Software, Storage, and Peripherals

Put one line of BASIC on a floppy. Carry the disk to an SD card. Record it on tape. Then change one copy and prove that the original still works.



Cream Tandy cassette recorder with a smoked tape door, counter and red record key

Brian K. Holman

Book 5 · VCC Plus 3.7.1

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Put a program somewhere

Chapter 1 of 8

You're about to make a disk small enough to send to a friend. It will hold a program called **CARGO**. When your friend runs it, their CoCo will say **CARGO ORIGINAL**. They need neither your running emulator nor the contents of its memory. What, exactly, do you have to send them?

Give the disk a home on the Mac

1. Make a new folder in Finder for this book's exercises. Choose a place where you can find it again. Select the empty, initialized practice disk. Save a copy in your folder as **CARGO.DSK**. In the app reader the link opens a save panel. In a browser, rename the downloaded copy in Finder. If you opened the book directly from its folder, you can also duplicate **media/BLANK.DSK** into your practice folder.
2. Start in **Disk BASIC**. If a program is already in RAM, save anything you want to keep. To change setups, choose **Machine → Configuration Profiles…**, select **Disk BASIC**, then **Load…**. Read and confirm the restart. Resolve any pending work before switching.
3. Choose **Media → Floppy Disks…**. Find **FD0**. Use **Insert…** on an empty drive, or **Replace…** on an occupied one. Choose the **CARGO.DSK** you just made. Read the filename in the FD0 row. On this disposable copy, leave **Write protected** and **Temporary changes** off under **Disk options**. The row should say **Saves automatically**.
4. Resume the emulator with the Mac toolbar's **Run** if it paused. Click the CoCo screen, or choose **Input → Focus CoCo Display**. Wait for the **OK** prompt.

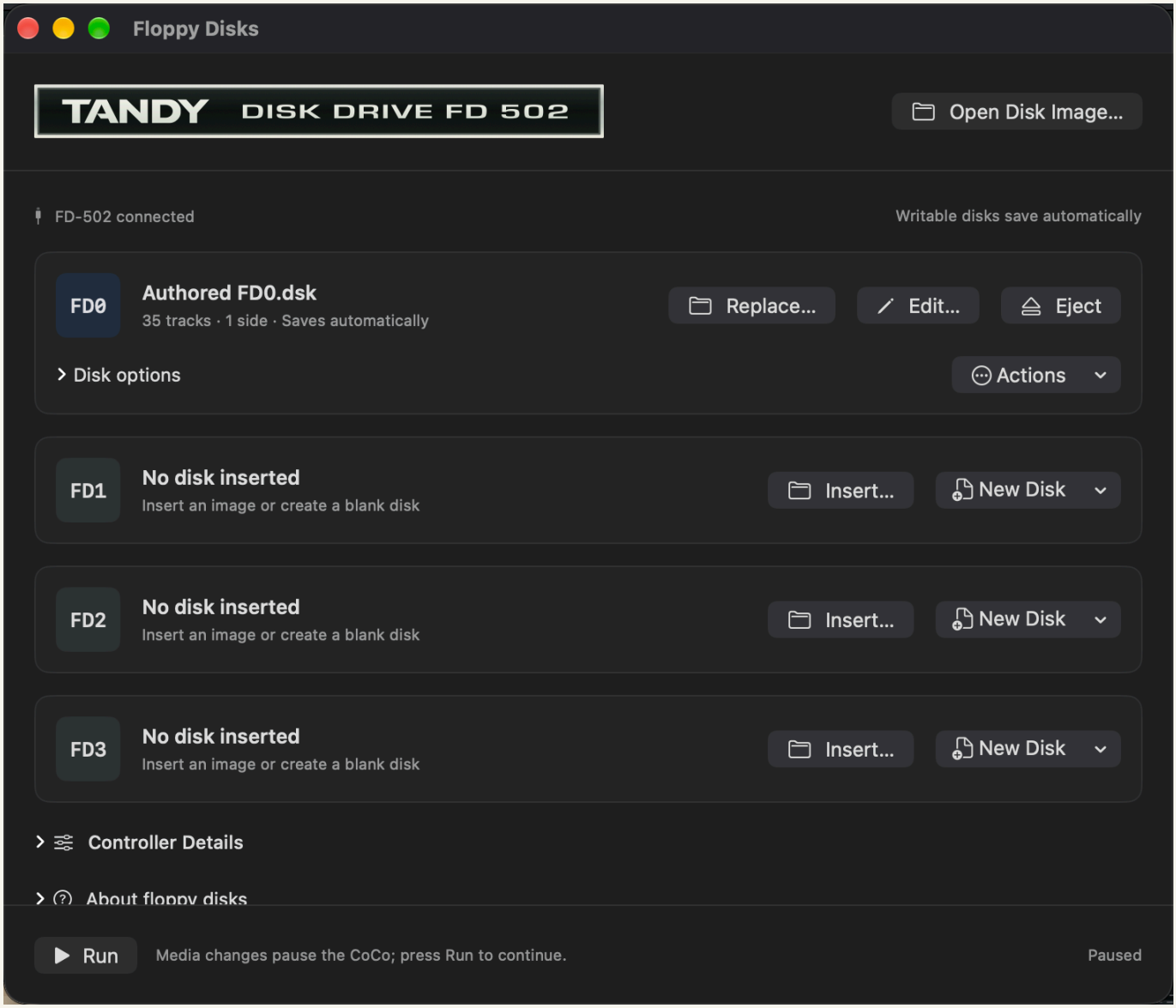


Figure 1: The Floppy Disks window puts the Mac filename and save mode beside the FD0 label. This example uses an authored test disk; look for CARGO.DSK on yours.

In the original disk system, a cable ran between a controller in the cartridge slot and the drive. The FD-502 controller understood the computer's requests to read and write. The physical drive held whichever floppy you put in it. Here, the device named **FD0** plays the part of that first drive. The image in it can change while the drive keeps its name. One FD-502 can serve FD0 through FD3.

Put a line in the directory

At the BASIC prompt, type `NEW` and press Return to begin with empty program memory. Type the following line and press Return. You can also open the source in its own editor to see it beside the machine. For this exercise, enter the line on the CoCo so you can follow the disk operation yourself.

```
10 PRINT "CARGO ORIGINAL"
```

A numbered line goes into memory. Now type these two commands, pressing Return after each one and waiting for **OK**.

```
SAVE "CARGO:0"
DIR 0
```

Find **CARGO** and **BAS** together in the list. That is a BASIC file inside the emulated disk. The zero in the SAVE name selected guest drive zero. In the Disk BASIC profile, that drive is FD0. The new Mac file you should see in Finder is the **CARGO.DSK** you chose earlier. You can store several BASIC files inside one such image.

If someone asks for…	Give them…
A line of BASIC to read or edit on the Mac	The editable **CARGO.bas** source
The floppy they can put in a drive	A copy of **CARGO.DSK**, after saving finishes
The name to type at the CoCo prompt	**CARGO**, the BASIC program in the disk's directory

Bring it back after NEW

Before clearing RAM, check FD0 for a completed save. If its row asks you to save pending changes, resolve that first. Enter the following, one command at a time:

```
NEW
LIST
LOAD "CARGO:0"
RUN
```

After **LIST**, you should see **OK** with no numbered lines. After **RUN**, you should see **CARGO ORIGINAL** and **OK**. The Mac **Run** button resumed the processor earlier. The word `RUN` here asked BASIC to execute the program it had just loaded. The result shows that the disk carried enough information to rebuild the program after RAM was cleared.

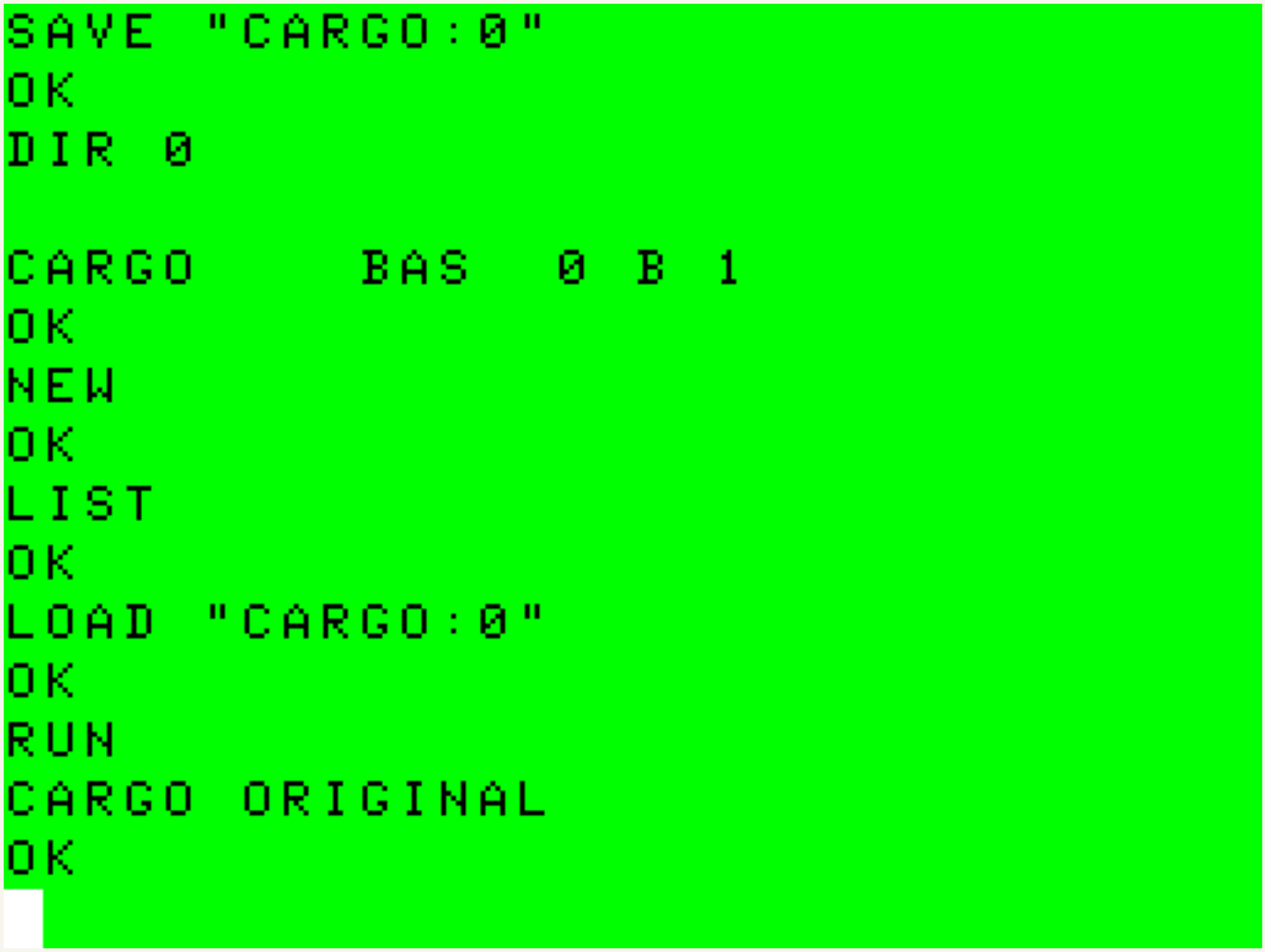


Figure 2: The guest first lists CARGO BAS on drive 0. After NEW and an empty LIST, LOAD and RUN recover CARGO ORIGINAL.

When the drive has finished, eject **CARGO.DSK** in **Floppy Disks**. The disk stays in your Finder folder. You'll copy it to a different kind of device in the next chapter. If you're picking up the book at that point, you can use the finished CARGO disk instead.

When someone hands you a different disk

Our practice file is a standard 35-track, single-sided Disk BASIC image. Old collections can also hold JVC sector images, DMK track images and VDK images. A DMK can retain details of a track that a plain list of sectors leaves out. The FD-502 sometimes recognizes DMK or VDK contents even when the name ends in .dsk. **Save As…** preserves the mounted representation. Renaming an image changes its label in Finder.

Start by mounting a copy with **Write protected** enabled. A protection flag inside a DMK or VDK header may lock that choice on. Check the software's own loading instructions before assuming Disk BASIC can list its directory. An OS-9 disk can fit in a CoCo drive and still require OS-9 to interpret its files. The same distinction applies to software written for a different computer.

An initialized disk already has a directory ready for use. **New Disk** in the Floppy Disks window also offers Standard DSK, DMK Track Image and VDK Disk Image, but those begin as unformatted media in memory. A guest format prepares their directory and destroys any previous contents on the selected disk. This book supplies an initialized blank so you can learn to save and reload without formatting a drive. Use the media field guide when deciding what to do with an unfamiliar file.

Inspect the files from the Mac

Choose **Edit...** beside the occupied FD0 row to open **Disk Image Editor**. The CoCo pauses and is locked while that mounted image is being edited. The table shows files inside the disk, with actual allocation totals below it. Exporting a tokenized BASIC file preserves its disk bytes; it does not turn it into the editable text listing used by BASIC Development.

Import, rename and delete work on a private copy and support Undo/Redo. For a Disk BASIC import, choose the file type and ASCII or Binary / Tokenized metadata to match the bytes you already have. These choices do not translate text, tokenize BASIC or assemble a binary. **Save Edited Copy...** keeps a separate image. Applying to the mounted drive requires **Restart and Apply**, which clears guest RAM before it can use the changed filesystem. Closing without applying leaves the source unchanged and the CoCo paused.

For a separate file, **Media → Floppy Disks... → Open Disk Image...** opens the editor without mounting it. A supported raw OS-9 image can be browsed too, including folders and its File Information permissions. Editing has narrower format limits than mounting: DMK, VDK, unsupported OS-9 geometry and oversized images may mount normally yet be refused by the editor. Use the handbook procedure for those limits, protection and save choices.

Carry the disk to a real CoCo

If your real CoCo uses DriveWire, open the separate **DriveWire for VCC Plus** app with its remembered personal profile and connect its serial session. Its separate companion guide explains profiles, connections and recovery. Back in VCC Plus's **Floppy Disks** window, choose **Actions → Send a Copy to DriveWire...** on the occupied row. Pick that session and a DW0–DW3 slot, then choose **Send Copy**. DriveWire asks **Allow for This Connection** before accepting the first transfer on that connection.

This sends the current disk bytes, including guest changes still in memory. It does not save or modify the emulator's source image, pause the emulator or clear its unsaved-changes indication. The destination becomes a separate working copy. If a disk was already there, DriveWire retains its current bytes for recovery before replacing it. Stop guest disk activity and return the real CoCo to BASIC or reset before using changed media. Do not assume the physical CoCo's cached directory changes just because the Mac switched images.

DriveWire also reuses VCC Plus's editor and a disk-only Software Library. There is one catalog maintained by VCC Plus; you do not update another database in the DriveWire app. Install matching public versions of the two apps. For permission, format limits and the **Show Received Disks...** recovery folder, follow Send a floppy copy to a real CoCo.

Take the same disk to an SD card

Chapter 2 of 8

A CoCo SDC cartridge lets a Color Computer open disk images kept on an SD card. In VCC Plus a folder on your Mac plays the part of that card. Put yesterday's disk image in the folder, and you can use it in a second machine without retyping a line of BASIC.

Prepare a practice card

1. Have **CARGO.DSK** ready in Finder. Use the ejected disk from Put a program somewhere, or save a copy of the finished disk. The guest will look for those short names, so keep the filename **CARGO.DSK**.
2. Save the program in RAM and finish any pending media changes. In **Machine → Configuration Profiles…**, select **CoCo SDC** under **System Profiles**. Choose **Create Fresh Starter Media…**, give the personal profile a name such as *Cargo Card*, then select and load that profile. Creating a fresh set gives you your own card folder. Loading the profile restarts the guest.
3. Choose **Cartridge → Cartridges…**, find the **CoCo SDC** slot, and open its details. Choose **Show SD Card Folder in Finder**. You can reach the card controls from the cartridge in System view, too. Copy **CARGO.DSK** into the folder alongside **HELLO.DSK** and **startup.cfg**. Keep all three as separate files.
4. For this reading lesson, enable **Protect SD card files (read-only)**. Resume the machine if paused. Focus the CoCo display and wait for the SDC-DOS **OK** prompt.

A fresh card starts with a disk named **HELLO.DSK** in its first virtual drive. Making a personal profile alone can still point to shared media. It's the **Create Fresh Starter Media…** choice that gives this experiment its own files.

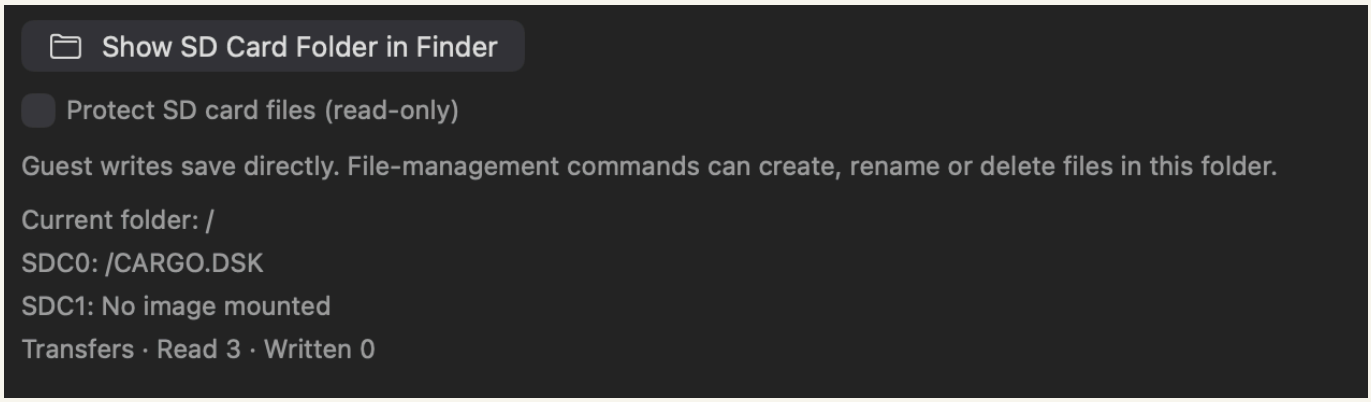


Figure 3: The native cartridge details show CARGO.DSK mounted in SDC0, an empty SDC1 and the card folder at its root. In this capture protection is off; turn it on for the reading exercise.

Read the card and then read a disk

Enter `DRIVE` at the SDC-DOS prompt. On a fresh startup the first row should name **HELLO.DSK**. Now enter `DIR –` with a space and a minus sign. Look for **CARGO DSK** and **HELLO DSK**. This is the directory of the card's current folder. You might recognize it from the Finder window. SDC-DOS displays a filename and its extension in separate columns.



Figure 4: DIR followed by a minus sign lists the disk images CARGO and HELLO and the startup file in the emulated card folder.

Mount your disk, then ask two different questions about it. Type each line separately.

```
DRIVE 0,"/CARGO.DSK"
DRIVE
DIR 0
```

DRIVE now lists **CARGO.DSK** in position 0. **DIR 0** looks *inside* that image and lists **CARGO BAS**. Try explaining those two results to someone who has only seen the Finder folder. Which name would they need to mount? Which would they need to run?

```
LOAD "CARGO:0"
RUN
```

Watch for **CARGO ORIGINAL** and **OK**, just as on the FD-502. The disk and its BASIC file kept the same contents through the move. The device interpreting drive zero changed. In this setup, use the SDC cartridge's mount display or the guest's **DRIVE** command to see the image you selected.

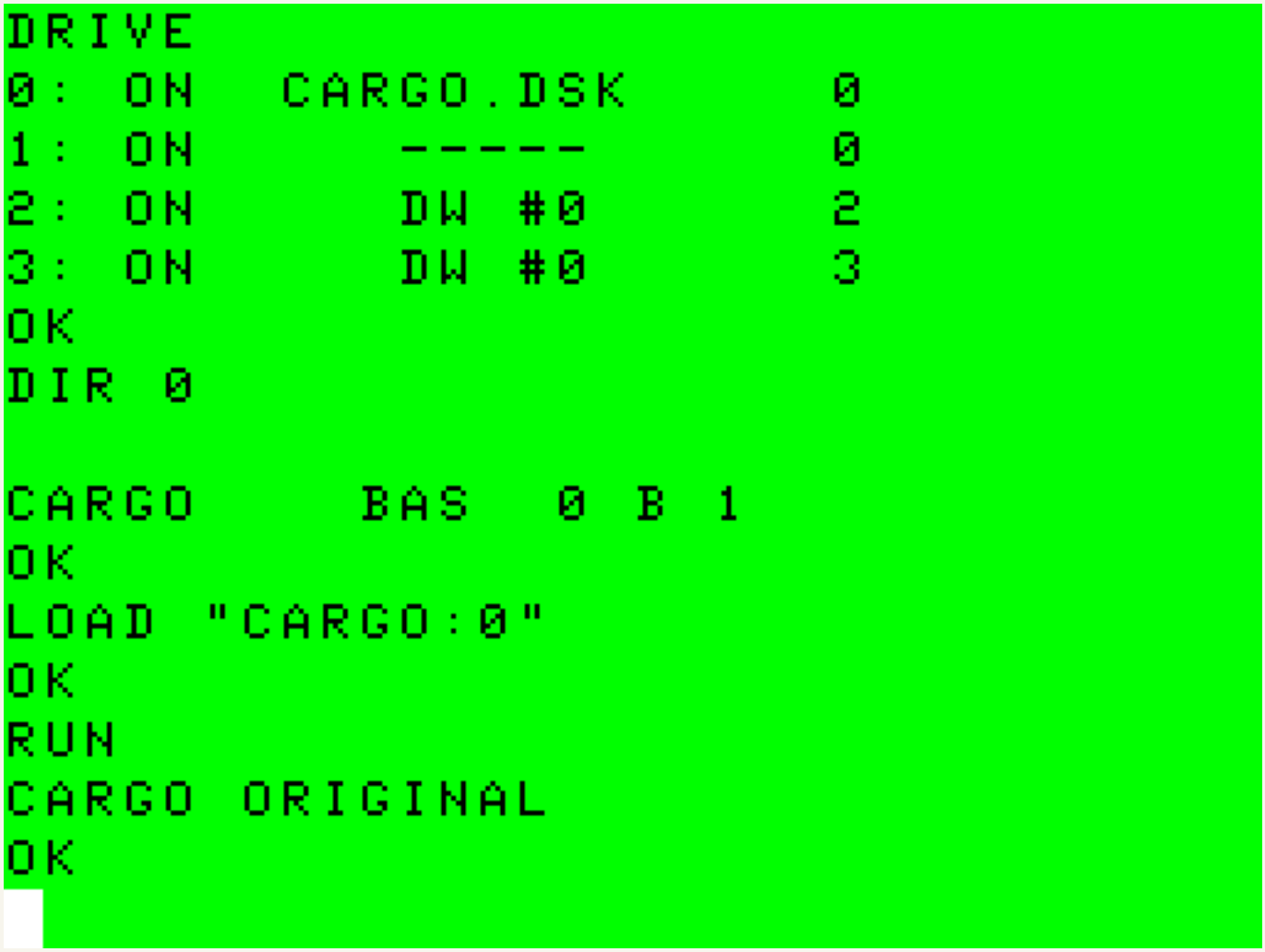


Figure 5: SDC-DOS shows CARGO.DSK on drive 0, DIR 0 shows CARGO BAS, and the loaded program prints CARGO ORIGINAL.

Keep a second image handy

The card supplies two image drives. Leave **CARGO.DSK** on SDC0 and put the starter disk on SDC1:

```
DRIVE 1,"/HELLO.DSK"
DIR 0
DIR 1
```

Look for **CARGO BAS** in the first directory and **HELLO BAS** in the second. Type `DRIVE` again to inspect the two mounted filenames. In the SDC-DOS 1.75 listing you may see additional entries marked **DW**. The two SD image mounts you used here are rows 0 and 1.

The slash at the start of each path means the top of this card. The Mac folder itself can have a long name with spaces. For files the guest must find, use short names of up to eight characters plus an extension of up to three, as in **CARGO.DSK**. If the intended image is missing from `DIR –`, start by checking **Show SD Card Folder in Finder**. Copying the image into a neighboring Mac folder can leave a perfectly good disk out of reach.

Decide what the card remembers

Open the starter card folder in Finder and examine **startup.cfg** with Quick Look. The fresh file asks the card to mount **HELLO.DSK** as drive zero when it resets. The commands in this chapter changed the current mounts for

the running session. Leave the starter file in place, and the next restart can bring HELLO back even though CARGO is still stored in the folder. Your profile remembers the folder's location. Keep the folder itself when moving a collection.

Some software expects a whole family of disk images beside one another. The CoCo SDC edition of *Double Dragon Arcade Port*, for example, comes as nine disks and uses SDC-DOS to switch among them. When you encounter a set like that, keep the filenames and directory relationships in the author's instructions. The Library's text readme for that edition explains the first mount and the game controls. There's no need to download the game for the CARGO lesson.

Leave a collection you only want to read protected. Turning off card protection lets guest software write disk images and manage actual files inside that Mac folder. Give an experiment its own copy first. This differs from FD0's Temporary changes, where you can choose when to write one mounted floppy image back to its Mac file.

Find the floppy behind drive zero

Chapter 3 of 8

A BASIC program on the hard disk and a BASIC program on a floppy can both be called **HELLO**. You could list drive zero, see a familiar filename and still be about to save on the wrong disk. Let’s give just one of the two disks a file you can recognize.

Set up two destinations

Save anything you want to keep from the current session. In **Machine → Configuration Profiles…**, select **Hard Drive BASIC** under **System Profiles**. Choose **Create Fresh Starter Media…**, give the new personal profile a name such as *Cargo Volumes*, then load it. Creating the files and loading the machine are separate actions. Using fresh media here gives you a safe place to write a marker and lets you compare your directories with the ones in this chapter.

Open **Media → Virtual Hard Disks…**. Find the assigned Mac image beside **HD0**. Now open **Media → Floppy Disks…** and find the separate image beside **FD0**. Both can be ready at once. The hardware setup includes a virtual hard-disk controller serving HD0 and HD1, and a floppy controller that supplies the disk ROM and serves FD0 through FD3. The profile selects compatible firmware for you. Resume and focus the CoCo. You should see **HARD DISK BASIC** at startup and reach **OK**.

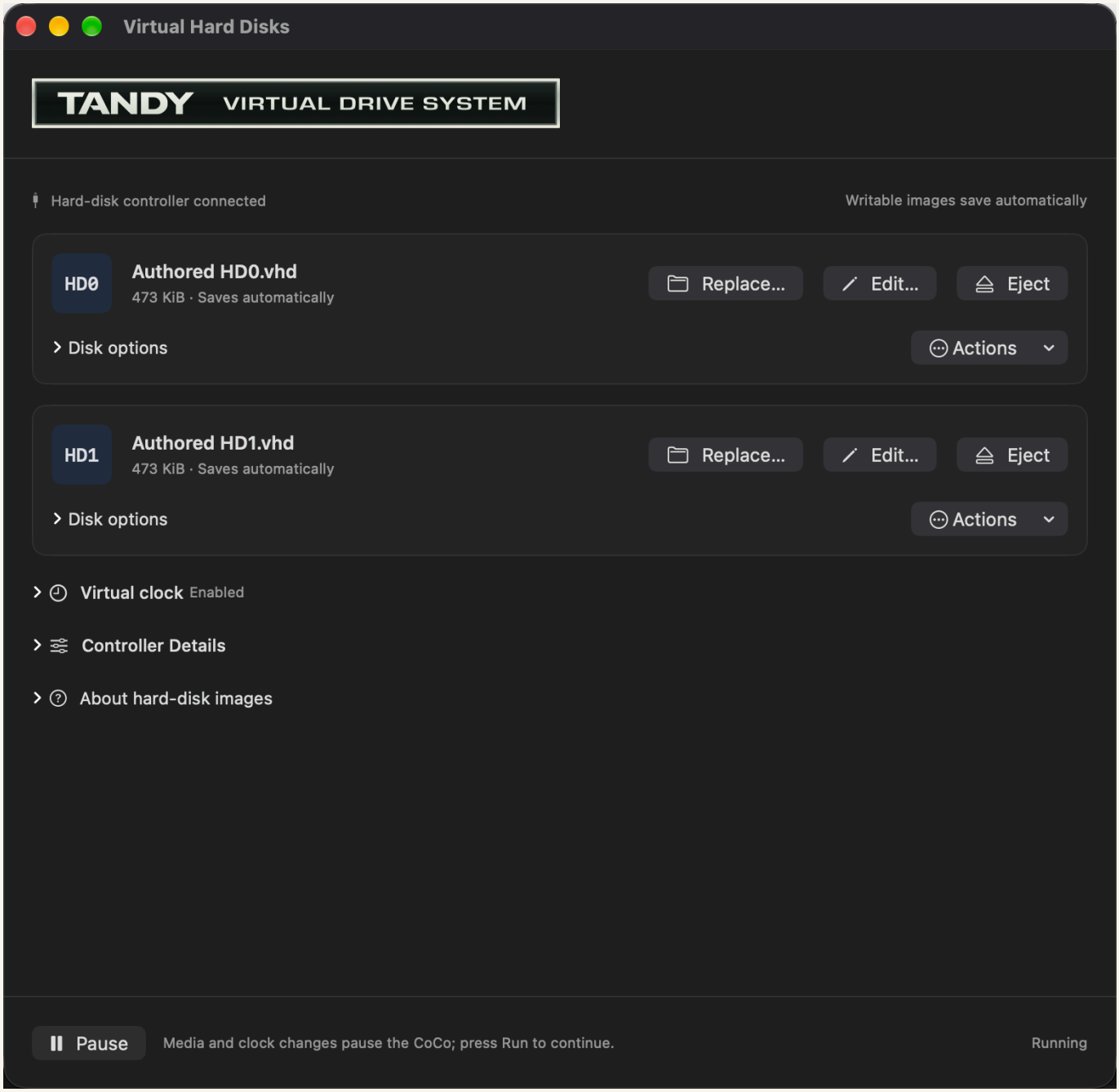


Figure 6: Virtual Hard Disks gives HD0 and HD1 their own assignments and Edit buttons. These authored small images illustrate the controls; use your personal profile's working images for this lesson. Compare HD0 with FD0 in the separate Floppy Disks window.

A floppy image represents one disk. A hard-disk image for this profile contains room for many numbered BASIC disks, called *volumes*. Here **HD0** is the Mac app's name for the first hard disk. **Volume 0** is one BASIC disk *on* that hard disk. Keep these two names apart, especially if your collection also has a second hard-disk image.

Leave a marker on volume zero

Enter the following lines, pressing Return after each. They assume you just loaded the fresh Hard Drive BASIC profile, where BASIC drive zero initially reaches volume 0 of HD0.

```
10 PRINT "VOLUME ZERO"
SAVE "VZERO:0"
DIR 0
```

Look for **VZERO** alongside **HELLO**. Write the two names down if you like. Call this your *hard-disk directory*. In the example, **FREE=66** follows the listing. Another disk may have a different amount of free space. The filename you added is the evidence to follow.

Ask the floppy the same question

At the next prompt, enter:

```
NEW
DRIVE OFF
DIR 0
```

Compare this directory with the first one. On the fresh floppy **HELLO** is there and **VZERO** is missing. **NEW** cleared the marker program in RAM. **DRIVE OFF** is the RGB-DOS instruction that lets ordinary floppy drives answer at numbers 0–3. FD0 just answered the same `DIR 0` you typed before. Both drives are still visible on the Mac. You can watch their read indicators as you issue the commands, but the marker stays in the directory long after a light goes out.

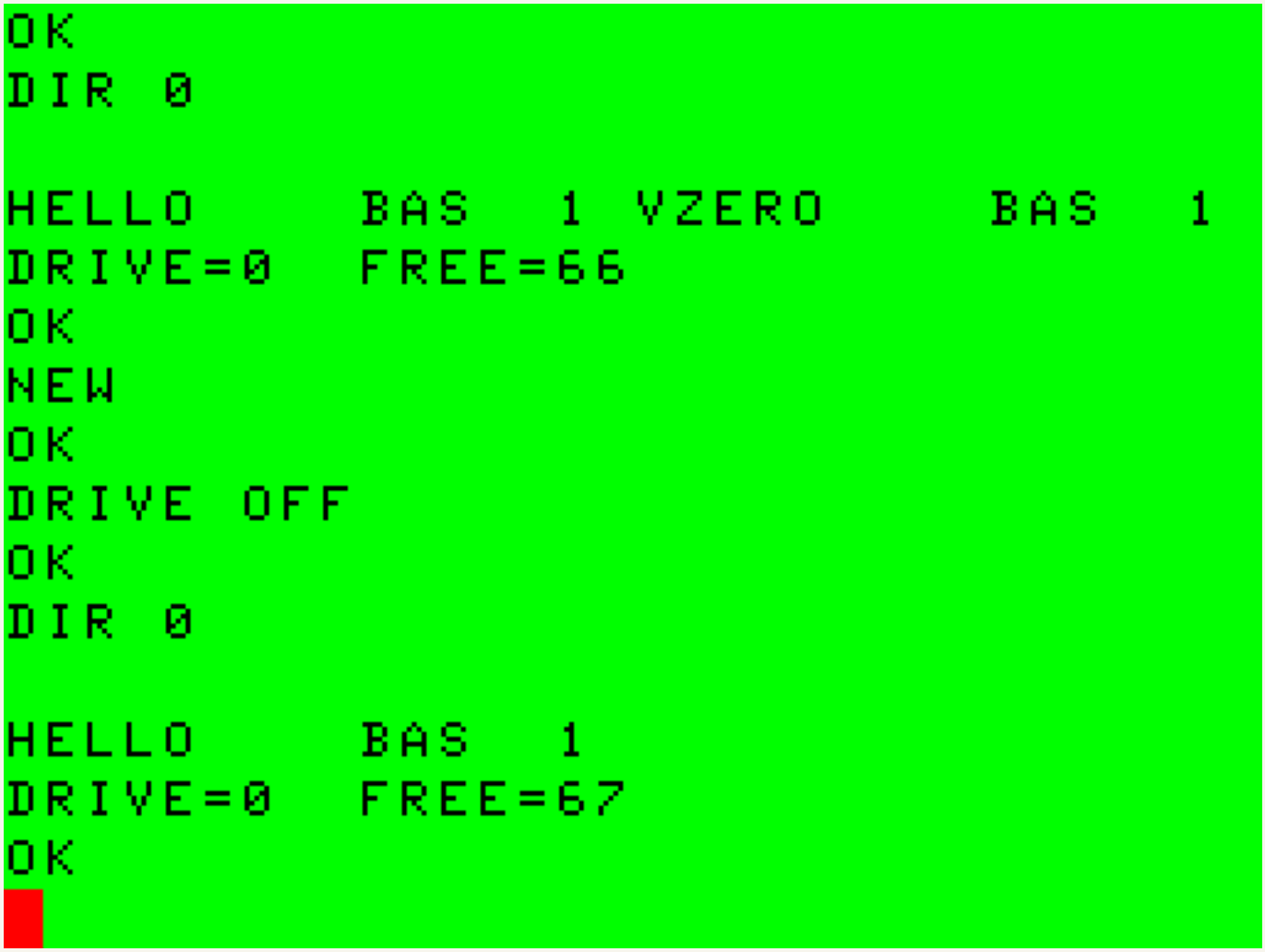


Figure 7: Both RGB-DOS listings identify drive 0. The one before DRIVE OFF contains HELLO and VZERO. The one after it contains only HELLO.

Predict what will happen if you ask the original device to answer again. Then try it:

```
DRIVE ON
LOAD "VZERO:0"
RUN
```

VOLUME ZERO and **OK** confirm that the CoCo read back the marker on the hard disk. You cleared RAM before making that trip. Seeing its message again is a stronger check than seeing the number zero printed next to two directory listings.

If you use your own images later, both copies might contain VZERO, or neither might have HELLO. Check the assigned Mac filenames, the last routing command and the title's instructions. In particular, use **DRIVE OFF** and **DRIVE ON** in this Hard Drive BASIC setup. The standard floppy profile and the SDC profile have different firmware. Read the SDC card and a mounted disk to compare the same drive number there.

Know which part of a hard disk you're opening

From this setup	The name you use	What it reaches
Hard Drive BASIC, just started	Drive 0	RGB-DOS BASIC volume 0 on HD0

From this setup	The name you use	What it reaches
Hard Drive BASIC after DRIVE OFF	Drive 0	The floppy in FD0
Bundled NitrOS-9 system profile	/dd	The OS-9 system filesystem on its main disk
Bundled NitrOS-9 system profile	/h1	The OS-9 filesystem on the second hard disk

The standard Hard Drive BASIC and NitrOS-9 profiles share a *working data image*. In the first profile that image is HD0. In the second it is HD1 because the NitrOS-9 system disk occupies HD0. The shared data image has separate space for BASIC volumes and an OS-9 filesystem. Opening its OS-9 directory shows the OS-9 files in that space. Your fresh personal profile for this lesson has its own working media, so keep it if you want to return to VZERO.

The **New Disk...** command in Virtual Hard Disks asks how much storage to create. A new raw image is empty space until software prepares its filesystem and you save the image to a Mac file. For a bootable setup or a ready-to-use BASIC directory, start with the matching system profile. For a short trip to the OS-9 shell and the two actual directory listings, see Visit the OS-9 side of the disk. To create and recover your own OS-9 file on HD1, follow Leave a captain's log.

The native **Disk Image Editor** also distinguishes the parts of a supported image. **Edit...** beside HD0 or HD1 pauses and locks that machine; the editor's **Volume** picker selects OS-9 or a numbered HDB-DOS Disk BASIC volume. Space totals apply to the selected filesystem. Saving an edited copy retains the whole image; applying to a mounted drive requires an explicit restart. See Edit the files inside an image before using that separate Mac workflow.

On the OS-9 side, you can follow a particular file through its disk sectors.

Record a program you can rewind

Chapter 4 of 8

With a floppy, BASIC can go straight to the directory and find CARGO. A cassette has a beginning, an end and a position somewhere between them. To find CARGO, the CoCo must pass the recorded name on its way along the tape. You can watch it recognize that name.

Put the recorder on your desk

Use **Disk BASIC** for this lesson. Save anything you want from RAM before changing profiles. Load a practice Disk BASIC setup in **Machine → Configuration Profiles…**, resume if paused, and choose **Media → Cassette…**. Clicking the recorder in System view leads to the same controls. Look for the tape name, transport state, motor state and position counter.

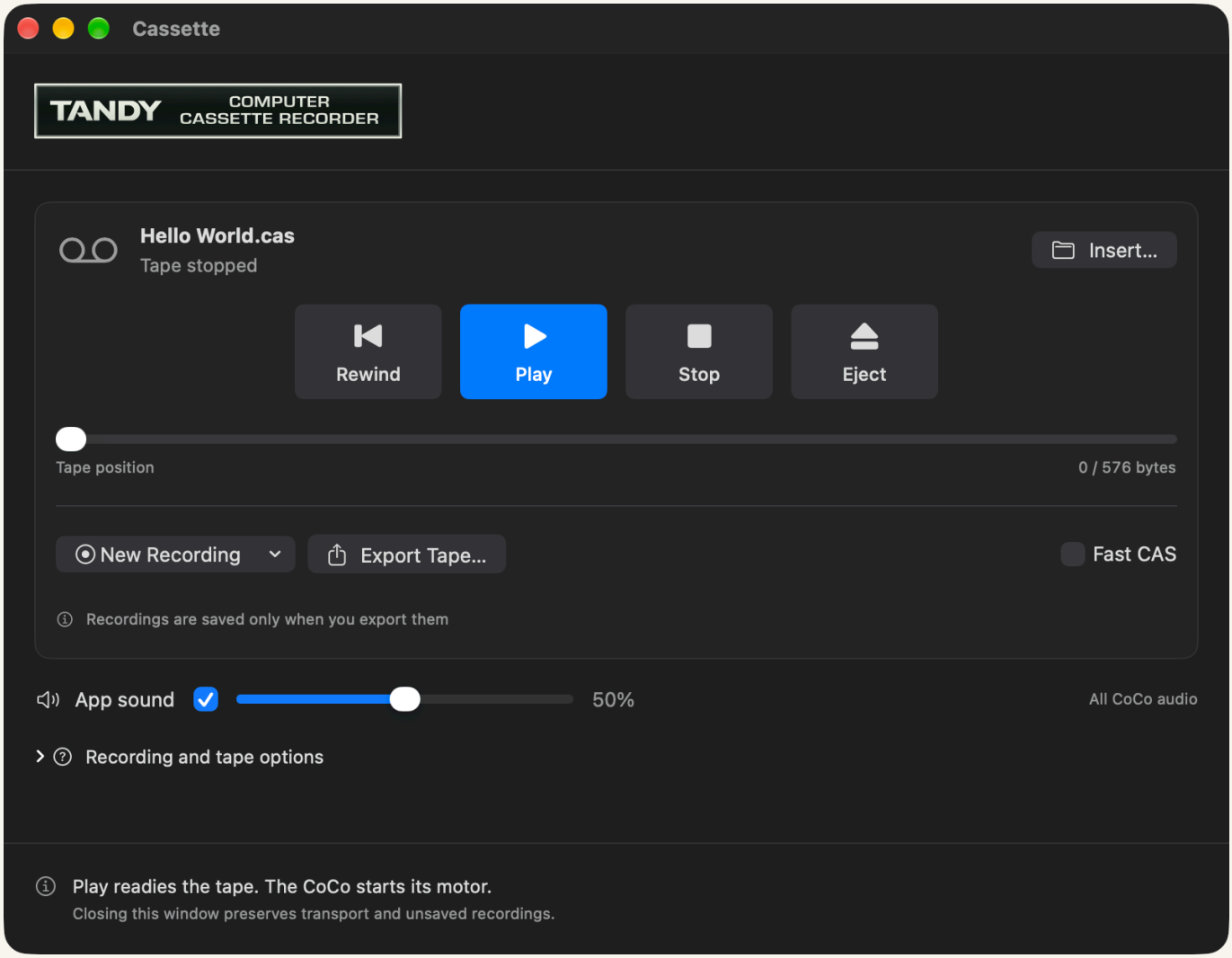


Figure 8: The starter tape Hello World.cas is stopped. New Recording and Export Tape are below the position counter. Use them to make and keep your CARGO tape.

On a CoCo desk the operator pressed buttons on the recorder and BASIC controlled the motor through its cable. Here **Play** gets the tape ready. The CoCo starts its motor when a program asks for input. Seeing that the tape is ready while its counter stands still makes sense at an idle BASIC prompt. The Cassette window can close

while the recorder is in use. Reopen it from **Media** or the tape status when you want to look at the controls again.

Want to try playback first? Save the cargo cassette in your practice folder and jump to Find the recorded name. To make your own, follow the recording steps below.

Record CARGO and keep the tape

1. At a practice BASIC prompt, type `NEW` and press Return to start with empty program memory. Enter the numbered line below. As in the floppy lesson, it stays in RAM until you save it.

```
10 PRINT "CARGO ORIGINAL"
```

2. In **Cassette**, choose **New Recording** → **CAS**. This replaces the inserted tape with a fresh tape in memory and arms the recorder. If an earlier recording needs export, keep it under its own Mac filename before starting another.
3. Return to the CoCo. Type `CSAVE"CARGO"` and press Return. Watch the tape position advance. Wait for **OK** and for the tape motor to stop. The C at the beginning of **CSAVE** sent the program to the cassette interface.
4. In **Cassette**, choose **Stop**, then **Export Tape…**. Give the new file an unused name such as **My Cargo.cas** in your practice folder. During recording you may see **Recording needs export to keep it**. Guest success at **OK** means BASIC finished sending the program to the recorder. Export is the step that keeps the recording in Finder.
5. After the export finishes, choose **Eject**. At the CoCo, enter `NEW`, then `LIST`. Check for **OK** without any numbered lines. You now have an empty BASIC workspace, an empty recorder, and a recording you can insert.

Find the recorded name

1. In **Cassette**, choose **Insert…** and select the CAS file you exported or the practice cassette you saved from the book. Choose **Rewind** to set position to the beginning. Choose **Play**.
2. Focus the CoCo screen and, if needed, resume the machine. Type `CLOAD"CARGO"` and press Return. Watch for **F CARGO**. BASIC found the name you requested. Wait for **OK** before typing another command.
3. Type `RUN` and press Return. Look for **CARGO ORIGINAL** and **OK**. Those words came from the program read from the tape. Its Mac filename can be **My Cargo.cas** even though the program name BASIC looked for was **CARGO**.



Figure 9: After the tape search, the CoCo displays F CARGO and OK. RUN then prints CARGO ORIGINAL.

If the search seems to go nowhere, check the tape filename, the position counter, and whether the guest is running. A counter already at the end means the recorded name is behind the current position. Return to a BASIC prompt, rewind, choose Play, and start the named load again. If the name was found but the greeting has yet to appear, check for **OK** and type `RUN`. Finding, loading and running are separate events.

Compare a compact tape with a waveform

Repeat the recording and playback steps with **New Recording → WAV**. Give the export a fresh .wav filename. Tape position now counts **samples**, while a CAS tape counts **bytes**. Hearing something through the Mac speaker is optional. The counter, found-file message and BASIC result let you check every step visually.

Both forms carried the same program in our exercise. The CAS file occupied **310 bytes**. One WAV recording of the same line occupied **131,160 bytes**. CAS keeps the encoded tape data compactly. WAV represents the signal as samples over time, so its length can vary with recording time. Use the format that matches the material you have or the destination you plan to use.

The **Fast CAS** switch is available with the transport stopped. It accelerates compatible BASIC ROM loads of CAS files. WAV playback follows the waveform. For a recording you want to pass on, keep the actual exported file and try it on a fresh load as you did here. The first chapter's floppy round trip uses the same proof with a different device.

Choose what goes in the slot

Chapter 5 of 8

A game cartridge could give you a title screen as soon as you switched on a Color Computer. Plug in a disk controller instead and you got a prompt. Both cartridges could contain a ROM: a chip holding instructions the computer could read as soon as power came on. The game ROM held a program. The controller's ROM gave BASIC the words it needed to use a disk.

Read the four slots

Start in your saved **Disk BASIC** practice setup. Save anything you want to keep from guest RAM. Open **Cartridge → Cartridges…**. In the usual Multi-Pak setup, three slots are empty and **Slot 4** says **Floppy controller (FD-502)**. Its drive count refers to FD0 through FD3. All four drives connect to that one controller. In System view, the pictured FD-502 in the slot and the drives in the tower are two different places you can click.

Look at the **Startup slot** selector and the **Live routing** readout. Startup is the physical switch you would set before turning on a CoCo. The two live readings answer different questions. Which slot supplies cartridge ROM bytes now? Which slot is selected for device input and output? At the Disk BASIC prompt the usual answer to all three is slot 4. Write down those three numbers before the next experiment.

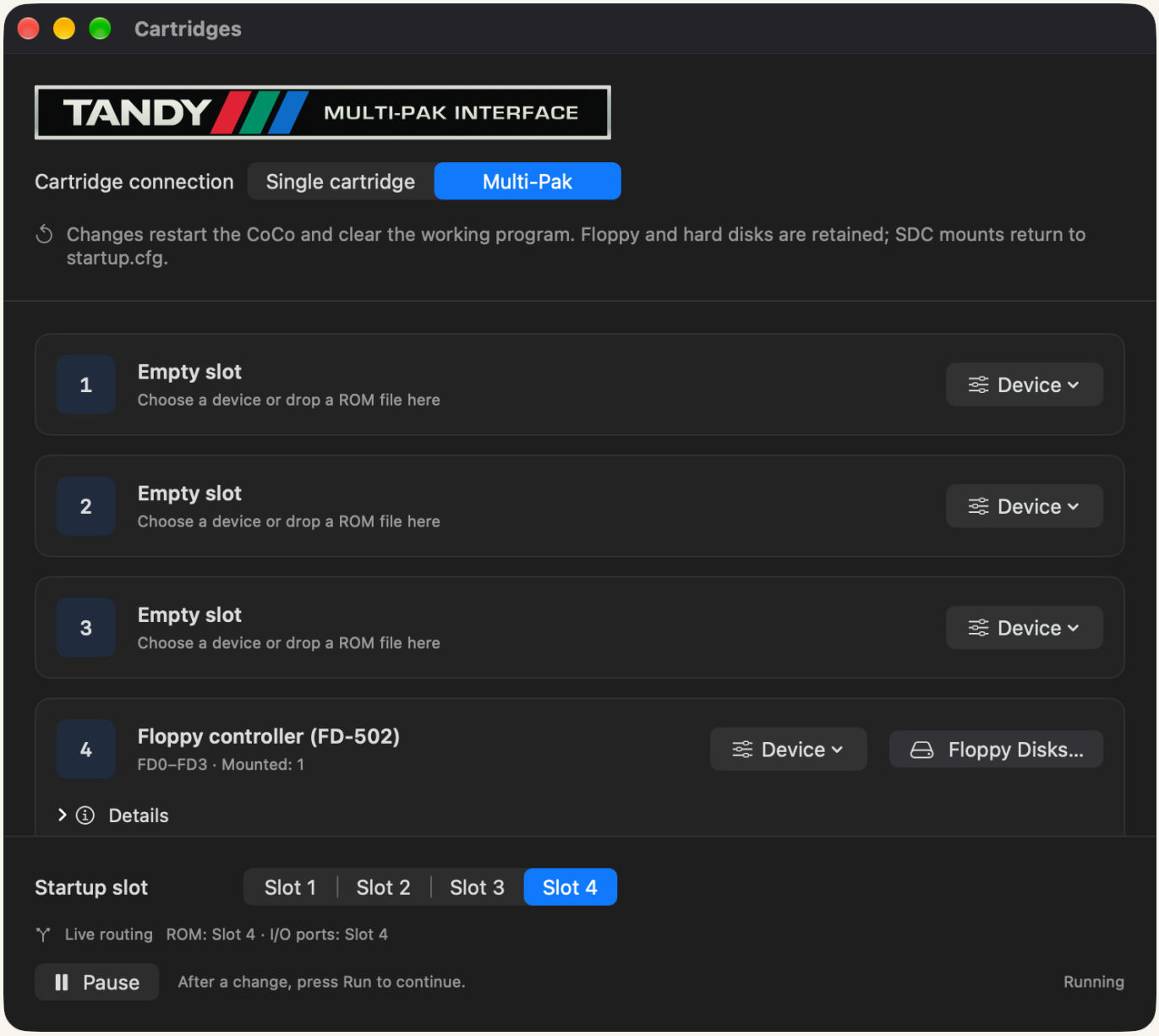


Figure 10: The native Cartridges window shows which slots are occupied and which slot starts the machine.

The **Device** menu on each row lets you assign a cartridge. Read the full menu item before choosing it: if the device is already in another slot, the menu tells you it will move. Selecting a different cartridge, startup slot or connection mode cold-restarts the machine. Resolve any unsaved media first. A cartridge change can leave the machine paused. The Mac toolbar's **Run** resumes it.

A byte in a cartridge

Here is a way to *use* the second live reading. A 512 KB RAM-disk cartridge can hold a byte even while the disk controller's ROM keeps BASIC running. Software talks to this board through numbered addresses. For this experiment, use **Slot 1** → **Device** → **RAM disk (512 KB)** and keep the FD-502 in **Slot 4** with **Startup slot 4**. Confirm the restart. If the illustrated desk gives way to conventional controls, use the Cartridges window. The hardware is still connected.

Resume the guest and click its screen. Finish any previous disk operation before you enter these commands. Enter one line at a time in this exact setup.

```
POKE &HFF7F,&H30
POKE &HFF40,0:POKE &HFF41,0:POKE &HFF42,0
POKE &HFF43,42
PRINT PEEK(&HFF43)
POKE &HFF7F,&H33
```

1. Pause after the first line and look at **Live routing**. The ROM selection stays on slot 4. Device I/O moves to slot 1. The physical startup switch stays where you left it. This lets BASIC run from one slot while reaching the board in another.
2. The second line selects location zero on the board. The third writes the number 42 there. The fourth reads that same location: BASIC should print **42** and return to **OK**. Here `POKE` means write one byte and `PEEK` means read one. The prefix `&H` introduces a hexadecimal number.
3. The last line restores device I/O to slot 4. Do this before trying a disk command, even if you stopped midway. With a BASIC disk mounted in FD0 you can now issue `DIR 0` again.

The RAM disk keeps its contents across a soft or cold reset. Removing its last assignment, loading a profile or quitting loses those contents. Use the owning program's transfer or save feature to copy anything valuable onto persistent media first. A profile remembers the board assignment. The experiment writes a byte on the board; to keep it as a named file takes software that understands the device. Increasing **Machine Settings → RAM** gives the computer more main memory and serves a different purpose.

Try a cartridge that starts a program

If you have a CoCo program cartridge image such as a .ccc file, save your disk setup with **Machine → Configuration Profiles… → Save Current As…**. Save any guest program separately. In a free Multi-Pak slot choose **Device → ROM Cartridge…** and pick the file. Make that slot the **Startup slot**, confirm the restart and resume. The cartridge's own opening screen is the checkpoint. A title that waits at a menu may already be running. Check the program's own instructions for its first key. The Color Scripsit II exercise takes you all the way from its opening menu to typing in the editor.

Single cartridge models a cartridge plugged directly into the computer. Use its single assignment row. **Multi-Pak** gives you four rows and a selector. VCC Plus remembers the two layouts separately. If the System illustration cannot represent the selected hardware, its explanation directs you to the conventional controls. The same file choosers, device details and running guest are available there.

A missing ROM is a different problem from choosing the wrong startup slot. Open the affected slot and read its status. If you moved the file, choose its new location; if its volume was disconnected, reconnect it and retry the unavailable ROMs. See the handbook's cartridge controls. Return to your saved practice profile when finished. Check that **FD-502** is back in slot 4, FD0 has the expected disk, and the BASIC prompt responds. The copy you saved on that disk is ready to load again.

Install, play, and come home

Chapter 6 of 8

A friend hands you a disk image. A Library search turns up a tape and a disk with the same game title. In either case, someone has to choose a machine, insert the right medium and start a particular program. You can do those jobs yourself. For many catalog entries, the Library can do all three.

Launch a file you already have

Try the reader's side of a manual setup first. Save your work and start at the **Disk BASIC** prompt. In the book, select the CARGO practice disk and save a copy in a Finder folder of your own. In a browser, use the download link or copy CARGO.DSK from this book's **media** folder.

1. Open **Media → Floppy Disks…**. At FD0 choose **Insert…** or **Replace…** and pick your copy. You can also drop a file on the appropriate drive row. Read the name beside FD0. Protect the disk for this reading visit.
2. Resume the machine if it paused. Focus the CoCo display, enter `DIR 0`, and find **CARGO BAS**. The image is mounted. Its directory lists a program that BASIC can run.
3. Enter `LOAD "CARGO:0"`, then `RUN`. **CARGO ORIGINAL** tells you which file you actually ran. After **OK**, you can keep working or eject the disk. For a file you have used before, **File → Open Recent Media** remembers earlier choices.

For a CoCo block-format machine-language binary, **File → Load Binary…** loads its blocks and starts at the file's execution address. For a disk image containing a binary, insert the *disk* and follow the title's loading instructions instead. **File → Open Media…** also accepts several media types. Check the selected drive, slot or recorder before confirming. The file guide collects the common choices in one place.

Choose an edition of Bedlam

Open **Media → Software Library…**, or click the wooden shelf in System view. Choose **All Software**, clear any old filters and search for **Bedlam**. Choose the Tandy adventure and look for its **disk** and **cassette** editions. The catalog follows the Color Computer Archive's collection. Its edition and source details help you identify what was preserved there. A title can appear on several media, and some similarly named releases may have different publishers or different loading procedures.

Under **Using this software**, read the recommended machine and loading instructions for your selected edition. Then read **Compatibility** for known requirements. Think of the difference this way: one tells you which disk to insert and what to type; the other may tell you which processor, RAM or controller you will need. The heart saves the title to **Favorites**. Your favorites can include software you have never installed.

To find a game's keys, look for **Read Manual** or **Read Instructions**. A PDF opens in the app's document reader; the instructions button opens a text document. The Library may need a connection for the first cover, manual or software download; it caches material it has retrieved. This book and its CARGO exercise work offline. For more browsing controls, see Choose a version that fits.

Compare Install Only, Play and Set Up

On a connected Mac, choose one Bedlam edition for an optional visit. **Install Only** checks the download and makes local working files. Watch the installed status appear in the Library. Look back at the running CoCo: the program you left there can still be running. **Show Files in Finder** shows the files available for use on this Mac. Writable media here belongs to your installation; the Library keeps the original package separately.

Save anything you want from guest RAM before starting the edition. Choose **Play…** for an installed edition with a launch sequence. If you started with **Download & Play…**, the install leads into the same setup preview. At **Start Software**, look for the processor, RAM, signal and the item the Library will mount or plug in. Check the destination before you choose **Start**. If the collection has several possible starting files, use **Choose Starting**

Media and the edition's instructions. **Cancel** at the preview lets you investigate further without restarting the CoCo.

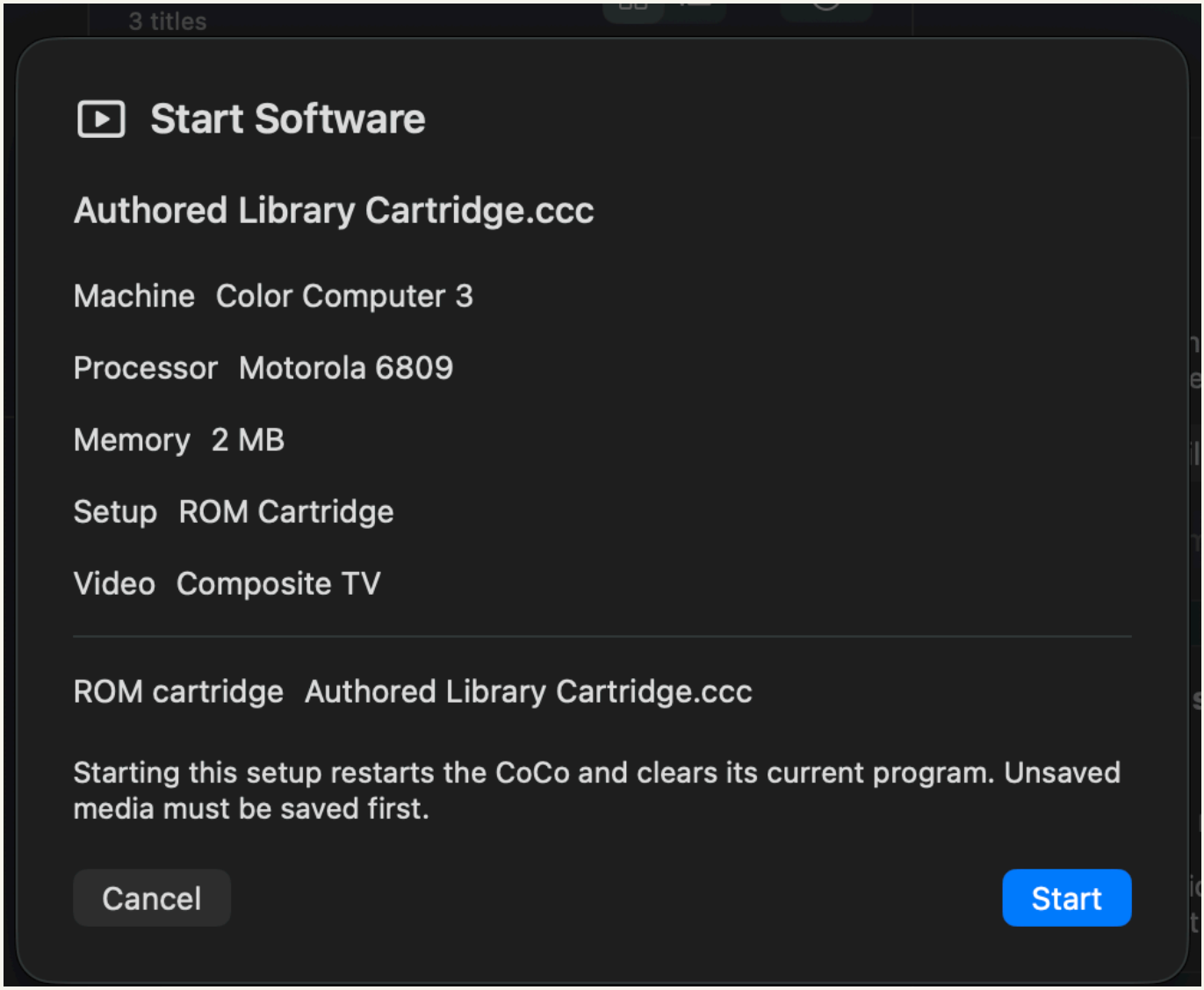


Figure 11: The Start Software sheet for an example cartridge identifies the processor, memory, video signal and cartridge file before asking to restart.

Bedlam gives you a useful comparison: the disk edition reaches the adventure by reading FD0, while the cassette edition reads the tape. Both reach the opening passage about waking from a bad dream. The media indicators and filenames can differ even though the story looks familiar. Click the guest screen when the story asks you to type.

Some editions offer **Download & Set Up…** or **Set Up…**. This is a manual launch. Read the **Manual loading** part of the preview and choose **Set Up** when ready. The Library prepares the equipment and media; the instructions tell you how to continue from the guest. For a blank data disk, reaching a prompt with the disk available can be the entire job. For CARGO you already know how to complete the two remaining steps yourself.

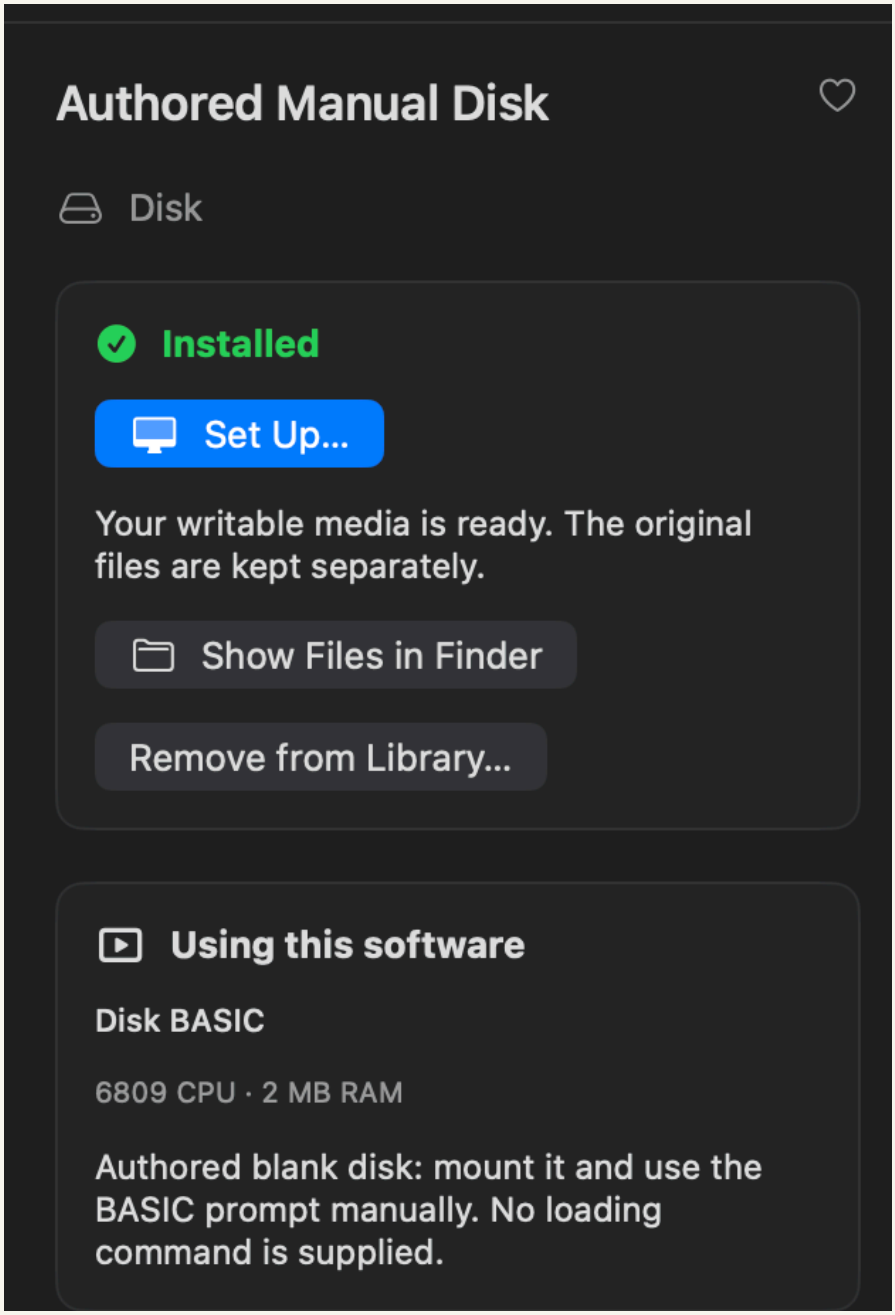


Figure 12: In the detail panel for an installed example disk, Set Up and Show Files in Finder appear above its manual loading guidance.

Return with your work

If you save a game, save it **inside the guest** on a writable working disk using the game's own instructions. Give the disk time to finish saving. A saved score can be part of a file inside the image without appearing as a separate Mac document. A write-protected disk, an unexported recording or a game that never writes a save needs a different plan before you leave.

Open **Media → Software Library...**. Near the top of the window, choose the curved back arrow **Return to Previous Setup...**, then **Restore Setup**. This option appears when the Library was able to capture your earlier configuration. It restarts the machine with the previous equipment and media assignments. A prompt where a game used to be is normal. Reload a program from the disk where you saved it. A visit you arranged yourself through the drive window can be undone by loading your named practice profile.

Return to **Installed** to find the game's working files again. **Remove from Library…** removes its installation entry while preserving its files on the Mac. A later installation gets a fresh working copy. If you want to keep playing from a saved game, locate your previous copy before starting over. Checking both the filename on the Mac and the guest's directory is a skill you can use outside the Library, too.

Send a receipt, a tune, or a voice

Chapter 7 of 8

Where would you look for a message that BASIC printed, but that never appeared on the screen? On a real CoCo you might have heard a printer start up at the other end of the serial cable. In VCC Plus you can catch that same stream of characters in a window. With another piece of equipment in a cartridge slot, the computer can also play a score or say a sentence out loud.

Print a receipt for CARGO

Start at **OK** in **Disk BASIC**, with the tape stopped. Open **Media → Printer Output...**, or click the little printer behind the cassette recorder. If the window already contains a print job you want to keep, stop capture and save it first. Choose **Clear...** and confirm when you are ready for an empty window. Click **Start Capture**. Return to the CoCo display and type this line, followed by Return.

```
PRINT #-2,"CARGO RECEIVED"
```

The CoCo returns to **OK**. Look in **Printer Output** for **CARGO RECEIVED** and **15 bytes**. Count the five letters of CARGO, one space and eight letters of RECEIVED. That makes fourteen. The last byte is a carriage return. On paper it tells the printer that the line has ended; the Mac text preview displays a new line. The `#-2` in BASIC's command chose the printer as its destination.

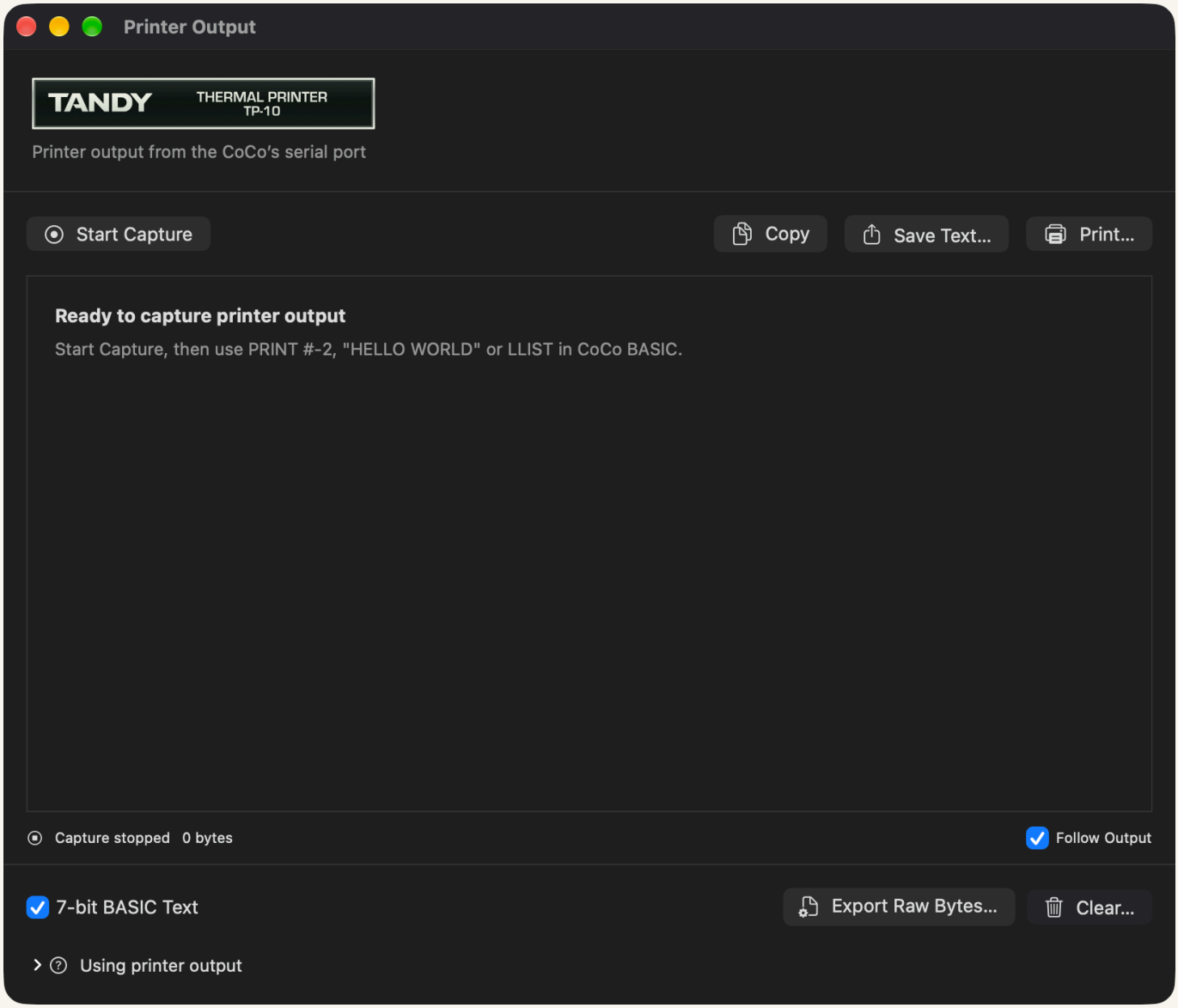


Figure 13: The native Printer Output window places capture and save controls above the text and a byte count below.

Click **Stop Capture**, choose **Save Text...**, and open your saved receipt in a Mac text editor. To keep the exact fourteen character codes *and* the end-of-line byte, choose **Export Raw Bytes...**. The **7-bit BASIC Text** switch affects the text interpretation. A printer control code may appear as a marker in the text preview. Raw export keeps the code itself, useful when examining how an older program drove a printer.

You can close the window during a print job and open it again. Capture continues until you stop it. **Clear...** stops capture and discards the collected output after confirmation. Stop capture between jobs: other software can use the same output register, and a long-running capture can fill up. **Print...** opens the ordinary Mac print dialog if you would like a paper receipt.

Score and play William Tell

Orchestra-90 contains stereo sound hardware. Its optional program ROM turns the CoCo into a music editor with a score already in memory. If you have that ROM, you can go from a quiet desk to Rossini's *William Tell Overture* in a few keystrokes.

1. Save anything important from guest RAM and note your practice profile. Open **Cartridge → Cartridges...**. Choose **Orchestra-90** as the device in a free Multi-Pak slot. In that slot's details confirm the 8 KiB music

program ROM, or choose yours. Set **Startup slot** to that slot, confirm the restart and resume the machine if paused.

2. At the cartridge's opening screen, give the guest keyboard focus and tap **Space**. Look for **WILLIAM TELL OVERTURE** and **BY ROSSINI**. Those two lines are comments identifying the score the synthesizer will use.
3. Type **S** and press Return. Give the cartridge time to score the music. Then type **P** and press Return to play it. Start at a comfortable volume. The left and right channels carry distinct parts. **Esc** sends the CoCo's Break key if you want to stop.
4. If you can see the score but hear silence, confirm the machine is running at normal speed, app sound is enabled, and the Mac output volume is up. If you return to Disk BASIC immediately after restarting, check the music ROM and its startup slot. A program can use the stereo ports without the music ROM; this particular lesson uses the program in that ROM.



Figure 14: The real Orchestra-90 editor displays WILLIAM TELL OVERTURE and BY ROSSINI after the opening screen.

Have the computer introduce itself

The Speech/Sound Cartridge takes another approach. Leave your FD-502 in startup slot 4 so BASIC boots as usual. The speech board waits for a program to send it characters. In this exercise, you can watch BASIC send a short message and hear the cartridge read it.

1. Return to your saved **Disk BASIC** practice profile. Open **Cartridge → Cartridges…** and assign **Speech/Sound Cartridge** to free slot 2. Keep **Startup slot 4**. Expand the speech board's details. It needs both its internal **PIC firmware** and its **Speech ROM**. If either is missing, use **Choose PIC Firmware…** for pic-7040-510.bin and **Choose Speech ROM…** for sp0256-al2.bin. Confirm any restart and resume at **OK**.

2. Open VOICE.bas in BASIC Development. If reading in a browser, save the file first and open it in the BASIC workspace. Save anything you want to keep from guest RAM, then choose **Run** in that workspace.
3. Look for **SENDING GREETING**, then **GREETING SENT**. The voice says "Hello from your Color Computer." The second screen message means the last character made it through; the voice can still be finishing the sentence. **CHECK SPEECH CARTRIDGE** means the program timed out waiting for the board to accept another byte. Check the assignment and both ROMs before running it again.

```
10 REM A GREETING FOR THE SPEECH/SOUND CARTRIDGE
20 A=&HFF7E
30 M$="HELLO FROM YOUR COLOR COMPUTER. "+CHR$(13)
40 PRINT "SENDING GREETING"
50 FOR I=1 TO LEN(M$)
60 T=0
70 IF PEEK(A)>=128 THEN 100
80 T=T+1:IF T<500 THEN 70
90 PRINT "CHECK SPEECH CARTRIDGE":END
100 POKE A,ASC(MID$(M$,I,1))
110 NEXT I
120 PRINT "GREETING SENT"
```

Follow one letter through the loop. Line 70 checks whether the cartridge is ready for it. Line 100 converts the letter to a character code and sends it to the board. The carriage return at the end of the string closes the message. To try another greeting, change the words inside the quotes on line 30. Keep the space and the carriage return expression at the end.

When finished, reload your saved practice configuration and check the controller and FD0 assignment. Your receipt is a Mac file, VOICE.bas is editable source, and the music you heard came from the score in cartridge memory. Each can outlast a listening session in a different way.

Leave the original just as you found it

Chapter 8 of 8

Someone hands you a disk and says, “Try changing the greeting, but let me have my original back.” When you finish, both disks will have a BASIC program called CARGO. Looking at the two directories will tell you almost nothing. What could you do to prove which disk has the change?

Make two practice disks

Start with the CARGO.DSK practice image or the disk you made in Put a program somewhere. In Finder, make two copies in a practice folder. Name one **Cargo Original.dsk** and the other **Cargo Working.dsk**. Put the supplied practice file away. You can repeat this experiment as often as you like.

Save any other work from the CoCo. Choose **Disk BASIC** in **Machine → Configuration Profiles…** and load the setup. Open **Media → Floppy Disks…** and put *Cargo Original.dsk* in FD0. The button says **Replace…** if a disk is already there. In FD0’s **Disk options**, turn on **Write protected**. Read back the filename and the words **Write protected** together. On a narrow screen, scroll inside the Floppy Disks window to see the options.

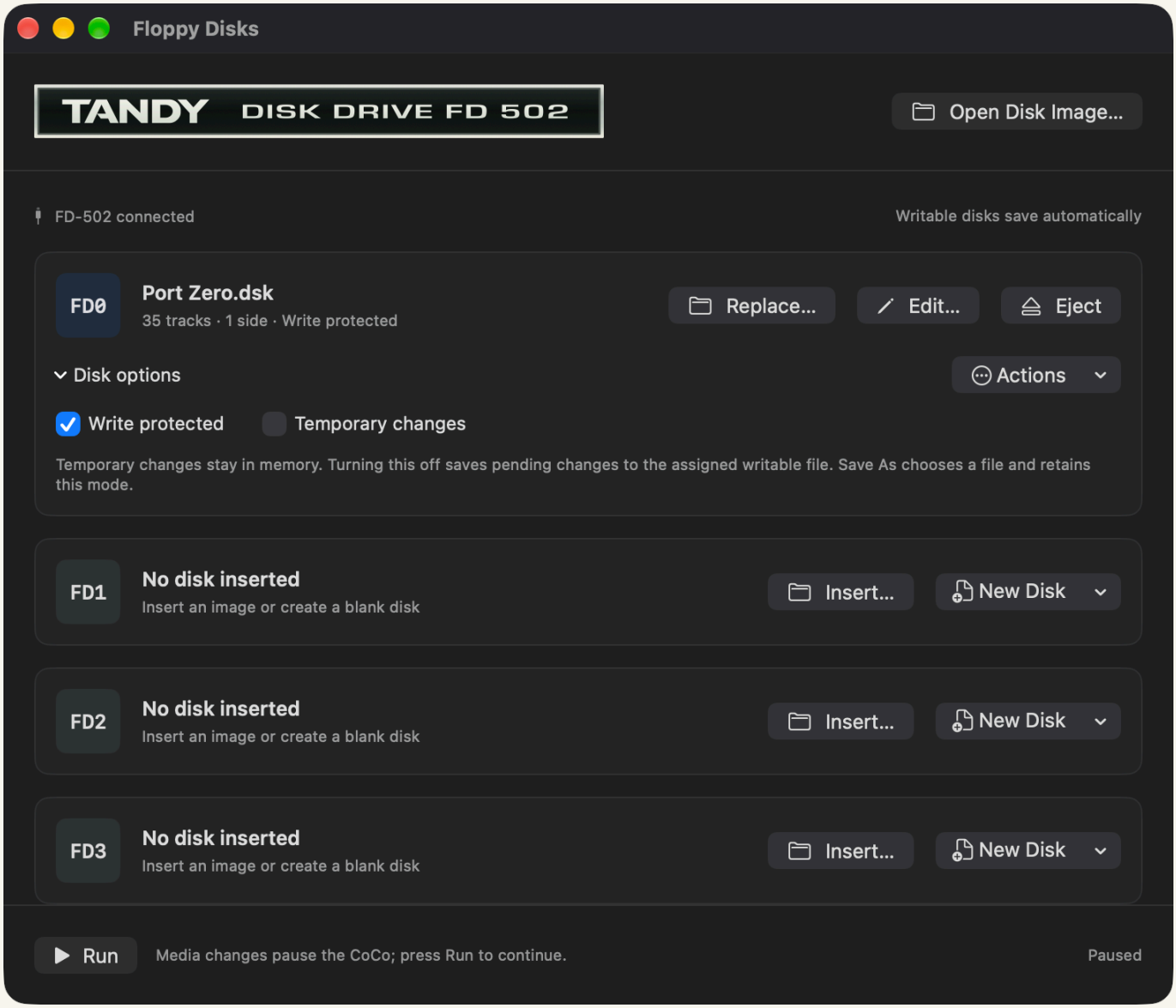


Figure 15: FD0 shows Write protected with its matching box selected. This representative practice disk is Port Zero.dsk; your lesson copy should be Cargo Original.dsk.

Media changes pause the CoCo. Click **Run** in the window footer to resume, then click the CoCo display to type. At the BASIC prompt, enter each of these commands and press Return:

```
LOAD"CARGO"
RUN
```

You should see **CARGO ORIGINAL**, then **OK**. The disk supplied the program, and BASIC ran it in RAM.

Change the greeting in RAM

Enter these two lines:

```
10 PRINT "CARGO COPY"
SAVE"CARGO"
```

Expect **?WP ERROR** from BASIC. WP means *write protected*. Line 10 changed as soon as you pressed Return after typing it. The error came on the next command, when BASIC tried to put that line on disk. Leave the program in RAM while you swap disks.

Open **Media → Floppy Disks…** and use **Replace…** on FD0. Choose **Cargo Working.dsk**. Read the filename again. For *this working disk*, leave **Write protected** and **Temporary changes** off and check that the row says **Saves automatically**. Resume the machine. At the guest prompt enter:

```
SAVE"CARGO"
```

This time BASIC should say **OK**. Let the Mac finish saving the disk. The directory entry still says CARGO. What will the program actually say the next time you load it?

Prove which copy changed

1. With the working disk saved, cold-restart the practice machine. A cold restart clears the program in RAM. Check that **Cargo Working.dsk** is still in FD0, or insert it again. Resume if paused.
2. Type `LOAD"CARGO"`, then `RUN`. Look for **CARGO COPY** and the **OK** prompt.
3. Replace FD0 with **Cargo Original.dsk** and select **Write protected** again. Resume and enter `NEW`. This clears the stored line you just ran. Now type `LOAD"CARGO"`, then `RUN`. Expect **CARGO ORIGINAL** and **OK**.

Disk file attached on the Mac	Name requested by BASIC	What came back
Cargo Working.dsk	CARGO	CARGO COPY
Cargo Original.dsk	CARGO	CARGO ORIGINAL

That last load matters. If you simply swapped the two disks and typed RUN again, the CoCo would run the version already sitting in RAM. Loading each program after clearing RAM lets the disks answer the question.

Keep a change only if you like it

Some games need to write to a disk before they will run. Sometimes you just want to try a change and decide later whether to keep it. Make a fresh Finder copy of **Cargo Original.dsk** and call it **Cargo Trial.dsk**. Use that disposable file for this variation.

1. Mount the trial in FD0. With the disk clean, turn on **Temporary changes**. Allow guest writes by clearing **Write protected** if selected. Resume the machine.
2. Load CARGO, enter `10 PRINT "CARGO COPY"`, and enter `SAVE"CARGO"`. This time BASIC accepts the write. Open **Floppy Disks…**. FD0 says **Unsaved changes · Save As to keep them**.
3. Choose **Save As…** on the FD0 row. In the Mac save dialog choose your practice folder and enter a different filename, such as **Cargo Working Export.dsk**. Read the folder and filename before you save. After saving, check which filename appears on FD0. It is now the exported copy, and its save mode is still **Temporary changes**.
4. Finish with the same proof. Start a fresh practice session. Load and run CARGO from the exported disk, then from the unchanged trial. The export should print **CARGO COPY**, and the trial should print **CARGO ORIGINAL**.

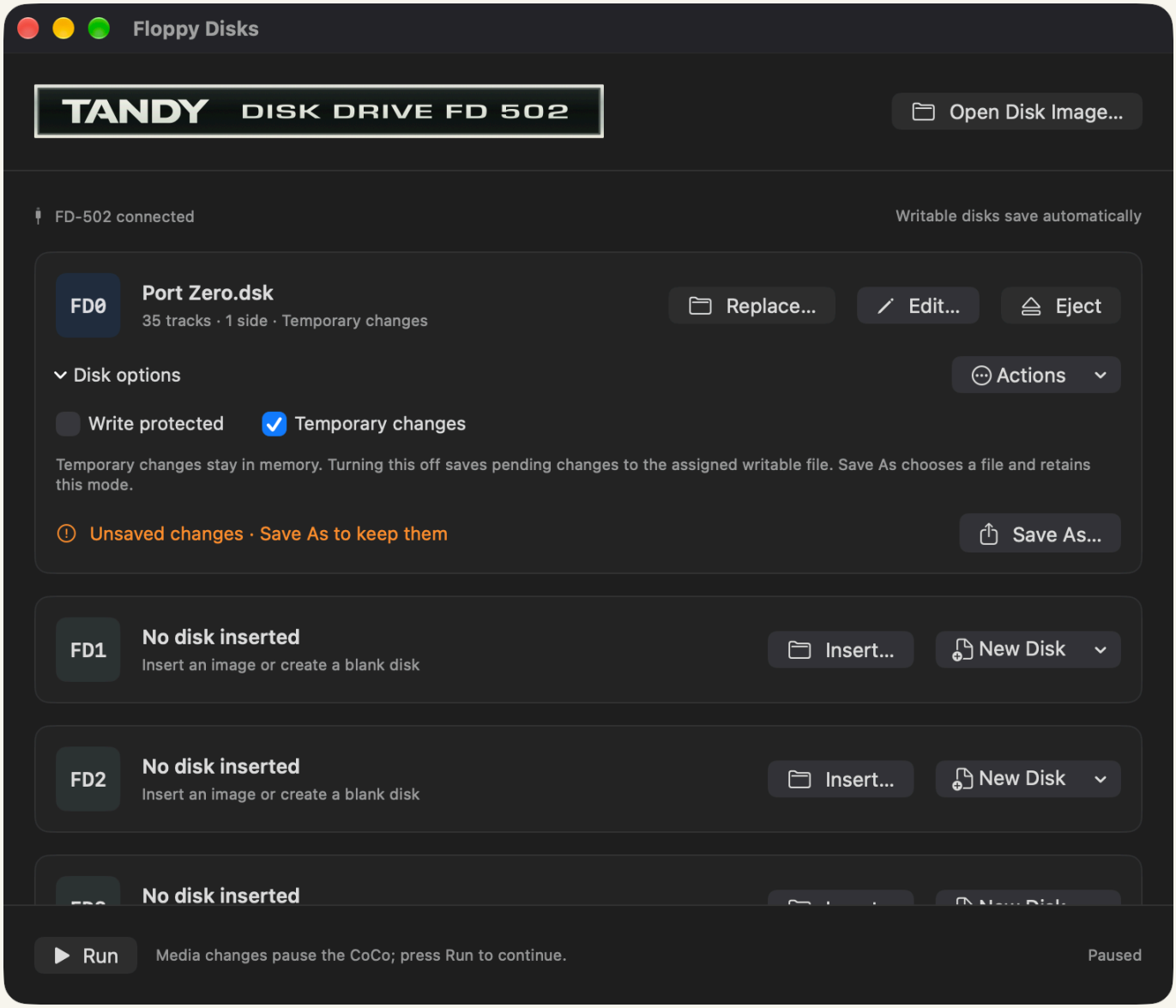


Figure 16: After a guest SAVE, FD0 shows Temporary changes and offers Save As to keep them. This representative Port Zero.dsk rehearsal saved CAPTEST; the lesson above saves CARGO.

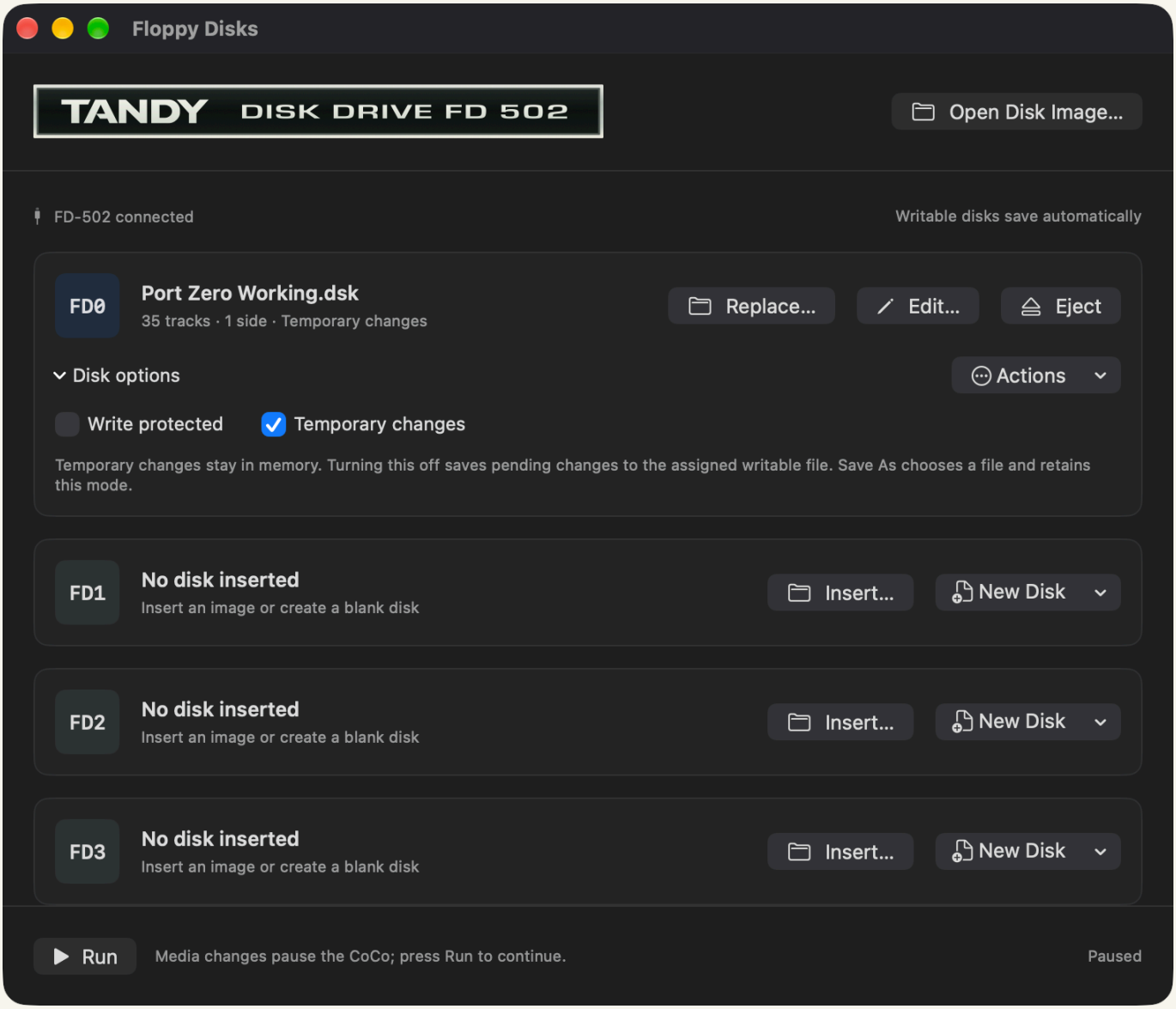


Figure 17: After Save As, FD0 names the new Port Zero Working.dsk copy. The warning is gone and Temporary changes remains selected. Your lesson export should show Cargo Working Export.dsk.

Turning **Temporary changes** off while edits are pending allows those edits to save to the assigned writable file. To abandon a temporary experiment, choose **Actions** → **Discard Changes and Eject...** and review the confirmation. Discard gives up the pending changes. It cannot roll back writes that already reached a file while automatic saving was on.

When the Mac cannot save

The CoCo can accept a write just before VCC Plus discovers a problem with the Mac file. The app pauses and the affected drive row explains what happened. Keep that disk mounted while you decide what to do. If you have the only copy of your work in memory, **Save As...** to a fresh filename on a writable volume preserves the current image.

What you see	What to check	How to proceed
BASIC says **?WP ERROR**	Read the protection state on the drive BASIC used. Image-header or Mac file permissions can enforce protection.	Load a personal writable working copy, then try the guest save again.
FD0 says **Unsaved changes · Save As to keep them**	Check whether temporary mode is on or the image still has no backing file.	Save As under the name you want to keep. Check that FD0 now displays it.
A previously attached disk is missing when you reopen the app	Check whether its external volume is mounted or the Mac file moved.	Reconnect the volume and choose **Retry Remembered Disks**. Use **Replace…** to choose a file that moved.
A save failed after the Mac volume disconnected	The current guest edits may still be in the drive.	Reconnect the original volume and use **Retry Save** if its file is still the expected version. Use **Save As…** elsewhere if you need to rescue the image first.
Another app changed the disk file	You have two versions worth keeping: the changed file on the Mac and the guest's version in memory.	Save As to a different filename. Compare disposable copies later. Avoid mounting the same writable file in two emulators at once.

You can now hand both copies back. You know what each contains because you made the machine read them, and you can tell which save belonged to BASIC and which belonged to macOS. Keep the User's Handbook's recovery chapter handy for missing media and configuration problems beyond this exercise.

What have I got?

Appendix A

Start here if someone has handed you a folder of CoCo files. Pick one file and look at its name in Finder. If macOS hides its ending, use **File → Get Info → Name & Extension**. Keep the folder together. A readme beside a disk can tell you which machine to use, which disk to insert first, and which key starts the program.

Pick up the practice files

Make a **Cargo Practice** folder in Finder. Choose a link below. In the app reader, a disk or cassette opens a save panel so you can keep your own copy. From a web preview, move the downloaded file into Cargo Practice before attaching it. If you opened the HTML directly from Finder, you can copy the file from the book's **media** folder in Finder. A BASIC source link opens an editable example in the native reader. In a browser you can save the source and open it in **Develop → BASIC Development...**.

File	What you'll find	Where to start
BLANK.DSK	An empty floppy with a Disk BASIC directory already prepared. Save your copy as **CARGO.DSK** for the first exercise.	Make your own cargo disk
CARGO.DSK	The finished floppy. Its directory contains one BASIC program called CARGO. Use your own copy of this image to join the course at the SD card or working-copy exercise.	Carry a disk to an SD card
CARGO.CAS	A cassette with a recording of that same program under the name CARGO.	Find the recording
CARGO.bas	One line you can edit or type at the BASIC prompt. It prints **CARGO ORIGINAL**.	Follow a program from RAM to disk
VOICE.bas	A BASIC program for the Speech/Sound cartridge. The output chapter explains the required firmware and the result to expect.	Try the sound cartridges

If you've already made your own CARGO.DSK, give the supplied finished disk a different Finder folder. That lets you compare your work without replacing anything.

Which device opens this file?

You found	Look for	First move in VCC Plus
A .dsk or .jvc floppy image	A readme or catalog entry naming Disk BASIC, another operating system, or a particular controller. The filename's ending alone does not tell you which filesystem it contains.	In **Floppy Disks...**, mount a copy in the drive named by the program, usually FD0. Enable **Write protected** for the first look. A Disk BASIC directory is useful evidence on a BASIC disk.
A .dmk or .vdk floppy	A track image or a disk with a header. DMK can carry information about individual tracks that a simple sector image omits.	Start with the FD-502. It accepts supported DMK and uncompressed VDK images. **Save As...** preserves their representation. Renaming a file to .dsk does not convert its contents.
A folder containing several disk images, perhaps with startup.cfg	Directions that name CoCo SDC or SDC-DOS. A program may expect later disks under their original names.	Choose a **copy of the folder** as the card in the CoCo SDC slot. Keep it protected while exploring. The SDC accepts ordinary flat sector images

You found	Look for	First move in VCC Plus
		and a narrower range of headers than the FD-502. Choose the controller the author tested.
A .vhd, .os9 or .img file	Notes identifying a virtual hard disk or a floppy. Both the device and the filesystem matter. An .os9 file can be a floppy image.	Use **Virtual Hard Disks…** for a documented hard disk and **Floppy Disks…** for a supported floppy. Read the drive-zero map before writing.
A .cas or .wav tape	A title and a loading command in its instructions. WAV can also be ordinary audio.	Use **Cassette…** → **Insert…** on a CoCo tape image. Rewind, choose Play and use the guest loading command for that recording.
A .ccc or cartridge ROM	A cartridge label or release notes. Firmware for a controller can have a .rom or .bin ending too.	For a program cartridge, use **Cartridges…**, choose a ROM cartridge and its startup slot. For controller firmware, use the named device's own ROM control.
A .bin program	An author's instruction to use LOADM and EXEC, or a description of a CoCo loadable binary.	A supported block-format binary can use **File** → **Load Binary…** in the expected machine setup. Save the current program in RAM first. For a binary already inside a disk image, follow the guest instructions for that disk.
A .bas listing or a ZIP download	Is the .bas readable text? Does the archive contain a readme, several files or some combination of formats?	Open plain-text BASIC source in **BASIC Development…**. A tokenized file inside a CoCo disk belongs to the guest. For a Library edition, use the installer and read the selected edition's instructions. For a personal ZIP, unpack a copy and examine the contents.

What is the machine telling me?

Opening a floppy-compatible file in Finder or **File** → **Open Media…** now asks whether to **Edit Disk Image** or **Insert into Floppy Drive**. Editing is the default for a general open. For insertion, select FD0–FD3 and **Keep current state**, **Pause** or **Run**. Run resumes only after insertion succeeds; it does not type a boot command or start a program from the disk. An OS-9 file can also retain its hard-disk insertion choice. Use the explicitly named device in the table above when you already know where the image belongs. Inspect disk files from the Mac explains the editor's separate save and restart rules.

You see	Check one thing first	What to do with the answer
A familiar directory, but your new program is missing	Which profile and which drive answered?	Under RGB-DOS, compare the floppy and hard-disk routes. Under SDC-DOS, check the mounted image. Use the VZERO experiment to tell two directories apart.
BASIC says **?WP ERROR**	Open the row for the drive you actually used. Does it say **Write protected**?	Leave protection on for a treasured disk. Write the program still in RAM to

You see	Check one thing first	What to do with the answer
		a separate writable copy. Prove which copy changed.
BASIC returned to **OK** but the Mac says **Unsaved changes**	Is the row set to **Temporary changes**, or is it a new disk with no backing file?	Choose **Save As...** and use a distinct filename. Check which filename the drive row shows afterward.
The Mac reports a failed save	Is the backing volume disconnected, read-only, or changed by another program?	Reconnect a missing volume and use **Retry Save**. If another copy changed, rescue the pending guest edits with **Save As...** under a new name. Keep both until you compare them.
The disk is mounted, but typing does nothing	Does the Mac toolbar offer **Run**? Is the CoCo display focused?	Resume a paused machine and choose **Input → Focus CoCo Display**. Then give the guest its loading command.
BASIC keeps looking for a tape file	Is the right tape inserted, rewound and set to Play?	Cue it again and check the guest filename. A Mac filename and the name recorded on the tape can differ.
A title starts at an unexpected prompt	Which slot supplied the startup ROM? Does the selected edition require a manual loading step?	Read the title's instructions. Check the cartridge assignment before changing RAM or installing another ROM.
A newly attached sound cartridge stays quiet	Does its slot show the required firmware? Is sound muted, or is the machine paused?	Try the known sound exercise. A sound device may be waiting for a command from a program.
An image is unavailable after moving it in Finder	Which file path does the app remember?	Put it back and retry, or choose the file in its new location. A saved profile keeps file locations. It cannot reconstruct a missing file.

For a supported OS-9 image, the editor also offers Move To… and folder drops for regular files inside the same disk. This does not add folders to Disk BASIC or transfer a file between two disk images.

Beside the original hardware

Appendix B

A disk drive, a floppy controller and a BASIC disk command are three inventions working together. Owners of the original machine could point to the drive and the cartridge. The command they typed chose a file on the disk inside. You can make the same distinction in VCC Plus, even when a single Mac file stands in for a whole disk.

Historical reading

- *Color Computer Disk BASIC Quick Reference Guide*. InterTAN Canada Ltd., 1987. Disk commands, pp. 3–8, and errors, p. 9. Compare the directory, save and load entries with the CARGO floppy exercise.
- Tandy Corporation. *Tandy Color Computer 3 BASIC Quick Reference Guide*. 1986. Commands, pp. 2–17. Useful for the tape and printer statements as well as for the BASIC program recorded in both formats.
- Tandy Corporation. *TRS-80 Multi-Pak Interface Owner's Manual*. 1983. The equipment setup and slot selector explain the hardware behind the cartridge chapter.
- Lindner, Tim, producer. *CoCo SDC*. Fourth version, February 2023. Hardware and software by Darren Atkinson. Read the card and virtual drive descriptions alongside the two directories in the CARGO card exercise.
- Radio Shack. *TRS-80 TP-10 Operation Manual*. Catalog no. 26-1261. Introduction and setup. The physical printer used thermal paper. VCC Plus captures the characters that would travel down its serial connection.
- Tandy Corporation. *Orchestra-90 CC Stereo Music Synthesizer with Percussion for Tandy Color Computer*. Special Composer's Edition, catalog no. 26-3143. The mini-concert on pp. 8–10 describes scoring and playing the ROM demonstration.
- Tandy Corporation. *Speech/Sound Cartridge Owner's Manual*. 1984. The speech and sound programming sections explain how a program commands the cartridge.

The Color Computer Archive preserves historical documentation and software that informed this book. The lessons and practice media here were written for VCC Plus.

Pick your next experiment

If saving and reloading CARGO made you curious about what's inside a *data* file, Keep a flight log shows how a BASIC program writes and reads records. To trace the same BASIC program one statement at a time, try Find the leak. For the guest shell that sees directories such as /dd and /h1, Visit the OS-9 side of the disk is a short tour you can take now.

For a Mac setting, go to the User's Handbook control index. In the C volume, follow a word from FD0 into guest RAM. A compiled program opens a separate file and reads its data. Keep the distinction between an image and a file inside it. Both languages rely on it.

About the pictures and files

The cover uses the VCC Plus cassette recorder illustration. The window pictures show the working Mac application, and guest screens show output from the emulator. A few pictures show another practice filename or a Library title so you can recognize a control across different setups. Captions identify those examples. Software titles, manuals, cover images and trademarks retain their respective credits. See the artwork notice.

The practice files belong with the lessons. Keep an original set and put your own edits on copies. You can hand someone the resulting disk or cassette and ask them to find out which program you left there.

Publication and artwork notices

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The CoCo 3 and CM-8 monitor presentation in VCC Plus's skeuomorphic System view was inspired by SockMaster's "pic of CoCo 3 and CM-8 monitor," published on CoCopedia. VCC Plus's artwork was designed and rendered independently. The remaining hardware illustrations were independently designed using historical photographs and renderings as references.

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