

CHAPTER 1

BRINGING YOUR RETRO MACHINE TO LIFE

Setting Up Your TRS-80 Color Computer

The TRS-80 Color Computer (Also known as the COCO) is a “deceptively” easy machine to work with. One of the great things about this machine is that you do not need to have a degree in computer engineering in order set it up. Furthermore, when the machine starts up it has everything you need to start programming right there onscreen in front of you. There are no diskettes to load or operating systems to worry about. There are operating systems such as Disk Basic and OS9 (not to be confused with Apple’s operating system) and disks available for the color computer but you do not need to even look at these things until you are ready to.

Take a look at the photo of the back of the TRS-80 in Figure 1.1.



Figure 1.1 Photo of the back of the TRS-80COCO/ COCO2.

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There are three switches and five ports. Starting at the left, the first thing you see is the reset switch. When you press this button and the machine is turned on it will reset the machine. What this means is that it will clear memory and all of the registers, basically placing the machine into the state that the machine was in when the computer first started. When the rest is completed you will see an OK onscreen.

Second from the left is the cassette port. This is where you plug your cassette player into the color computer to use as a storage device.

Third from the left is the serial port. This port allows you to connect all manner of devices to the computer. While it can be used to drive robots or for home automation, it also allows for more practical capabilities, such as using a modem to log into bulletin board services.

Next are two joystick ports. This is where we connect our joysticks in order to play arcade video games.

Sixth over from the left is the channel selection switch. This switch allows you to choose between using channels 3 or 4 on your TV screen to view the computer's output. The 7th element from the left on the back of the computer is the TV connection. This is where you will plug in the cable that connects your computer to the TV.

Finally the eighth element from the left is the power switch that turns the computer on and off. Over to the far right is the built-in power cord.

The beauty of this machine is that if all you want to do is jump in and start programming, we may completely ignore five of the eight elements on the back of the machine. As you advance and your knowledge of the machine expands, you can make use of the other elements. The greatest feature of this machine is that you can easily get started using its basic features without being intimidated by its more complex elements. As your knowledge grows, you can move on and make use of more and more of the computer's resources.

Figure 1.2 is a photo of an RF switch.

This is all you need to get started programming the TRS-80. Examine Figure 1.3.

As you can see from the diagram, all that you need to get started programming is to connect the computer to your TV using an RF switch and then plugging in the machine's power cord.

Turn on the machine by pressing the power switch and you are good to go.

Right now your screen should look like the screen shown in Figure 1.4.



Figure 1.2 Photo of the RF switch.

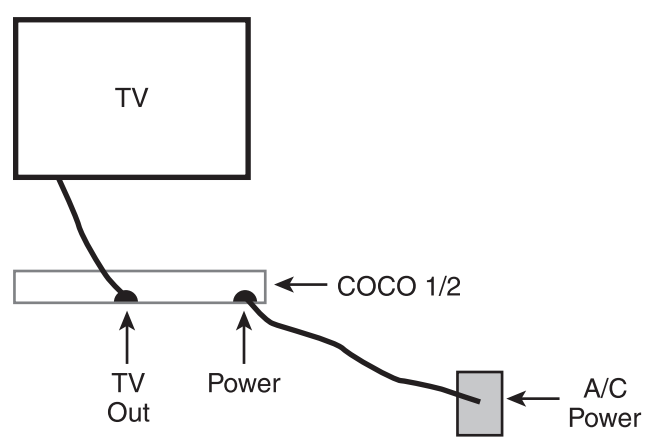


Figure 1.3 Diagram of basic TRS-80 color computer installation.

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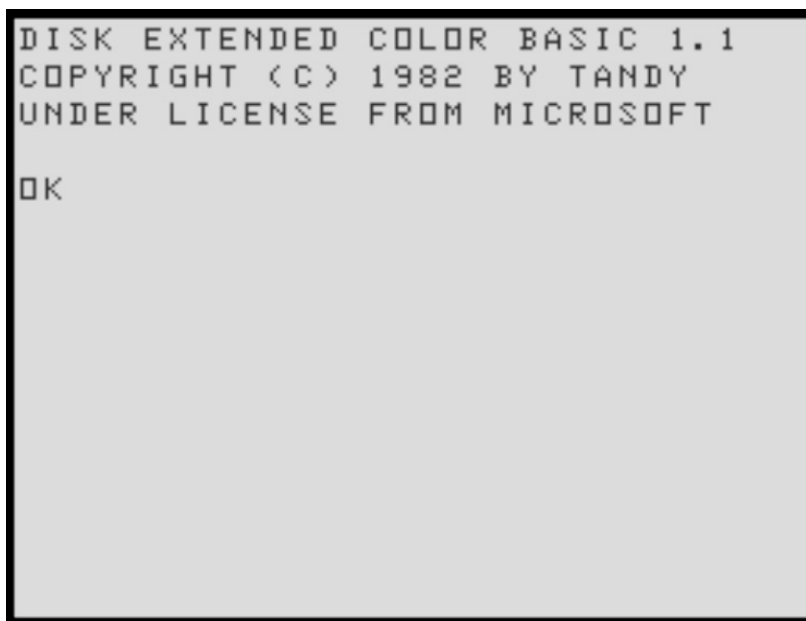


Figure 1.4 The TRS-80 boot screen.

You are now in extended color basic (or color basic if you are following along on a COCO1). The text onscreen tells you which version of basic you are using. Also note that you may have a color computer that has been upgraded to extended basic, in which case, you will know which system you have by looking at the case. (The COCO1 has a gray case while the COCO2 has a white case.)

Color Computer Storage Devices

You have two options for storage: disk drives or cassette tapes, discussed in the following sections.

Cassette Tapes

We will discuss cassette tapes first. Fortunately, the tape cassette is very easy to install. Figure 1.5 is an illustration of how to install the TRS-80's CTR-80A cassette recorder. There are other cassette recorders that may work, but the connection will be different, and there is no guarantee that they will function correctly.

One end of the cable has a single connection, pictured in Figure 1.6.

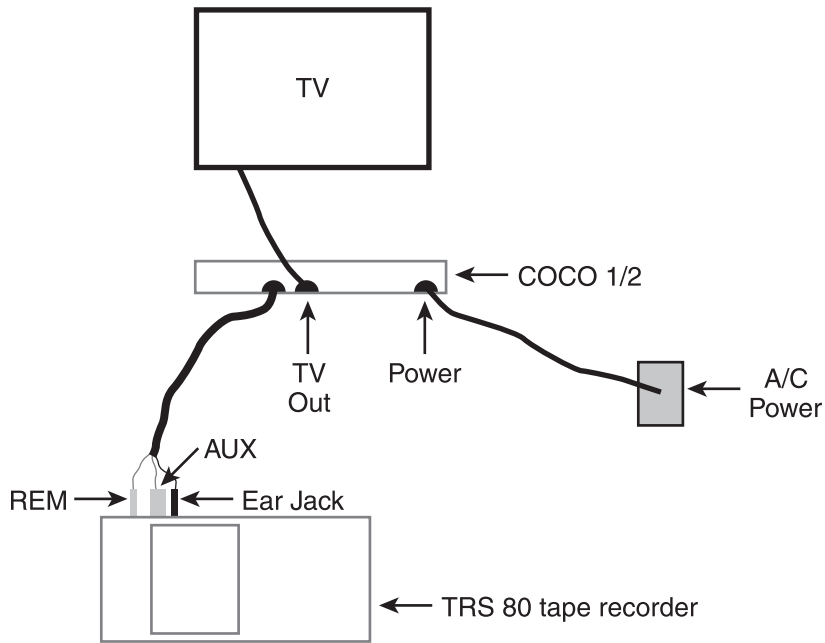


Figure 1.5 Illustration showing the installation of the cassette recorder.

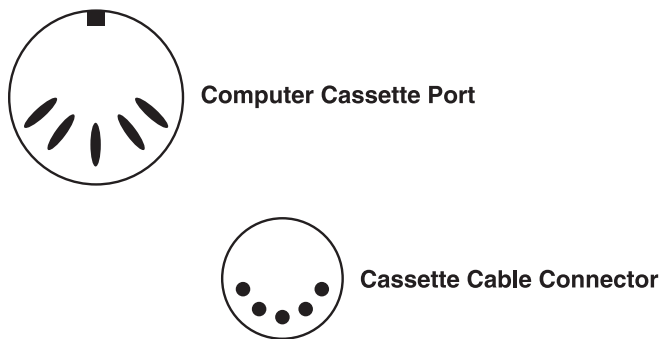


Figure 1.6 Illustration showing the connection that plugs into the computer.

Look at the U shaped pattern of this pin. The cassette port on the back of your TRS-80 has the same U-shaped pattern of indentations. Line the plug up next to your computer's cassette port so that both of their U-shaped patterns line up. Plug it in.

Next, take a look at the three plugs on the other end of the cable, illustrated in Figure 1.7.

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Figure 1.7 Illustration of the other end of the cable.

The small gray plug connects to the REM jack, the large gray plug connects to the AUX jack, and the black plug connects to the ear jack.

Finally, plug the recorder power cord into the wall's power supply.

Disk Drives

Setting up the floppy disk drives is just as easy. Look at the diagram in Figure 1.8.

There are two cables coming out of the floppy disk drive. One looks like a power cord, and the other looks suspiciously like a game cartridge. This appearance is a hint as to how the floppy drive is connected. The cable that ends with an improvised cartridge case (shown in Figure 1.9) is plugged into the TRS-80's ROM drive on the right side of the computer.

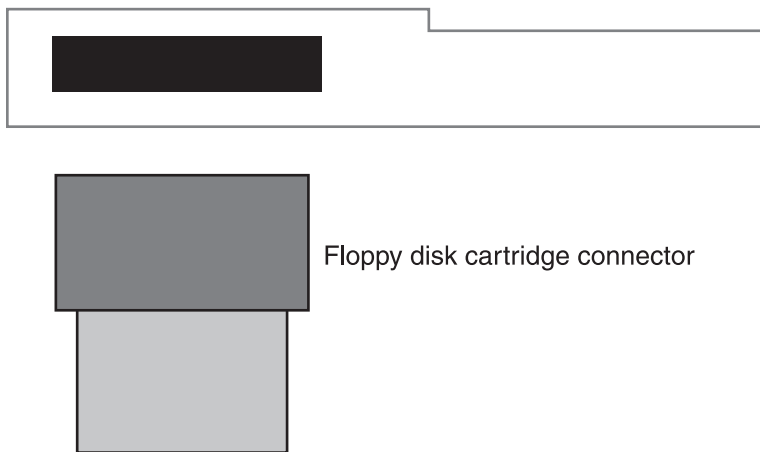


Figure 1.8 Diagram of the installation of the floppy disk drive.

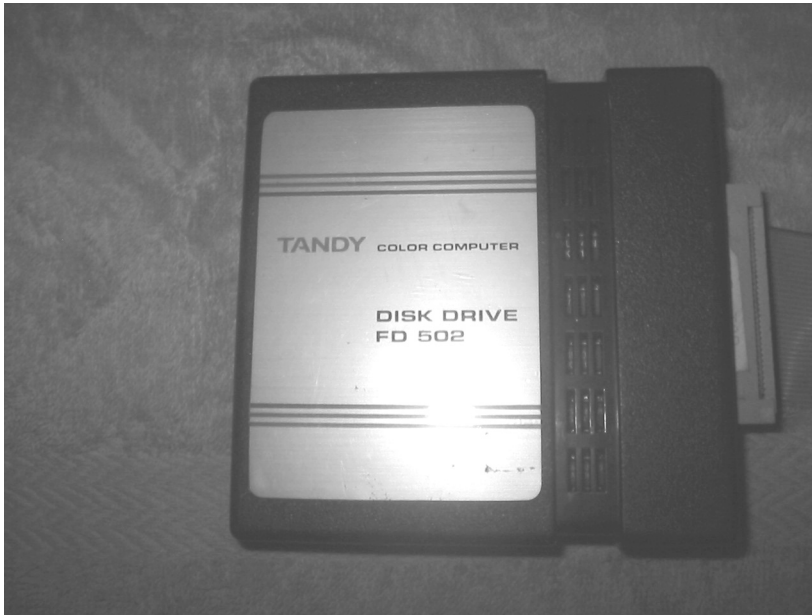


Figure 1.9 Photo of the ROM cartridge connector.

Next we plug the power cord into the wall socket. After turning the power switch on the back of the floppy disk into the on position, you are ready to go. When you turn on your computer with a disk drive connected, the Disk Basic operating system will automatically be loaded which will give you the ability to interact with the disk drive.

Setting Up Your Atari 400/800

Before you can use the Atari 800, you have to set it up. The exact cables that you need to install an Atari 800 vary slightly depending on whether you are connecting it to a TV or to a monitor. Following is a list of the devices that you will need to install your Atari.

- Power supply (Figure 1.10)
- Serial Cable (Figure 1.11)
- Joy Stick (Figure 1.12)
- Disk Drive (Figure 1.13 and 1.14)
- RF Switch (Figure 1.15)
- In Line connector (Figure 1.16)
- Video Cable (Figure 1.17)

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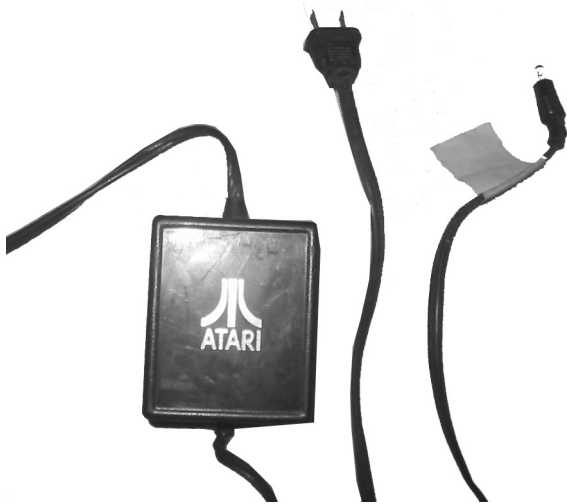


Figure 1.10 Power supply: You should have two of these, one for the Atari Machine itself and one for the disk drive.

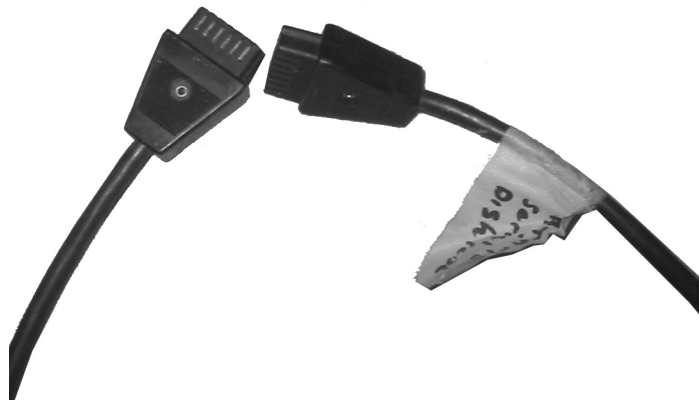


Figure 1.11 Serial Cable: This is used to connect the computer system to the disk drive.



Figure 1.12 Joystick: Of course no video game system would be complete without one of these. You will use this to control all of the action on your Atari console.



Figure 1.13 Atari 810 disk drive front view: This is used to store your programs.



Figure 1.14 Atari 810 disk drive rear view: This is used to store programs.

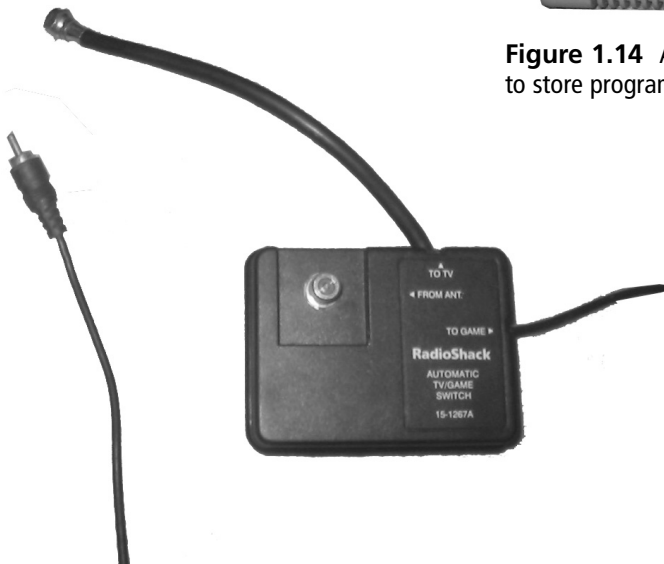


Figure 1.15 Generic RF switch: This is used to connect your Atari to the television.

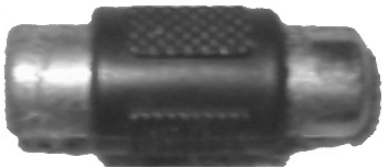


Figure 1.16 In-line connector: You will have to use this along with your RF Switch to connect the Atari to your TV.



Figure 1.17 Generic Video Cable: This is used to connect the Atari to a computer monitor.

Installation Instructions

Now, you have gathered all the parts needed to fire up the Atari 800, so let's bring this "baby" to life.

Installing the Power Supply

First things first; we have to give our machine some power. Look at the Figure 1.11 above for a picture of the power supply. Set the Atari before you with the keyboard facing you. Put your hand on the right side of the machine and turn that end of the Atari to face you. What you see should look like Figure 1.18.



Figure 1.18 Side view of the Atari 800.

Monitors and Receivers

At first glance a TV and a computer monitor may seem to be exactly the same. Indeed, today with the plasma screens being used for both television and computers, they often are. Plasma screens often come with enough input options to allow them to be used interchangeably. Traditionally, however, computer monitors have the advantage of a much higher resolution and provide a crisper image than television. The downside is that they usually do not have the circuitry needed to convert television signals to an image on the screen. A television set does not have the same high resolution of a computer monitor, but it does possess the circuitry to convert a television signal to an image on its screen.

When you connect the Atari to a computer monitor, it passes a standard composite signal to the monitor. A composite signal carries the data that determines the brightness and color of each point on the screen.

Things get a bit more involved when you connect your television to the Atari. The television was designed to receive a composite signal that has been mixed with an RF (radio frequency) signal. A composite signal has all of the information that is needed to display an image on the screen. The problem is that a composite signal is not strong enough to travel through the air.

If all we had were composite signals, broadcast television would be impossible. RF signals are strong enough to travel great distances through the air. These are the signals that are used on AM and FM radios. By combining RF signals with composite signals, we can send television images great distances through the air.

In order for your Atari to display images onscreen, it has to take its standard composite signal and combine it with an RF signal so that the television is used for receiving.

This technique, which is called *crowbar modulation*, was actually invented by Mr. Ralph Baer as a way to display the images from his games on television screens.

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The connections that you see going from left to right are as follows:

- **Monitor port:** This is where we are going to plug our monitor into the computer.
- **Serial port:** This is where we connect the disk drive to the computer.
- **Channel selection switch:** You can use this to decide whether your Atari should function on channel 2 or 3 if you choose to use a TV to play your games.
- **Power switch:** This is the master switch, which is used to turn the Atari off and on.
- **The power port:** This is where the power supply is plugged in.

Be sure that the power switch on the power supply is in the off position. Pick up your power supply and examine both ends. You will notice that one end looks just like a regular drop cord. Plug this end into your wall socket or surge. In Figure 1.19, you will see a picture of the other end of the power supply. Plug this end into the power port of your Atari 800.



Figure 1.19 This side of the power supply plugs into the Atari's power port.

Connecting the Atari to a Monitor

You can use either a TV or a computer monitor to view the action on your Atari.

First, we will go through the steps for connecting your Atari to a computer monitor. Figure 1.20 pictures the monitor port on the Atari. Figure 0.21 is a picture of a generic video cable. One end of this cable separates into four separate cables; the other is round and cylindrical. It is this cylindrical end that we are interested in first. Look inside this end of the cable and make note of the pattern of the pins inside. Now, look at the pattern of the holes in the monitor port of the Atari. You will see that they both form a half circle as seen in Figures 1.20 and 1.21.

Now take this same end of the cable and hold it just below the monitor port, shown in Figure 1.21.

Turn the cable until the patterns of the port and the cable line up with each other. Now push the cable into the port. Connecting the other end of the cable to the video monitor is going to be tricky. You have to get the pinout for the generic video cable. This tells you which pin on the cylindrical end of the cable corresponds to which pin on the other side of the cable. This is very important for you to know when connecting any of these computers (except the Apple) to your monitor. Next, after finding this information, you will need to know the pinout information for the Atari 800's monitor port. This information is provided for you in Figure 1.22.

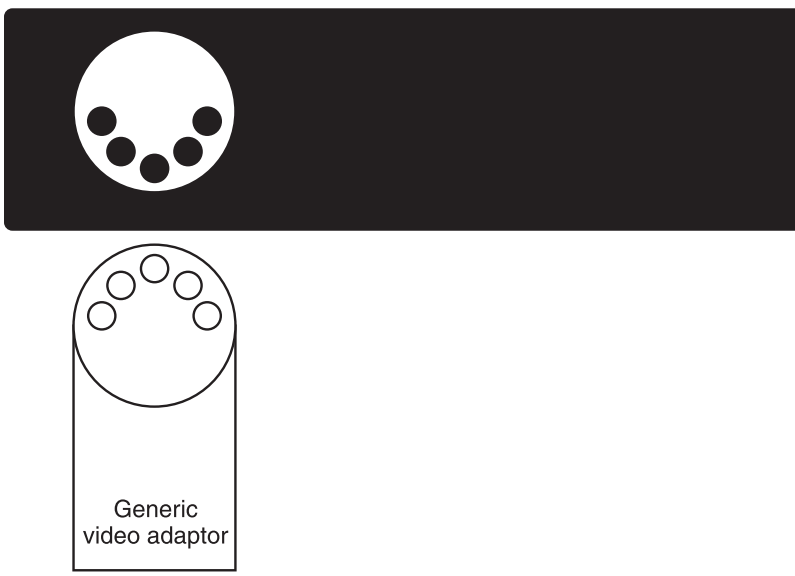


Figure 1.20 The Atari's monitor port and the generic video cable have matching patterns.

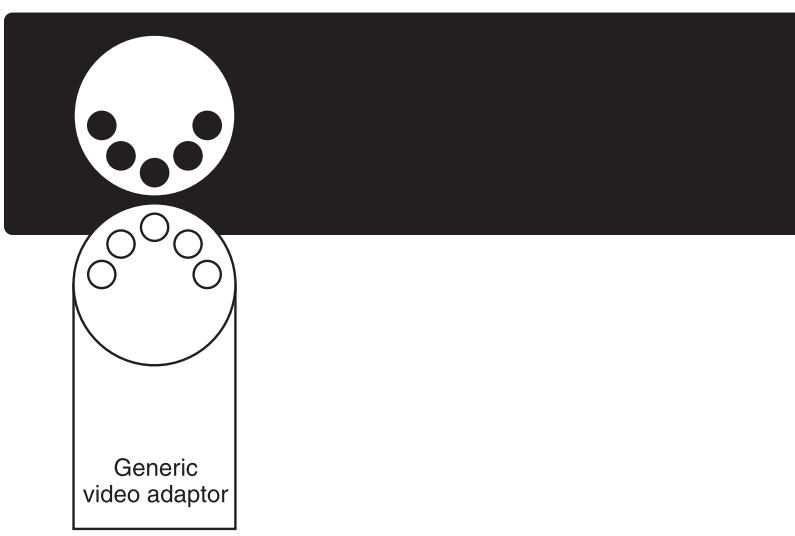


Figure 1.21 Be sure to match the patterns of the Atari's monitor port and the generic video cable.

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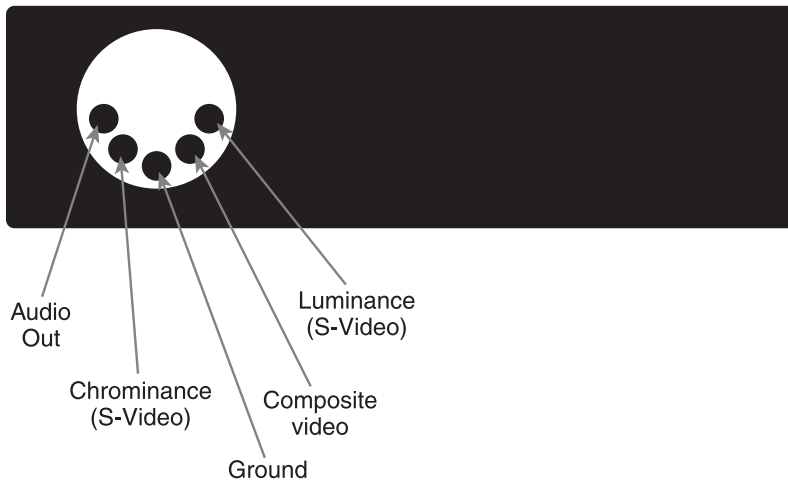


Figure 1.22 Pinout of Atari's monitor port.

Look at Figure 1.23 carefully. Make note of which pin is used to transmit *luma*, which transmits *chroma*, and which transmits *audio*. Now carefully pull out the monitor cable from the Atari and hold it as shown in Figure 1.23.

Note

Chroma is short for chrominance and refers to color. *Luma* is short for Luminance and refers to brightness. The Chroma line controls the colors on the screen while the Luma line controls the brightness of the colors on the screen. The *audio* line transmits the sounds that people playing your game are going to hear.

Make a note of which pin on the cable corresponds to the connection on the monitor port for Luma. Now make a note of which pin connects to the connection for Chroma and Audio. Now you have all of the information you need to hook up your monitor. This information is laid out in Figure 1.24.

On the back of your monitor, you will see connections labeled Luma, Chroma, and Audio. Use the pinout information that you found for your generic video cable to identify which cable is transmitting luma, audio, and chroma from the Atari and connect them to the appropriate port on the monitor.

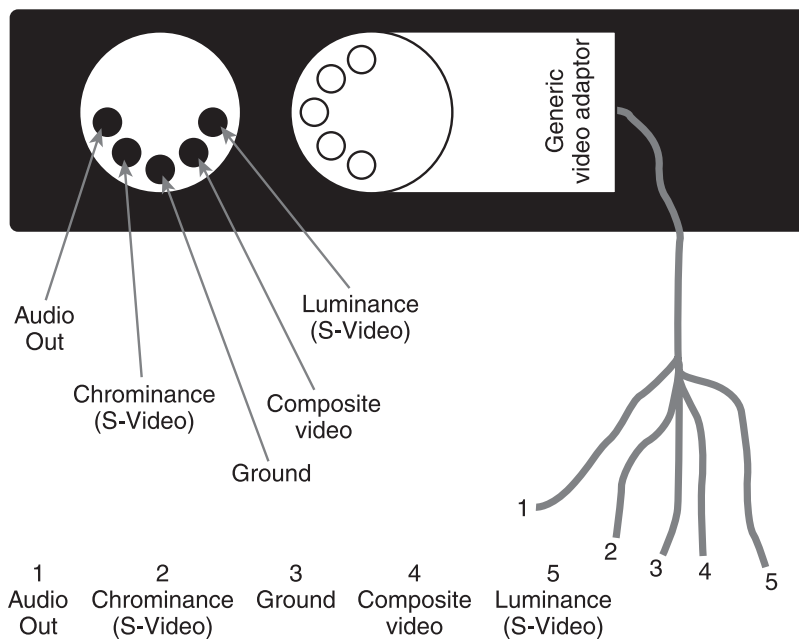


Figure 1.23 Make a note of how the pinout of your generic video cable matches up with the pinout of Atari's monitor port.

Pin Outs

	Audio out	Chrominance	Ground	Comp video	Luminance
Atari	1	2	3	4	5
Cable					
Monitor					

Figure 1.24 A diagram of all the information you need to connect your Atari to a computer monitor.

Connecting Your Atari to a TV

Most of you will be connecting your Atari to a TV though. For this configuration you will need three things:

- An RF switch
- An inline connector
- A TV

Located at the rear of the Atari you will find a built-in RF cable. The original Atari came with its own RF switch, which had a female input. For this reason, the built-in RF cable on the back of the Atari had a male connector (take a look at Figure 1.25 for an example of the differences between male and female connectors). Most RF switches today have a male connection that is designed to plug into a female socket at the back of the computer device you are working with. For this reason, you probably will not be able to directly connect your Atari to your RF switch unless you are lucky enough to find an original Atari RF switch.

This is where the inline connector comes into play. The inline connector has female connections on both sides. That helps us because we can connect the RF switch to one end and the Atari 800 to the other, as seen in Figure 1.26.



Figure 1.25 The relationship between male and female connectors.



Figure 1.26 You can use an inline connector to hook the Atari up to your TV using a modern RF switch.

It's a Boy!

Whether you are working with electronics, plumbing, or any number of other fields you will come across the terms male and female. These terms are usually found where we need to connect one device or cable to another, as in the case of connecting the generic video cable to the monitor port. Generally, one connection will be concave and the other will be convex. The convex connection will typically plug into the concave. As an example of this, think about when you plug your TV in to a wall socket. The plug from the TV is convex and is called male. The wall socket is concave and is called female. The male drop cord plugs into the female wall socket.

Installing Your Disk Drive

Now it is time to connect your disk drive. First, get your second power supply and plug the appropriate end into your wall socket or surge protector; plug the other end into the power socket on the disk drive. Next connect one end of your serial cable to the disk drive and the other end to your Atari as shown in Figure 1.27.

Now you must adjust the jumpers at the back of the disk drive so that the Atari will recognize this as disk one. Take a look back at Figure 1.14 to see a picture of the rear of the Atari 810 disk drive. You will notice that there are two identical I/O connectors. The disk has two connectors so that we can *daisy chain* a number of disks together. What this means is that we could actually string a number of disk drives together by connecting a serial cable from the Atari itself to the first disk drive by inserting the cable into one of the I/O connectors. We could then connect a second disk drive by running a serial cable

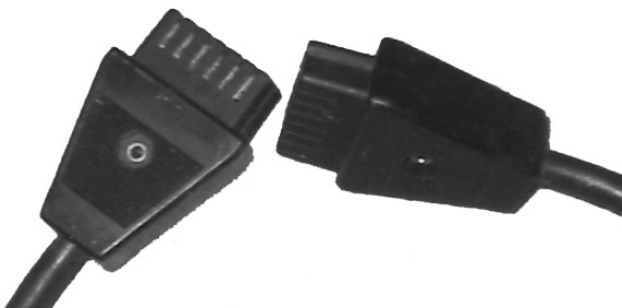


Figure 1.27 Both ends of the serial cable are identical, so don't worry about which end goes where. After it is properly oriented it will fit just fine.

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from the second I/O connector to one of the I/O connectors on the second disk drive. This process can go on until you have connected a total of four disk drives as seen in Figure 1.28.

Once you have daisy chained several disk drives together, or even if you only have one disk drive, the computer needs to know which drive is which. For this reason, on the back of the Atari 810 disk drive there are two binary switches. These two switches can be adjusted to form any one of four combinations. Depending on the combination that these switches are set to on each disk drive, the Atari will be able to tell which is disk 1, 2, 3, or 4. These combinations can be seen in Figure 1.29. Figure 1.30 illustrates daisy chaining and the disk settings for each switch.

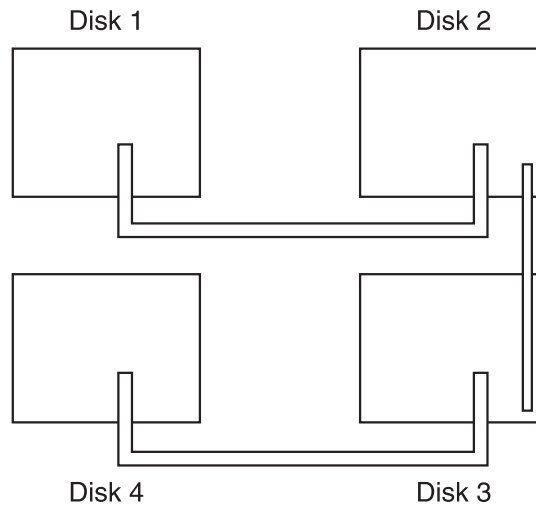


Figure 1.28 We can connect up to four disks together by using a daisy chain.

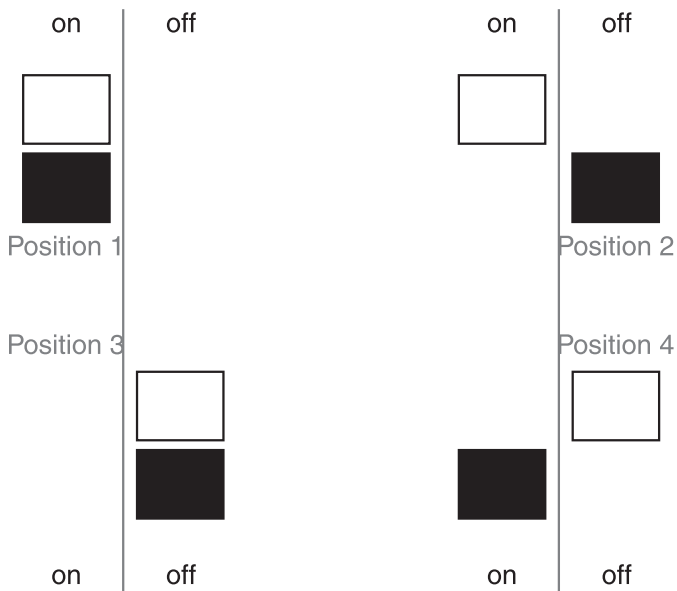


Figure 1.29 Set the two binary switches on the back of each disk drive so that the Atari can tell which disk drive is which.

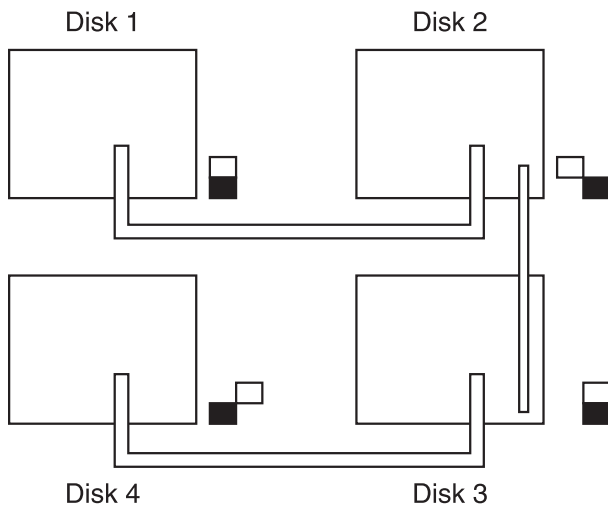


Figure 1.30 This diagram illustrates both daisy chaining as well as the appropriate switch settings for each disk in the daisy chain.

Connecting the Joystick

We are almost ready to rock and roll. There is just one more step; you must plug in the joystick. The diagram in Figure 1.31 demonstrates how to do this.

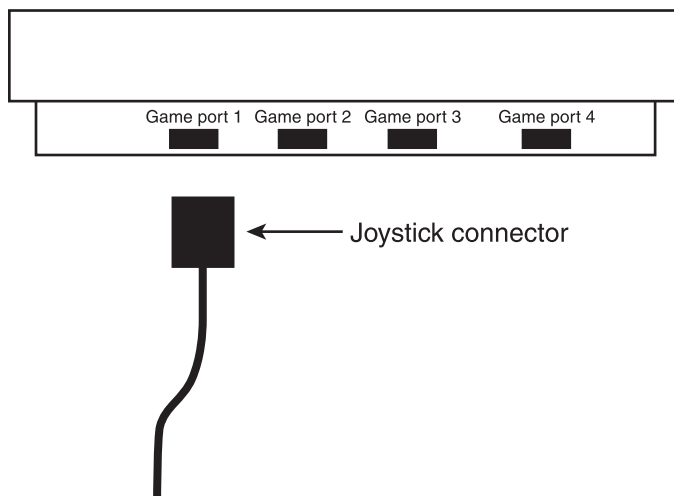


Figure 1.31 Connecting your joystick is easy.

Setting Up Your Commodore 64

Like the Atari and the Color Computer, the Commodore 64 is very easy to set up. Before you get started, make sure that you have the following items, pictured in Figures 1.32 through 1.36.



Figure 1.32 Commodore 64.

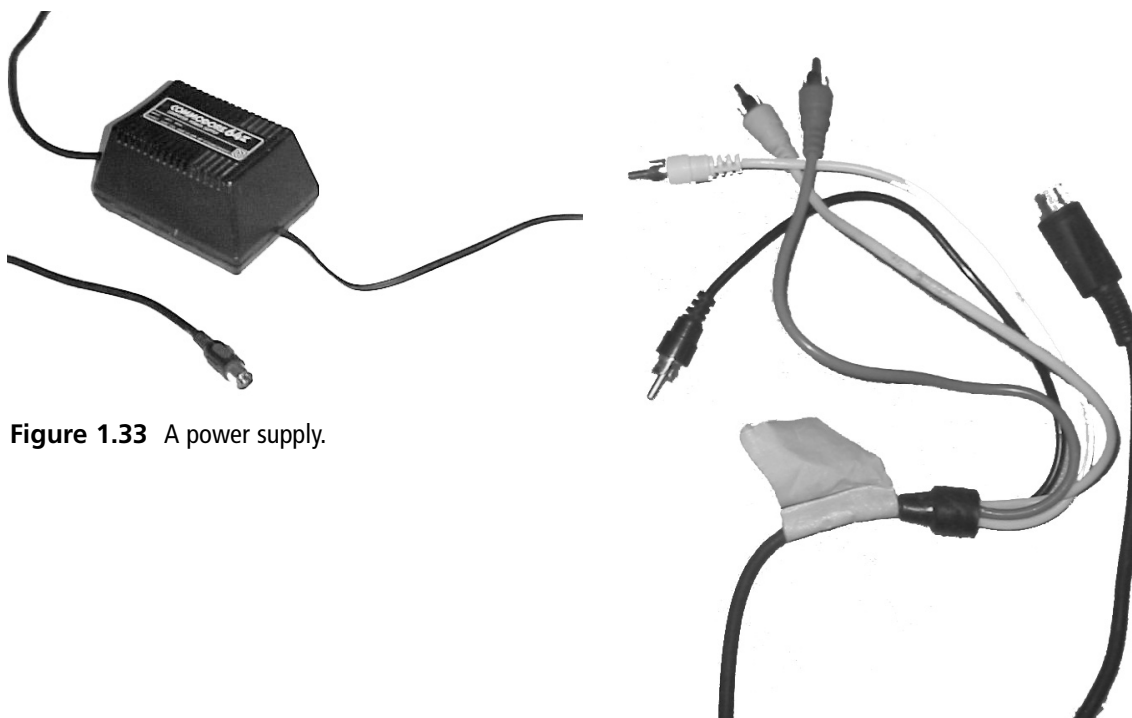


Figure 1.33 A power supply.

Figure 1.34 If you are using a monitor, you will need a video cable.



Figure 1.35 If you are using a TV, you need a TV switch box (sometimes called an RF switch).



Figure 1.36 You will need either a TV set or a vintage monitor.

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When you have all of these items, you are ready to get started. Examine Figures 1.37 and 1.38.



Figure 1.37 Side panel of the Commodore 64.



Figure 1.38 Back panel of the Commodore 64.

If you do not have a dedicated monitor for your Commodore, you will have to use a TV set. Fortunately, this is no problem to do.

The first thing that you need to do is connect your computer to some form of video output. These steps will vary depending upon whether you are using a monitor or a television set. If you are using a TV, you will attach one end to your computer's TV connector and the other end to the back of your set. Figure 1.39 below illustrates.

Connecting your Commodore is just as easy; it just requires a bit more attention to detail. It is easy to tell which end goes into the computer. See Figure 1.40.

The other ends of the cable will vary slightly depending on the manufacturer. There will usually be a white or red connector that must be connected to the video input on your monitor. Your cable should come with a pinout. Compare it to Figure 1.41 to be sure that you are connecting the right cable to the right inputs.

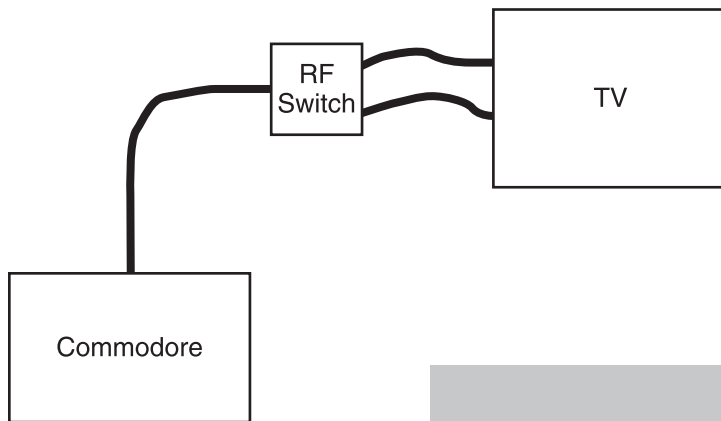


Figure 1.39 Here we see just how easy it is to connect our Commodore to our TV set.

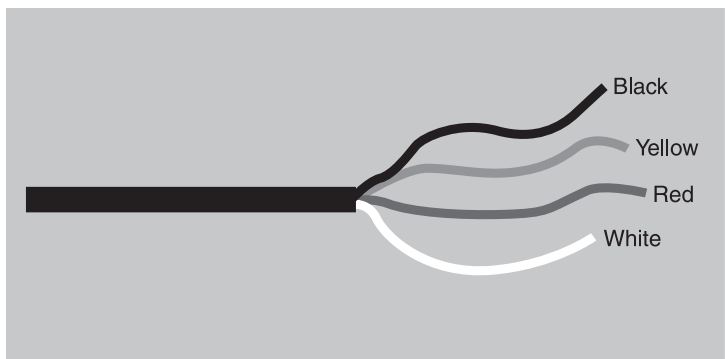


Figure 1.40 This end of the video cable gets connected to the computer.

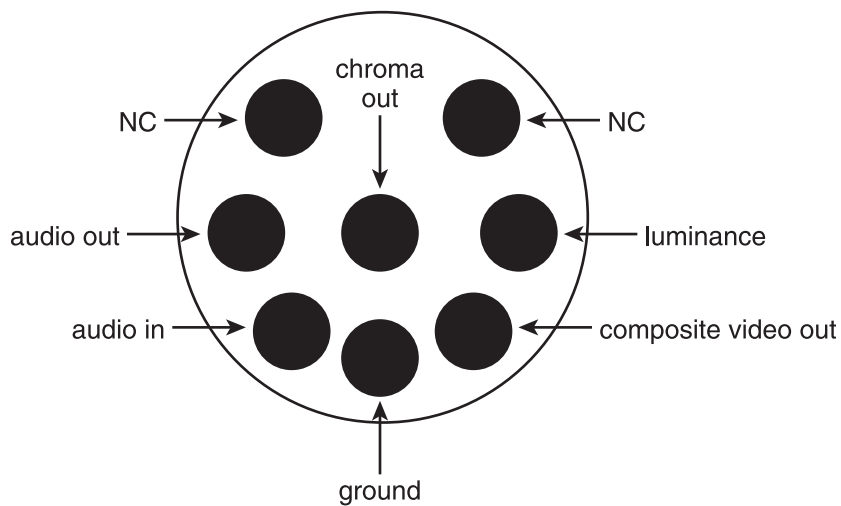


Figure 1.41 Use this pinout to make sure that you are placing the correct part of the cable.

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After you have confirmed that you know where to put each cable (see Figure 1.42), you can connect your monitor.



Figure 1.42 Your array of cables.

Now all that you have to do is connect the power supply to your computer and you are almost ready to rock. There is just one more thing you need to do, and that is connect your disk drive.

Simply make sure that your computer is off and the disk drive is switched off; then connect the drive.

Setting up your Apple II

This machine comes in a few different flavors. The one that I am going to be using is the IIe Platinum Edition.

In order for you to set up your Apple II, you need the following items:

- Retro Computer Monitor
- Video Cable
- Power Cable
- Disk Drive
- DOS Boot Disk

You can connect your Apple II using the diagram in Figure 1.43.

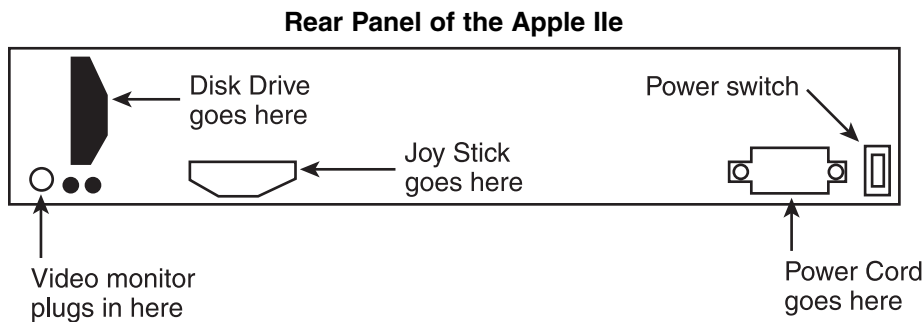


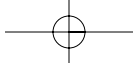
Figure 1.43 Basic configuration used to set up our Apple II.

Let's go through the process step by step. The first thing you need to do is to ensure that your power switch is in the off position and the power switch is disconnected. Also make sure that your computer monitor is turned off.

Now that you are sure that there is no power going to your computer, you can begin the process of installing the machine.

Connect one end of the video cable to the video port of the Apple II. Plug the other end into the chroma port of the video monitor.

Now connect the disk drive to your computer. Look at the diagram in Figure 1.43 and locate the disk port. Find this port on the back of your Apple II. This is where you are going to plug in your disk drive. Connect the disk cable to your computer and place the disk drive on the side of your computer or on top of it. Place your boot disk into the disk drive and close the door.



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Connecting a joystick is usually optional, and you do not need one in order to use your Apple computer. If you are going to be playing games, however, then a joystick is a must. Find the joystick port on the back of your Apple computer. You can use Figure 1.43 as a guide.

Finally, double check to make sure that the power switch is in the off position and plug in the power cord. You are now ready to go; turn on your computer monitor and flip the power switch on the back of your computer into the on position. Your Apple II will now roar to life. Welcome to the world of the Apple II. You are now ready to get started working with your retro machine.

