

## INTRODUCTION

The Universal Video Plus allows you to connect a monitor to your Color Computer or Color Computer II. It is specifically designed to produce superior quality pictures on either color or black and white (monochrome) monitors. The video output is a 1 volt peak to peak composite video signal with negative sync and is set up for 75 ohm input. The circuit is adjustable for almost any composite video monitor. Both a TV and a monitor may be used at the same time and a color TV will still display a color picture.

Installing your Video Plus board is a relatively simple task that can be accomplished easily by following the instructions given below. Before beginning, please note that opening the computer's case will void your Radio Shack 90 day warranty. If your computer is still under warranty, we recommend that you 'burn in' the unit for a minimum of a week before opening the computer's case. To 'burn in' means to leave the computer on continuously for a period of time and then run some tests to assure yourself that all is functioning as it should. It is not necessary to purchase a diagnostic program to test the computer - writing some simple programs to access the joysticks, saving and loading from cassette, etc. will serve the same purpose. The Video Plus board is easily removed if you should need to have the computer serviced by Radio Shack.

If you have a Color Computer II, you will notice that it has a two wire plug. This makes it very important to make sure that the monitor you will be using is plugged in correctly. If you defeat the polarization, you risk burning out your computer.

## WHICH MODEL COCO DO YOU HAVE?

Before you can complete these instructions, you need to figure out what model of Color Computer you have. At last count, there were 7 models of the CoCo and CoCo II. If you have a computer with the original, larger case, you have either a D, E or ET board. The D board model number is 26-3001, the E is 26-3002 and the ET is 26-3003. The D and E boards are also identified by the letter D or E printed on the circuit board near the ROM-Pack slot and are all in grey colored cases. The ET board (also known as the F board), does not have a letter on the circuit board, but can be identified by the fact that the board does not completely surround the power transformer in the left front corner. If you have a TDP-100 CoCo, you probably have the ET circuit board.

If you have a CoCo II (the unit with a smaller, white case), the easiest way to identify the circuit board is to look at the model number on the bottom of the computer case. You should find a number like 26-3026, 26-3134 or 26-3134A. We will identify these computers by the last four numbers of the model number.

If you can't decide which model circuit board you have, or it doesn't look somewhat similar to one of the diagrams at the end of this manual, don't try to install it - ask someone who knows about these things or call Computerware for assistance.

## THE INSTRUCTIONS

The following five steps are for everybody:

- [ ] STEP 1: UNPLUG THE COMPUTER BEFORE PROCEEDING ANY FURTHER!
- [ ] STEP 2: Remove the six Phillips screws (7 in the big case, 6 in the CoCo II) from the bottom of the computer. One of these screws is covered by a label warning you about your warranty. After loosening the screws, put a small piece of masking tape over the holes. This will allow you to turn the computer over and not lose the screws.
- [ ] STEP 3: Hold the top and bottom covers together, turn the computer right side up and remove the top cover. You are now looking at the heart of your Color Computer. The drawings on the last page will help you locate the parts mentioned in the next few steps.
- [ ] STEP 4: Using the appropriate drawing at the end of this manual, locate the MC6847 chip. It is one of the large, 40 pin integrated circuit chips and is typically labeled U8 or IC8. This is the video display generator (VDG). If you look closely at the chip, you will notice a notch in one end of it's case. If you look at the chip with the notch at the top, pin one is the pin just to the left of the notch. Counting down the left side, you get to pin 20. Directly to the right of pin 20 is pin 21. Counting up the right side, you finish at pin 40. Using this and the drawing at the end of this manual, use a pencil to mark the positions of pins 9, 10, 11, 17, 28 and 33 on the chip. This makes it easier to find the right pins when we start hooking the connectors to them.
- [ ] STEP 5: Get your Video Plus board out of its package. Unwind the cables and wires and take a close look at it. You will notice two rows of 20 holes on the board with a small number 1 near where hole 1 is. These correspond to the pins on the VDG chip. Seven connector wires are attached to holes 1, 9, 10, 11, 17, 28 and 33. At the end of each wire (except the one connected to hole 1) is a miniature test clip. Pushing on the top of a connector (like you would a syringe) exposes the small hook that will be attached to the pins. Attach the connectors to the corresponding pins on the VDG chip, i.e. the wire attached to hole 9 on the Video Plus board attaches to pin 9 on the MC6847 chip. Carefully double check your work after you finish.

THE FOLLOWING TWO STEPS ARE FOR D, E AND ET BOARDS ONLY.

- [ ] STEP 6: Now take the wire with the alligator clip and connect it to a grounding location. For D and E boards, you can clip onto the RF shield. For any board, you can clip onto one of a number of ground pins shown on the diagram.

- [ ] STEP 7: You will notice a wire with a test clip on it coming out with the audio and video cables. This is used to pick up the sound (audio) signal. Connect it to the second wire from the front on the right side of the RF modulator.

The ET circuit board includes a voltage divider circuit on the audio output signal. If you cannot get an acceptable volume level from your monitor or amplifier, try following modification. 1. Disconnect resistor R2 by clipping the wire at one end of it. 2. Short out resistor R36 by soldering a wire from one end to the other of the resistor. If you aren't comfortable making these changes, get someone who is a good solderer to do them for you.

THE FOLLOWING TWO STEPS ARE FOR THE COCO II ONLY.

- [ ] STEP 6: Now take the wire with the alligator clip and connect it to a grounding location. The best place is on one of the ground pins to either side of the ROM-pack slot as shown on the diagram.

- [ ] STEP 7: You will notice a wire with a test clip on it coming out with the audio and video cables. This is used to pick up the sound (audio) signal. For model 3026, connect this to the back wire of the resistor labeled R8. This is located near the left side of the circuit board as shown in the diagram.

For model 3134, R8 is located under the keyboard so carefully lift it up (you shouldn't need to disconnect it). Using the diagram, find R8 and connect the clip to the right end of it.

For model 3134A, the audio is gotten from resistor R4. This can be found on the diagram near the middle of the left side of the circuit board. Connect the clip to R4 on the end marked C32.

THE REST OF THE INSTRUCTIONS APPLY TO EVERYBODY.

- [ ] STEP 8: It is now time to try your new video interface. There are two cables about three feet long connected to the Video Plus board. The connectors on the end will have one labeled VIDEO or they will be red and black in which case, the red connector is video. Connect the video cable to the video input of your monitor. If your monitor has an audio input with an RCA connector, you can hook up the audio cable now. Turn on the power and make sure that the picture is acceptable. If it is, you can go directly to the next step.

If there is no picture, or the picture is of poor quality you probably need to adjust either the monitor or the video Plus. Try adjusting the monitor first. If that doesn't work, try adjusting the Video Plus.

You will notice a trimmer (the circular, metal component near the middle of the Video Plus board). Using a small screwdriver, turn this (slowly) until the picture clears up. If you cannot get a clear picture, double check your connections to make sure that they are correct and that your clips aren't touching more than one pin on the VDG chip.

- [ ] STEP 10: Once you have everything working, you need to find a place to mount the Video Plus board. There is a piece of black foam included with the kit that is sticky on both sides. Peel off the backing from one side and stick it to the bottom of the Video Plus board. Then peel off the backing from the other side and stick the whole thing to the top of a chip or a bare spot on the circuit board. The location isn't important as long as you make sure that the cover will fit back on.

The audio and video cables should be routed out the back of the case. You can fit them through the hole where the original TV connector is. Some CoCo II units have a punch out hole near the power cord that works nicely for this.

- [ ] STEP 10: When everything is working correctly, replace the cover and tighten the screws that hold it in place.

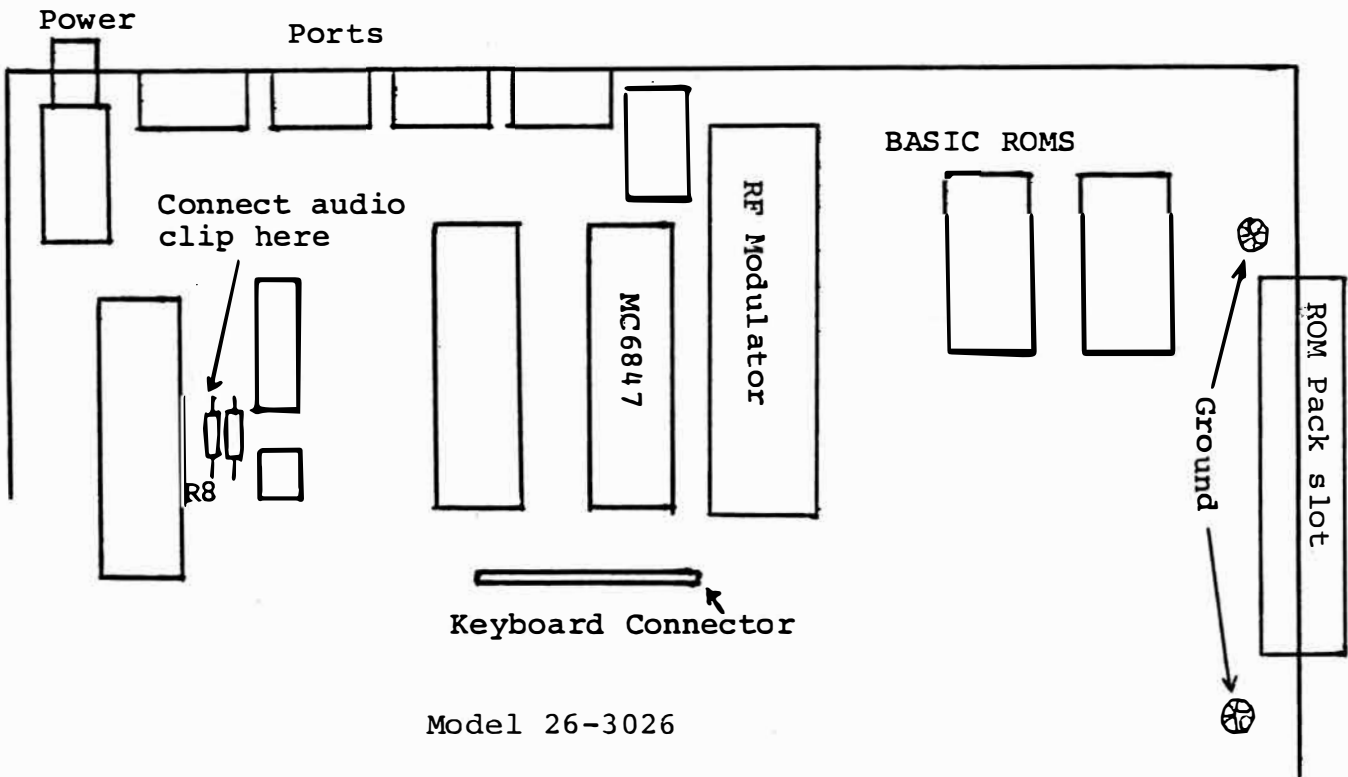
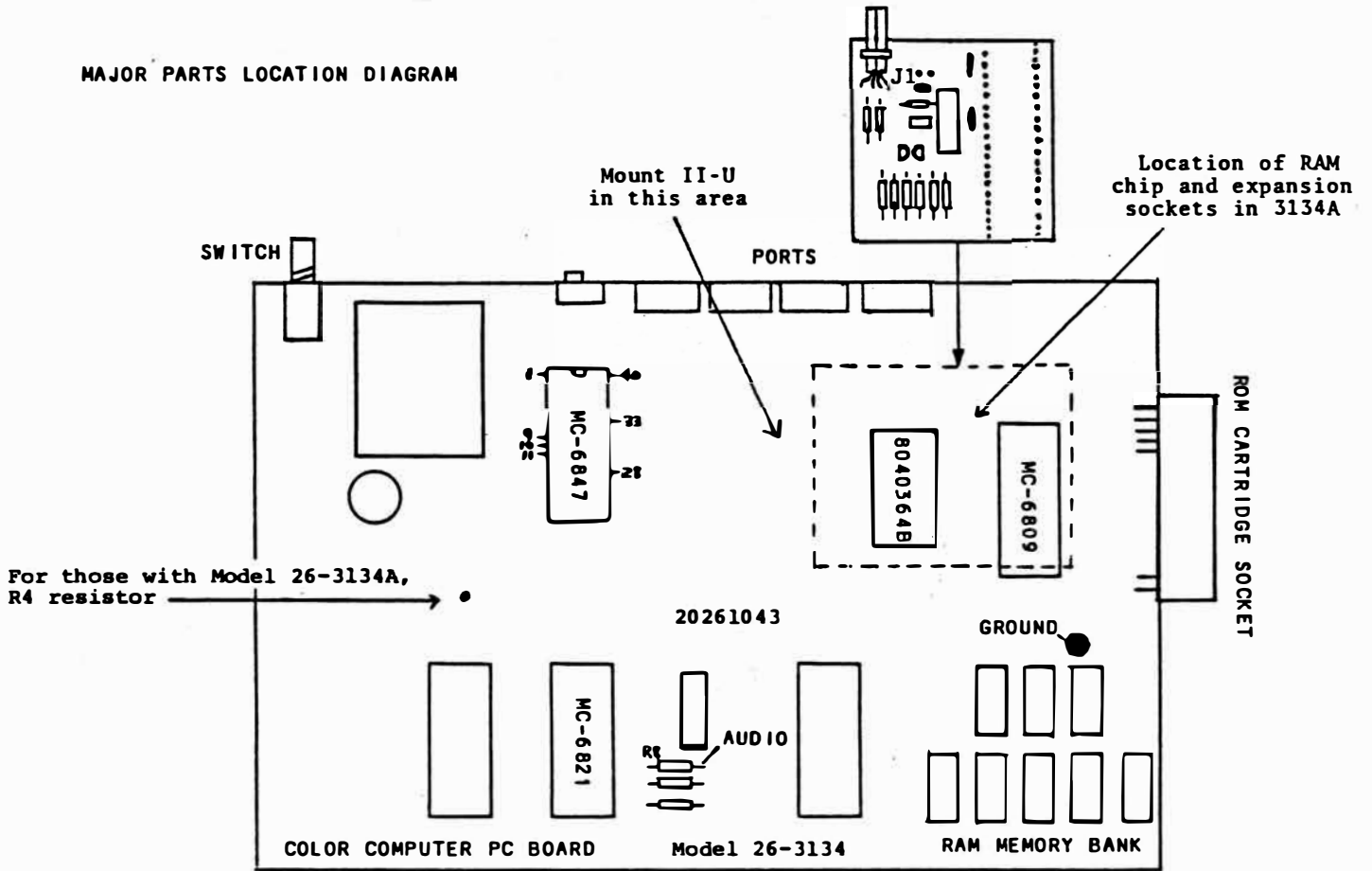
#### Some Additional Notes

If your monitor uses a 1/8 inch mini phono plug for the audio input (sound), you can get an adapter cable from Radio Shack or any good stereo store that will connect to the male RCA plug from the Video Plus to the monitor. This cable should cost less than \$2.00. Since there does not appear to be a standard for audio input, we chose to use the male RCA (phono) jack on the Video Plus. This is the most common audio connector and is the easiest to find adapter cables for. If you do have a problem locating the correct adapter, please contact Computerware for assistance.

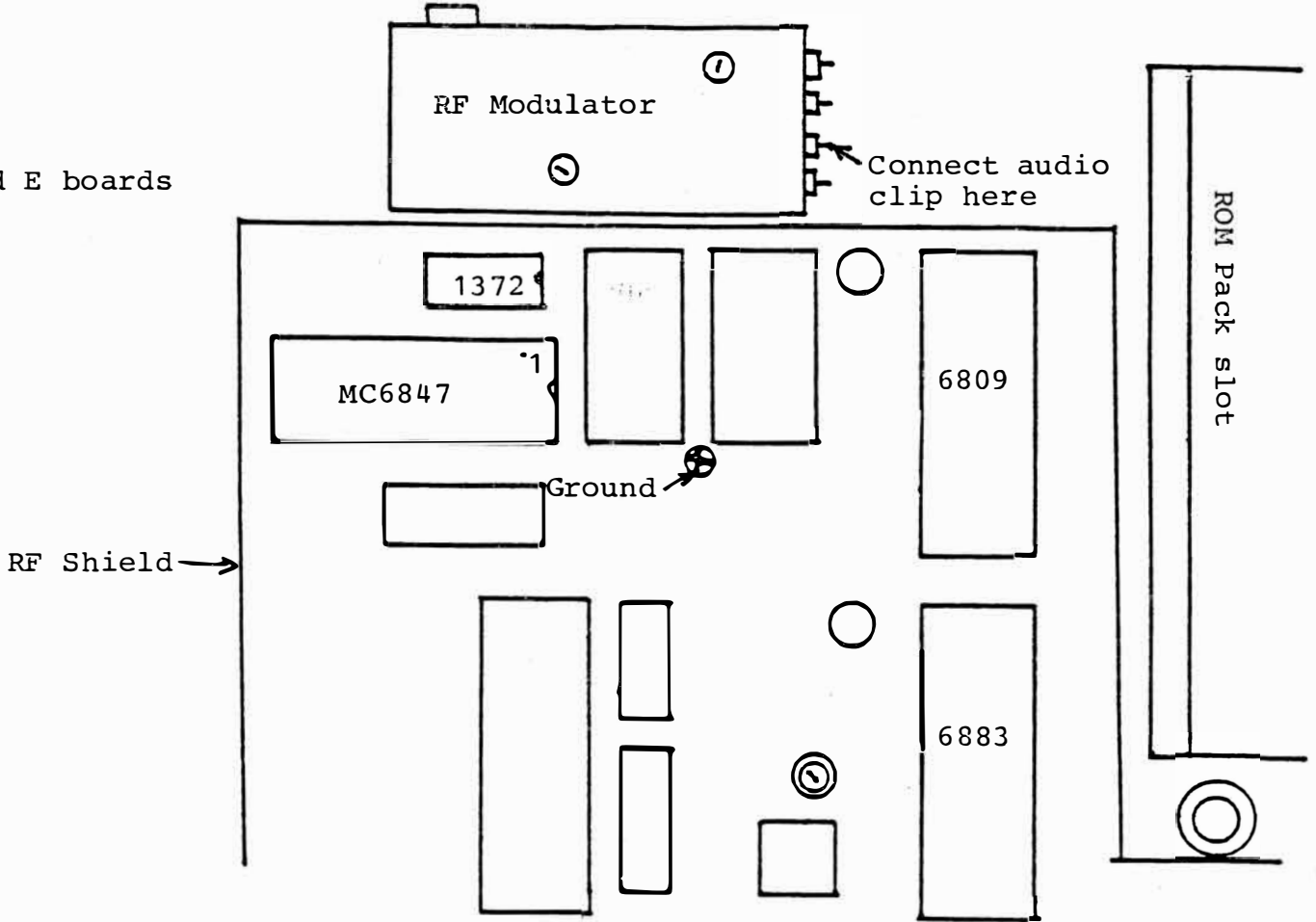
If your monitor has no audio input, you can get a small amplifier (RS # 277-1008 works nicely) and connect it to the audio plug of the Video Plus. This will allow you to get sound for games etc. without having to connect a TV also. With the Radio Shack amplifier, you will also need the adapter cable mentioned above.

If you want to produce a color picture, just clip the wire between the two holes above the 14 pin chip on the Video Plus board, labeled J1. You may want to connect a SPST switch (RS # 275-612 or equivalent) between the holes with about 4 inches of wire. This will allow you to switch between color and B/W without removing the cover.

MAJOR PARTS LOCATION DIAGRAM



D and E boards



ET Board

