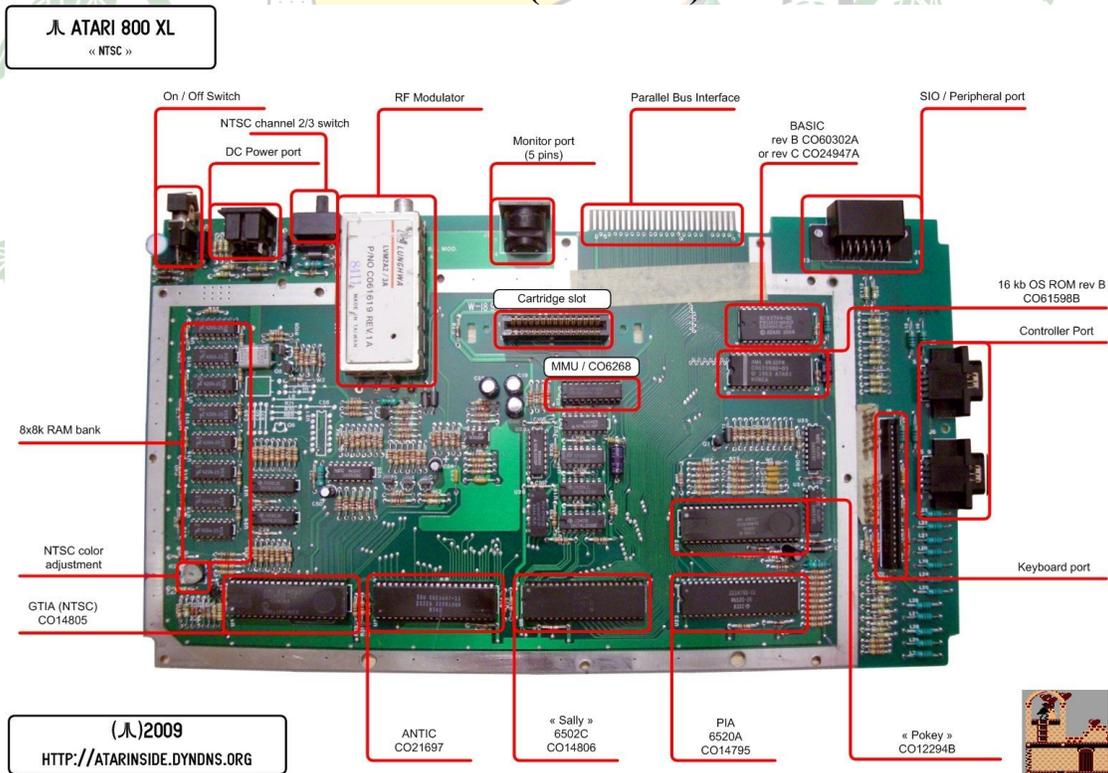


Appendix One

130XE Motherboard (identified)



800XL (identified)



(A)2009
[HTTP://ATARINSIDE.DYNDNS.ORG](http://atarinside.dyndns.org)

Appendix Two: Version History

0.9 Cut & Paste of information found on Atari Age

1.0-1.61 Lost to the ages

1.62 Exists

1.7 Lost to the ages

1.8 Added Version history
Added Table of Contents
Added Step By Step for 130XE

1.81 Corrected typos
Inserted pictures for 2600 Jr. connection

1.9 Added 2600 Six switch step by step
Added 6-switch Internal Audio board installation

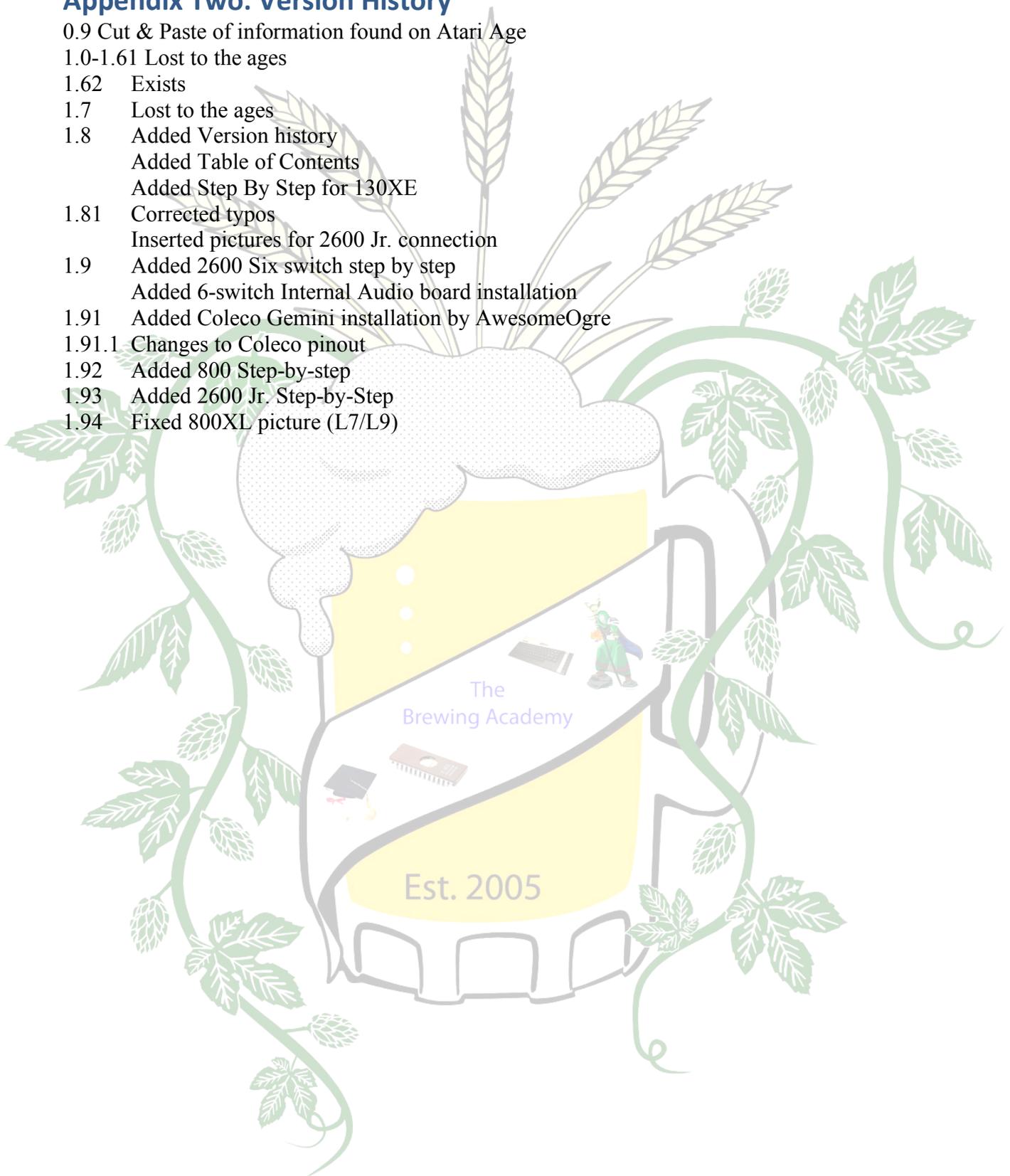
1.91 Added Coleco Gemini installation by AwesomeOgre

1.91.1 Changes to Coleco pinout

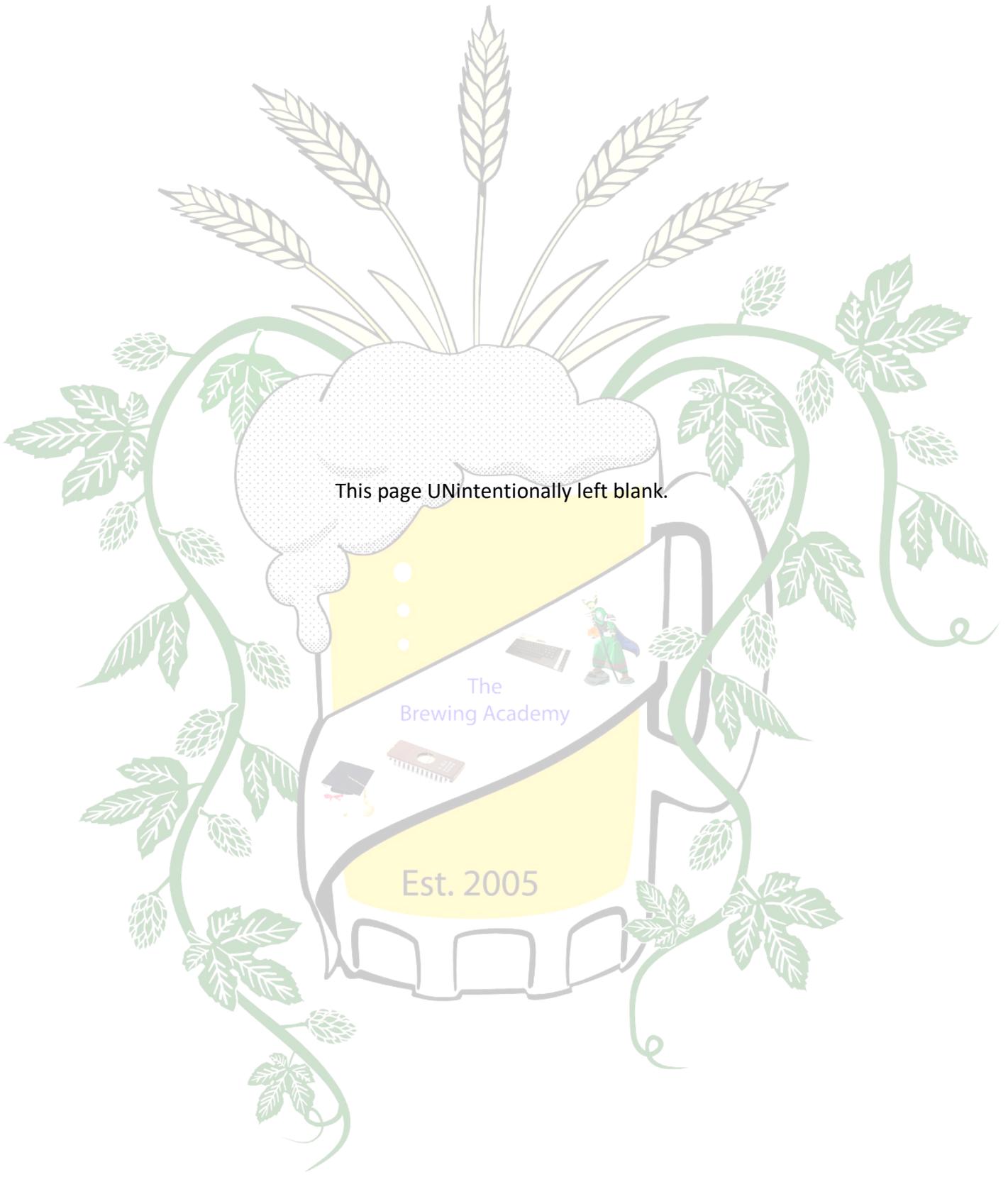
1.92 Added 800 Step-by-step

1.93 Added 2600 Jr. Step-by-Step

1.94 Fixed 800XL picture (L7/L9)



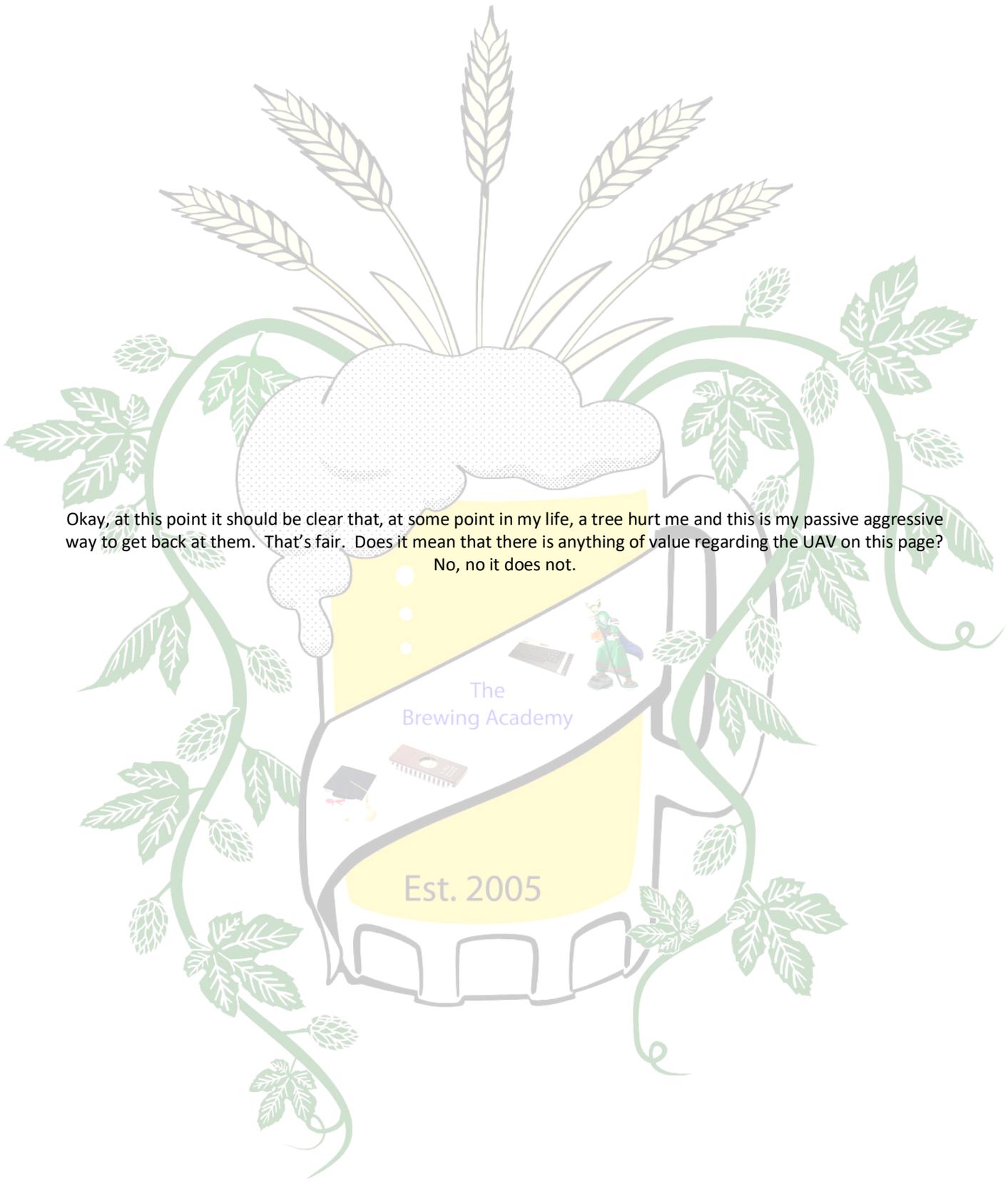




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The
Brewing Academy

Est. 2005



Okay, at this point it should be clear that, at some point in my life, a tree hurt me and this is my passive aggressive way to get back at them. That's fair. Does it mean that there is anything of value regarding the UAV on this page?

No, no it does not.



You may have noticed that this character figures prominently in the logos and labels on The Brewing Academy merchandise. The reason is that it is my World of Warcraft character, MacRorie (as drawn by one of my daughters) and is intrinsic to who we are.



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