FujiNet For CoCo:
The Basics

Everything You Need to Get Up and Running with FujiNet
on the Tandy Color Computer

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Chapter 1 - Introduction

What Is FujiNet?

FujiNet is a multi-function peripheral device for classic computers — including your Tandy Color Computer. It connects to your CoCo's cartridge port and gives it abilities it never had before: network access, virtual disk drives, a real-time clock, and more.

This guide covers everything you need to know to get started. By the time you reach Chapter 3, you'll be mounting disk images and loading programs from across the internet ... promise!

What Can FujiNet Do for Your CoCo?

Here's a taste of what's in store:

- Load disk images (.DSK files) from a local SD card or a network server
- Connect your CoCo to a WiFi network
- Use virtual disk drives — no physical disks required
- Access online resources directly from your CoCo

NOTE: FujiNet was originally developed for the Atari 8-bit family and has since been expanded to support many classic computers, including the CoCo. The community is active and growing!

Learned in Chapter 1

What FujiNet is and what it can do
Why FujiNet is exciting for CoCo users
What this guide will cover

Chapter 2 - Hardware Setup and Installation

Ready to get your hands dirty? This chapter walks you through connecting FujiNet to your CoCo. Take your time and follow each step. It's easier than it looks!

What You'll Need

Other than your FujiNet and your trusty CoCo, you're going to want a MicroSD card, formatted in FAT32 mode. That's pretty easy to do from a Windows machine. Put your MicroSD card into a reader, plug it in to your PC, and once the card comes up, right click it and select Format. Choose FAT32 as the format and proceed with formatting. Once that's done pop it into your FujiNet and you're ready to roll.

NOTE: It is recommended to stick with a 64GB or less MicroSD card. In reality, a card with 8-32 GB is probably more than adequate. It is also recommended to stick with a known reliable brand, such as SanDisk or Transcend.

Configuring your FujiNet to match your CoCo model

Your FujiNet needs to be configured to work properly with the model of CoCo you're using it on (1, 2 or 3). This ensures that you are using the proper BASIC ROM image for your computer, and that the serial data speed matches what your CoCo can handle.

On top of your FujiNet there will be small pair of DIP switches. Set your DIP switches based on the following table:

CoCo 1	ON	ON
CoCo 2	OFF	ON
CoCo 3	ON	OFF
Dragon 32/64	OFF	OFF

Once that's done, you're all set to move on to connecting your FujiNet to your CoCo!

Connecting the Hardware

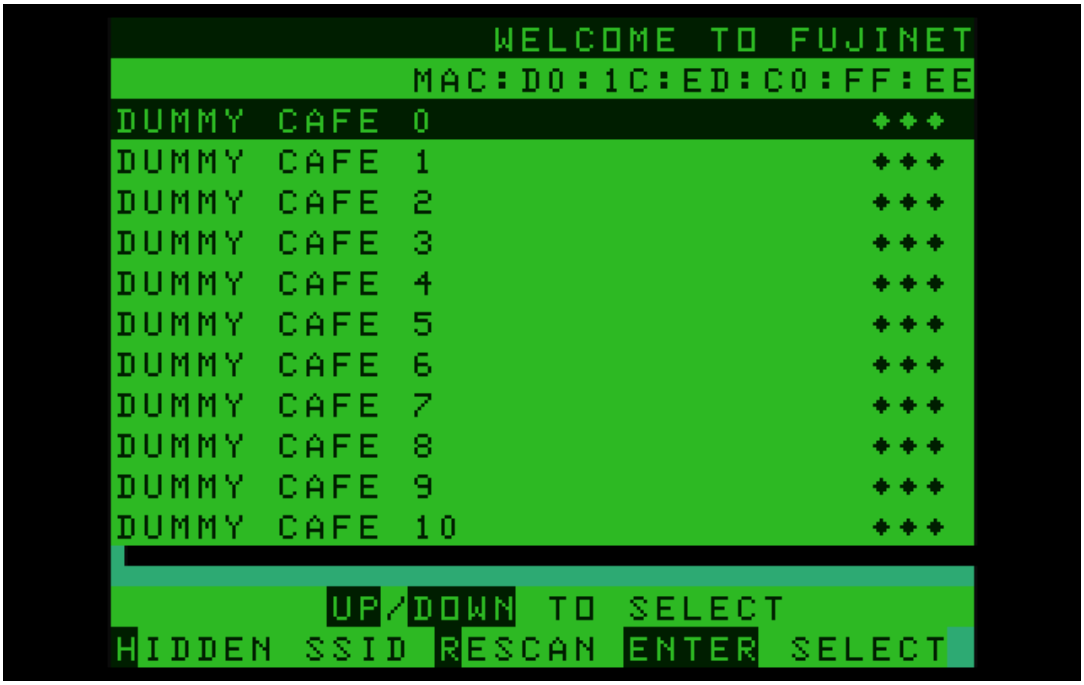
Connect your FujiNet by following these steps:

1. Turn off your Color Computer
2. If you haven't done it already, insert your MicroSD card into the FujiNet slot.
3. Insert your FujiNet into the CoCo's cartridge port.
4. Plug the cable into the port labeled "SERIAL I/O" in the back of your CoCo.
5. Power on your CoCo.

NOTE: Always turn off your CoCo before inserting or removing the FujiNet device. Plugging it in while the power is on could damage your hardware.

Initial Power-On and Connection

To start up and configure your FujiNet for the first time, turn on your CoCo. If the FujiNet is connected properly, you should see a message indicating that the FujiNet config is loading, followed quickly by the initial network configuration screen:



If you don't see this, try the following:

- Check that the FujiNet is firmly seated in the cartridge port.
- Make sure your SD card is properly inserted.
- Ensure that the contacts on the card edge of your FujiNet cartridge are clean
- Contact the vendor who sold you your FujiNet for help

- Ask for help on the FujiNet FB group or Discord

Learned in Chapter 2

Required components for FujiNet setup
How to physically connect FujiNet to your CoCo
How to verify the device is working on first power-on

Chapter 3 - The Configuration Program

FujiNet comes with a configuration program that lets you control everything — your WiFi network, disk images, device settings, and more. Think of it as FujiNet's control panel.

Let's take a tour, screen by screen.

Starting the Configuration Program

The configuration program starts automatically when you power up your CoCo. However, if you've gotten past that point and are sitting at a BASIC prompt, you can either power down your CoCo and power it back up to return to the configuration program, or simply hit the RESET button on the back of your Coco, and then type the word DOS, followed by the ENTER key. Your CoCo should start up the configuration program again.

The Network Configuration Screen

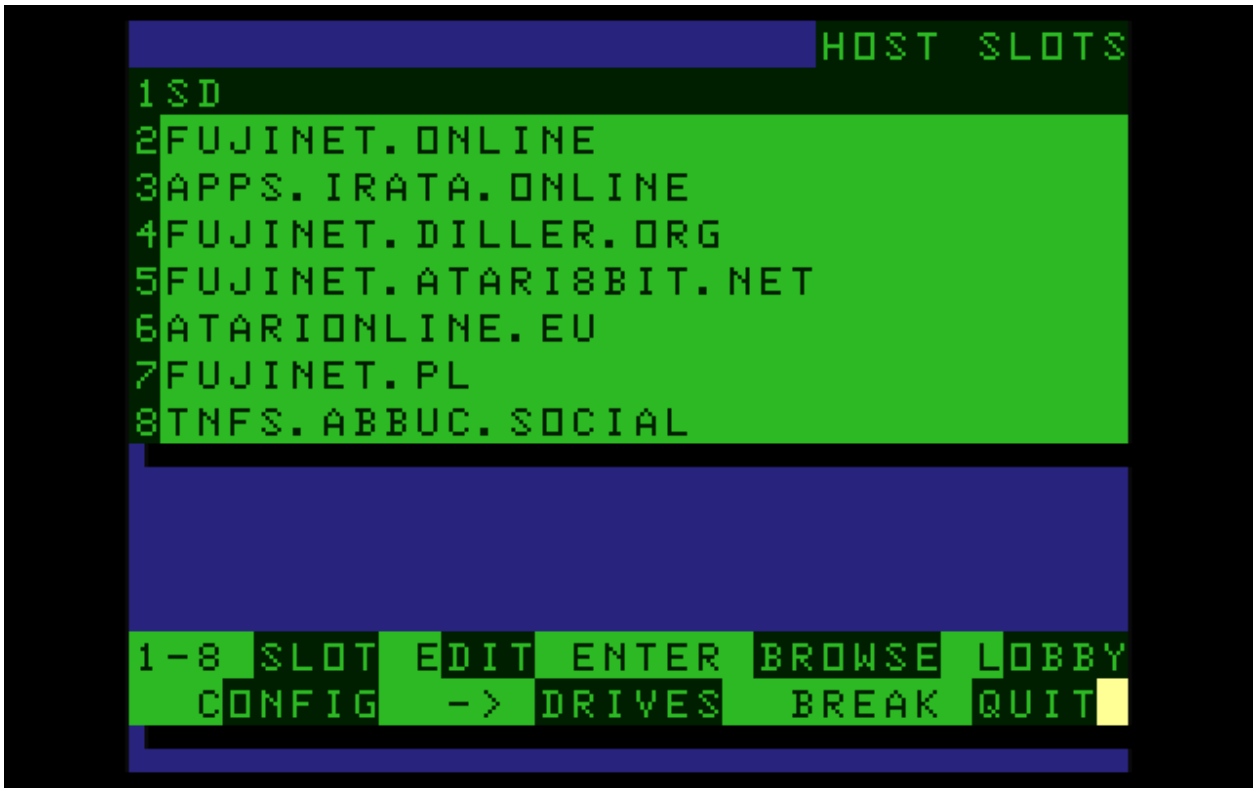
The first screen you will see when powering up your CoCo with the FujiNet inserted is the network selection screen:

You will see a list of the top WiFi networks that can be seen by your FujiNet, with the name of the WiFi network on the left, and asterisks denoting the relative signal strength

on the right.

From here, you can use the UP/DOWN arrows to highlight the WiFi network you wish to connect to, or hit H to enter the name of a hidden WiFi network (one that doesn't advertise its name). You can also hit R to rescan for WiFi networks. After hitting ENTER (or selecting R and entering the name of a hidden WiFi network, you will be asked to enter the network password. When typing the network password name, your keystrokes will be replaced with "*" characters on the screen. Like on your PC, the characters you type will be lowercase by default, and uppercase if you hold down SHIFT while typing. Press ENTER to finish typing your network password, and the FujiNet will attempt to connect to your selected WiFi network. If successful, you will be returned to the HOST SLOTS screen.

The Host Slots Screen



Your FujiNet loads programs to your CoCo by connecting disk image files on either your SD card or a network file server to disk slots that represent floppy drives to your system. There are 8 host slots on your FujiNet. Your FujiNet will likely have all the slots empty except the first slot when you first power it up.

The first slot is usually taken up by your SD card, and always has the name "SD". Although it isn't necessary for your SD card to be in the first slot, the name in whatever

slot you choose to put it in must always be “SD”, in ALL CAPS, in order for your FujiNet to access your SD card.

The remaining slots should have valid network server names or IP addresses, either remote or local. For instance, on a Windows system, if you are running a tnfs file server on your local PC, you can usually use your PC’s network name in a host slot. Remote slots should be a valid URI, or Uniform Resource Identifier, such as tnfs.fujinet.online.

> **NOTE:** You can find a list of some tnfs servers that are out there at https://fujinet.online/tnfs-server-status.

To add a new host in a host slot (or to modify an existing one), you can hit the key for the host slot number (1-8), or use the arrow keys to move the highlight to that row and press E to edit. You can then enter the desired host name in the slot and press ENTER to save it.

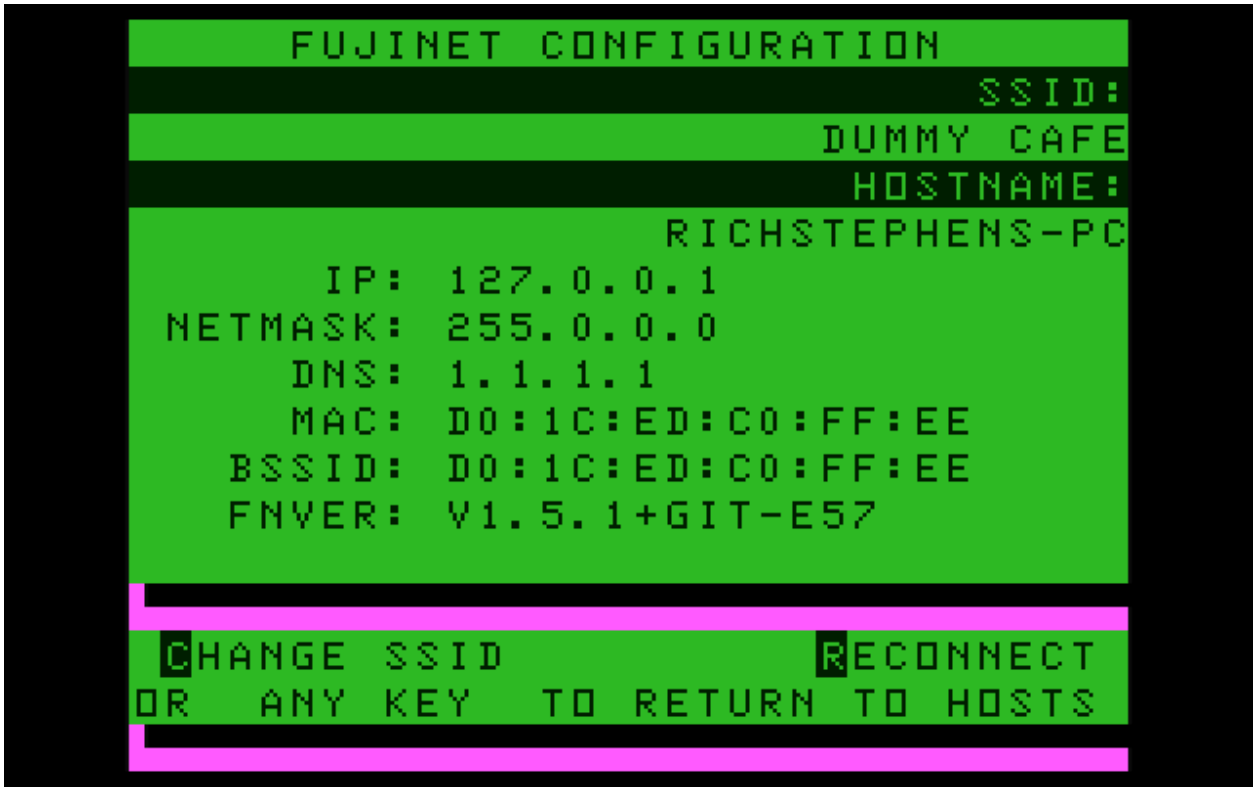
If you wish to browse the files on a particular host, navigate to that host slot and press ENTER. That will take you to a screen where you will see the files and directories on that server. We will explore this in more detail later on in this guide.

For now, let’s finish exploring the rest of the options on this screen. Press L, and you will be greeted with the prompt “BOOT TO LOBBY Y/N?”. If you press Y, FujiNet will load the FujiNet Game Lobby program, which allows you to play online games against the computer, or other players, such as Five Card Stud, Battleship, or Fujitzee. These games are multiplatform and can be played against players with other types of 8-bit computers such as Apple2, Atari, or MS-DOS.

> **NOTE:** The Lobby command may not yet be implemented in the config program in the firmware you have when you first get your FujiNet. If not, don’t worry, you can always load the game lobby by setting one of your host slots to tnfs.fujinet.online, navigating to the COCO directory, and loading LOBBY.DSK.

Pressing the BREAK key will exit the configuration program, mount any disk images you have selected, and reset your CoCo. (NOTE: If the disk in your first drive slot has a file called “AUTOEXEC.BAS” on it, or is an OS-9 disk with an autoboot track, the disk will automatically load whatever program is on it. Otherwise, we’ll cover viewing disk directories and launching programs in a later chapter.)

The Configuration Screen



Pressing C from the Hosts screen will launch the Configuration screen. This screen will show your currently configured WiFi network SSD, the Hostname of your FujiNet device, and other information about your network connection, such as your FujiNet's IP address, netmask, DNS, MAC Address, BSSID, and the version of your FujiNet's firmware.

If you wish to change the WiFi network you are connected to, hit the "C" key to change the SSID. You'll go to the network connection screen where you can select a WiFi network again.

Hit "R" to reconnect your FujiNet to the previously selected WiFi network.

Press any other key to return to the Hosts screen.

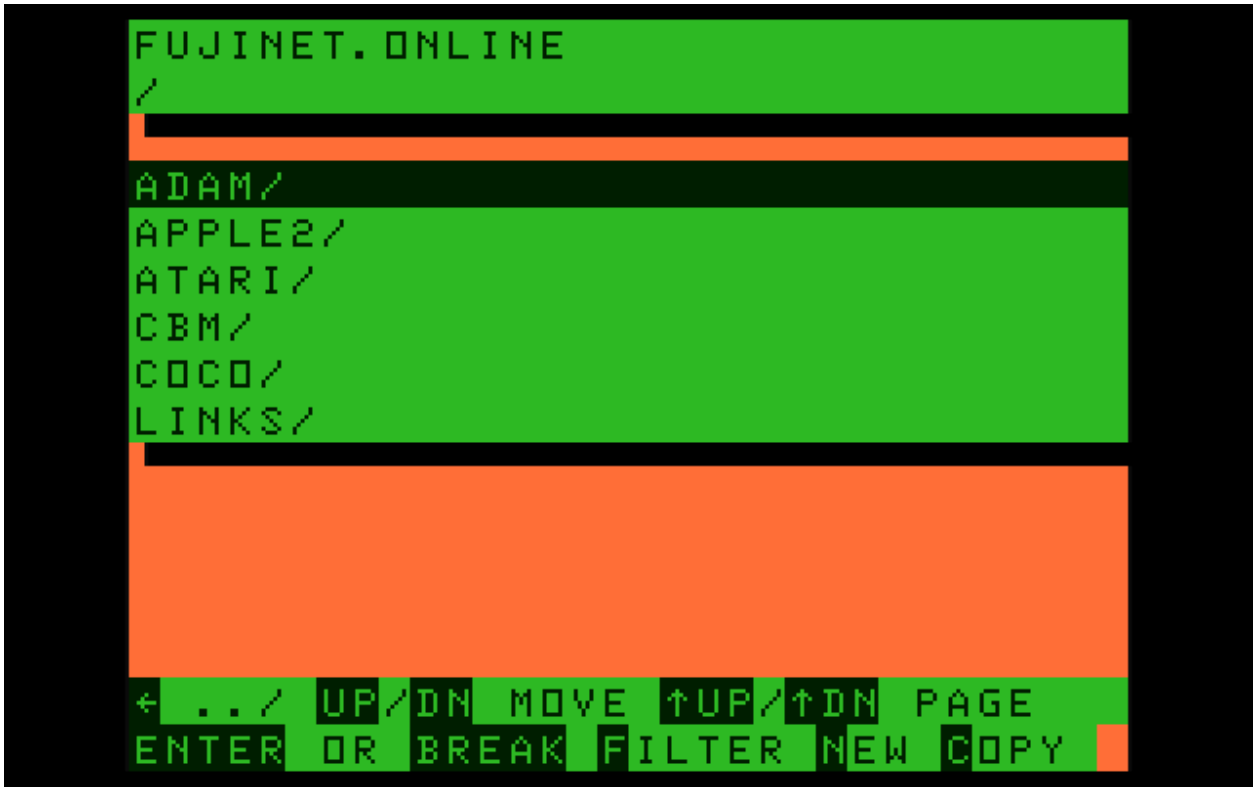
The Drives Screen

Pressing the right arrow (→) key will take you to the FujiNet Drive Slots screen. You will see a similar screen when you select a disk image from a host, as we will see later on in this guide. As in regular Color Computer Disk Extended Color Basic (DECB), there are four possible drive slots, 0 through 3. You can select one by hitting one of those numbers, or use the up and down arrow keys to move the highlight. Next to the drive slot is a color indicator that indicates whether the drive is set to Read Only or Write mode. You can hit “R” or “W” on this screen to change the read/write mode of a selected drive slot.

> **NOTE:** Only use “W” mode when you are working with a known disk image on your own SD card or local server.

Pressing the “E” key will “eject”, or disconnect, a drive image from the selected disk slot. Pressing the “CLEAR” key will clear ALL drive slots. Pressing the left arrow key (←) will take you back to the main Hosts screen. Finally, ass with the hosts screen, “C” will take you to the Config screen, and “L” (where implemented), will launch the FujiNet game lobby. Similarly to the Hosts screen, hitting the BREAK key here will exit the configuration program.

Navigating Host Folders and Selecting a Disk Image



Pressing ENTER while a populated host slot is selected in the Hosts screen will connect to that host and navigate its directory structure, via the screen above.

At the top of the screen, you will see the host name and the current directory. In this case it is "/", the root directory. Entries on the screen ending with a "/" are directories. You can hit ENTER on them to navigate into them and see their contents. UP and DOWN arrows will move up and down on the list. If there is more than one page of contents, pressing DOWN at the last entry will navigate to the next page, and likewise, pressing UP at the first entry will navigate to the previous page of entries. Holding SHIFT while pressing UP or DOWN will navigate to the previous or next page of entries if there are multiple pages. If you are NOT in the root directory, pressing the left arrow will navigate you to the parent folder.

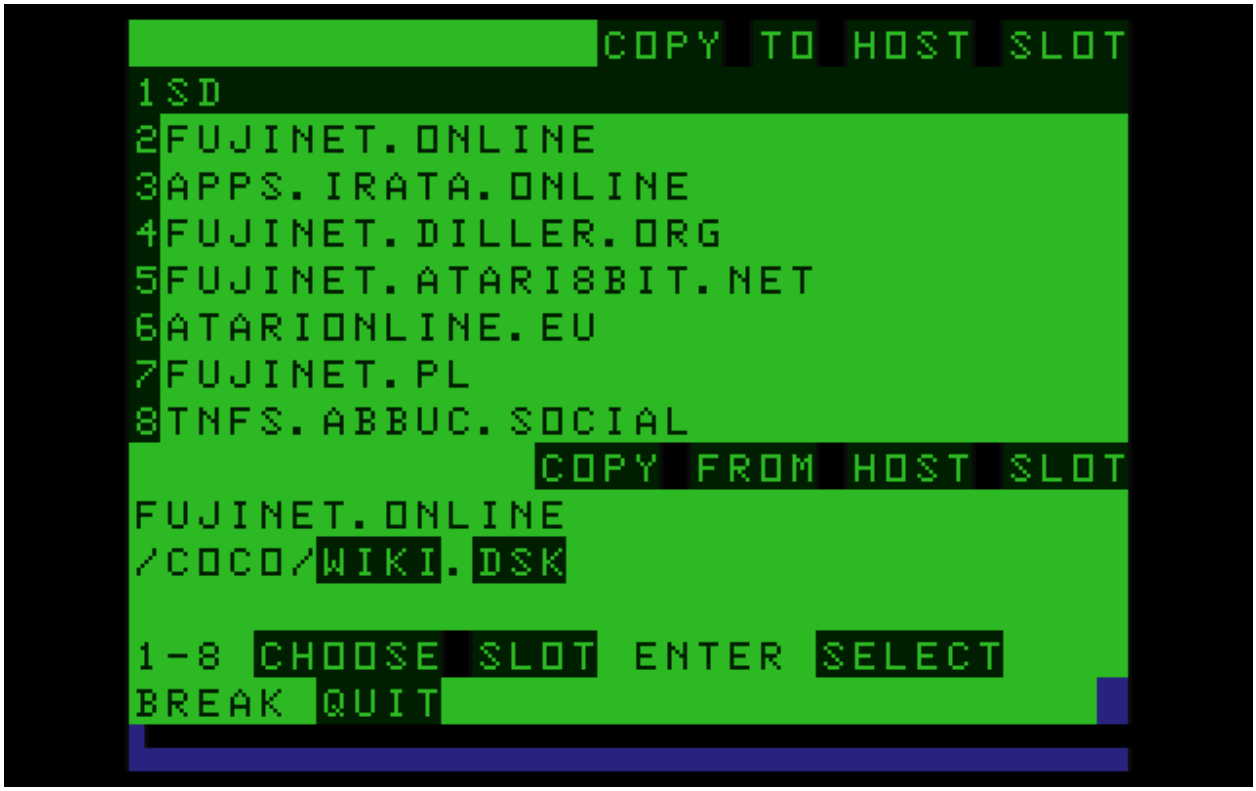
Pressing F will allow you to enter a filter value that will filter the directory contents shown based on what you enter for the filter. When entering the filter, if you precede your text with an exclamation point ("!"), it will recursively search through all subfolders of the currently selected folder and find any file that contains the text following the exclamation point. Wildcards ("*") will filter the current folder, much like using a "dir" or "ls -l" command in Windows or Linux. For instance, entering W*.* will show all files in the current folder that start with W. Hitting F and deleting the filter will clear it and show

unfiltered entries again.

Hitting “N” will allow you to create a new 157k floppy disk image that you can save programs and data to. You will be prompted with how many disk images to create (just use 1 for CoCo), and the name of the disk image. The disk image will be created in the currently selected folder.

> **NOTE:** Only attempt to create new disk images on your own SD card or local server.

The “C” allows you to copy a disk image from one server or folder to another one. To use it, navigate to the disk image you want to copy and hit “C”. You will then be prompted to select a host slot and folder to copy the disk image to, like the one below:

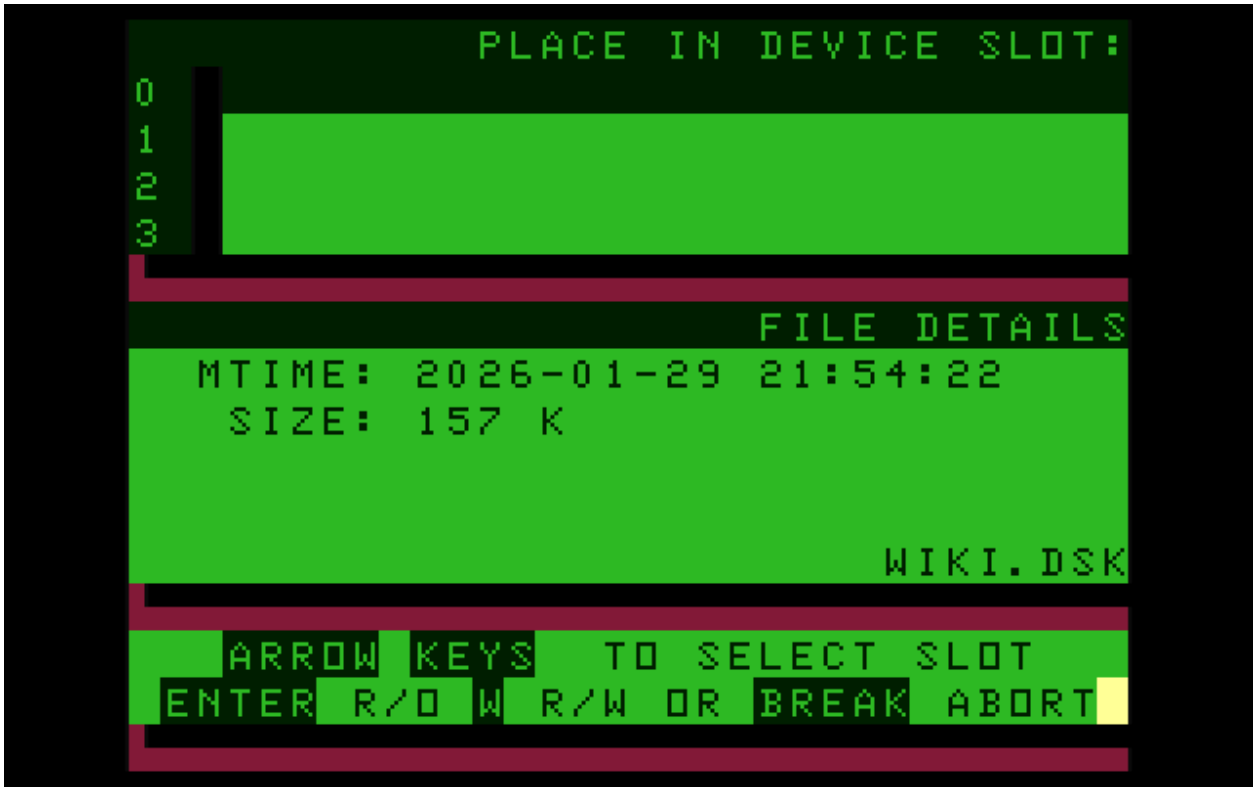


Navigate to the folder you wish to copy to, and hit “C” again. A screen will be shown that indicates the file and where it is being copied to, and the copy will be executed.

> **NOTE:** Depending on the version of your firmware, copying may not yet be implemented. Look for it in a future release.

Filenames longer than 32 characters will be “ellipsized”. That is, the config program will show the first few characters of the filename and the last few, with an ellipse (“...”) in the middle A new feature in some versions of the firmware is filename scrolling. If you hover over the filename for 5 seconds, if it is longer than 32 characters, the full filename will scroll back and forth across the screen.

To select a disk image, navigate to a file (usually one that ends in DSK) and hit ENTER. You will see the following screen:



The screen shows the file modification time and size, the name of the disk image file at the bottom, and the list of drive slots at the top. Use the arrow keys to select the drive slot you wish to mount the disk image in. Press ENTER to mount the disk image in read-only mode, or W to mount the disk image in read/write mode, or hit BREAK to cancel the disk image mount operation. When complete, you will be returned to the previous screen in the same folder you were in previously.

When you have mounted all the disk images you wish to use, simply press BREAK at the Host Slots screen to exit the configuration program. Your screen will briefly show the list of the drives and what is mounted to each, and then your CoCo will reset and return to an OK prompt.

NOTE: Only use “W” mode when you are working with a known disk image on your own SD card or local server.

Learned in Chapter 3

How to launch the configuration program

How to configure your WiFi network

The layout and functions of each configuration screen

How to browse and manage disk images

Chapter 4 - Working with Disk Images in HDB-DOS

This is where the fun really begins. Instead of physical floppy disks, FujiNet uses disk image files — exact copies of disks stored on your SD card or a network server. Your CoCo doesn't know the difference!

FujiNet uses a customization/extension of standard Tandy Disk Extended Color Basic (DECB), called HDB-DOS. In addition to the standard DECB commands, like DIR, LOAD, LOADM, and RUN, HDB-DOS has several features that extend DECB. Here are some useful things to know:

AUTOEXEC.BAS

On power-up, HDB-DOS looks for a BASIC program called AUTOEXEC.BAS on the disk image in drive slot #0. If one is found, it is automatically run. This BAS file can be used to run whatever program you wish from DRIVE 0. The DOS command initiates this function.

> **NOTE:** This is how the CONFIG program automatically runs when you power up your CoCo with the FujiNet inserted. Also, if you press the CoCo's RESET button, it will re-load the CONFIG disk image, so you can then enter DOS and restart the config program.

RUNM

Normally, running an binary executable in DECB is a two-step process: First, typing LOADM "FILENAME.BIN" and ENTER, then typing EXEC and ENTER. With HDB-DOS, you can simply type: RUNM "FILENAME.BIN" and press ENTER and the binary program will be loaded from disk and executed in one step.

DRIVE

In DECB, setting a different drive to be the default drive involves typing in "DRIVE X" where X is the number of the drive you want to switch to. In HDB-DOS, you must use the "#" symbol. For instance, if I want to switch to the disk image I have mounted in drive slot 1, I would type: DRIVE #1

FLEXIKEY

HDB-DOS has a feature called FLEXIKEY that allows you to recall the last command typed. Much like using the LEFT arrow will delete the onscreen characters one at at time, using the RIGHT arrow will recall the last command you typed, one character at a time. You can also delete the entire line you are currently typing by pressing SHIFT and

the LEFT arrow. Similarly, you can recall the entire last line you typed by pressing SHIFT and the RIGHT arrow. You can find more detail on FLEXIKEY in the HDB-DOS user manual (see below).

NOTE: There are more “hidden” features of HDB-DOS. Some of which do not apply to HDB-DOS running under FujiNet, since they apply to running real hard drives, but you can find more information in the HDB-DOS user manual at: http://cloud9tech.com/Cloud-9/Support/HDB-DOS%20User%20Manual.pdf

The FujiNet team did not write and cannot modify HDB-DOS. Please refer to the user manual for any specific questions about HDB-DOS itself.

Learned in Chapter 4

HDB-DOS and a few new commands

Chapter 5 - FujiNet for CoCo Programs

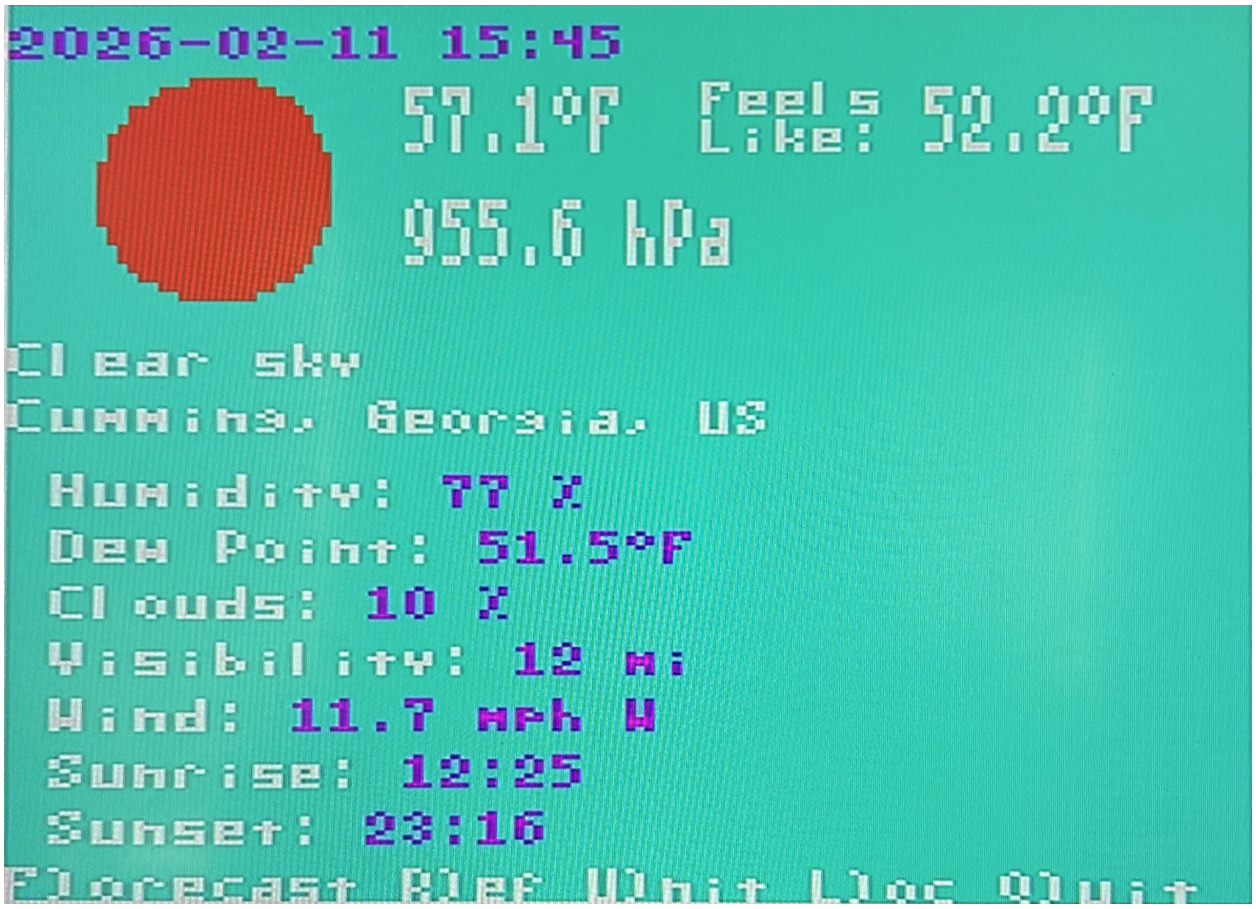
As was mentioned earlier, the FujiNet game lobby gives you access to some FujiNet-enabled multiplayer games. The following is a list of a few other example programs available.

News

News connects to a web server that gathers news stories from several different sources and allows you to read them on your FujiNet-enabled device. You can pick a topic, scroll through tons of headlines, and read the stories all on your CoCo. Fujinet-News for Coco 1 & 2 supports both 32 and 42-column (with real lowercase) text. On CoCo3, you can also choose the native 40 and 80 column modes.

> **NOTE:** You can find the FujiNet News program at:
> tnfs.fujinet.online/COCO/NEWS.DSK

Weather



Weather connects to a free web service that allows you to get weather information and forecasts for anywhere. It senses your location based on your FujiNet's IP address and shows you that location's weather and forecast information by default, or you can enter a new location to find out the weather anywhere you can name. You can change from Imperial to Metric measurements, and refresh the data at any time.

NOTE: You can find the FujiNet Weather program at:
tnfs.fujinet.online/COCO/WEATHER.DSK

Netcat

Fujinet-Netcat is a very simple terminal program that allows you to telnet to online BBSes and other services that accept telnet connections. You connect to a bbs using the URL form “N:TELNET://MYBBSEXAMPLE.COM:PORT”. The most recent version of netcat, shown here, uses a 42-character soft font that is VT-52 (monochrome) compatible, so if your favorite BBS has VT-52 terminal emulation, use it with netcat!

NOTE: You can find the FujiNet Netcat program at:
tnfs.fujinet.online/COCO/NETCAT.DSK

Wiki

Fujinet-Wiki connects to a web server that allows you to search Wikipedia for articles on whatever subject you enter. A limited number of articles are shown to choose from, but you can read them in their entirety once you have selected an articles. Fujinet-Wiki has a 42-column true upper/lowercase soft font on CoCo 1 and 2, and also supports the native 40/80 character formats on CoCo 3.

NOTE: You can find the FujiNet Wiki program at:
tnfs.fujinet.online/COCO/WIKI.DSK

Chapter 6 - Appendix

Firmware Updates

Fujinet firmware can be updated using the FujiNet-Flasher updater found at: https://github.com/FujiNetWIFI/fujinet-flasher/releases. This firmware can automatically download the latest release firmware for your FujiNet device and install it. Additionally, if you are feeling adventurous and want to try loading one of the unreleased nightly builds of firmware, you can download them at: https://github.com/FujiNetWIFI/fujinet-firmware/releases/tag/nightly. Look for the file with the name that starts with: “fujinet-COCO”.

> **NOTE:** The nightly builds are provided 100% *AS-IS* with absolutely no guarantee that they will work. Only use these builds if you know what you are doing & are willing to troubleshoot any problems on your own.

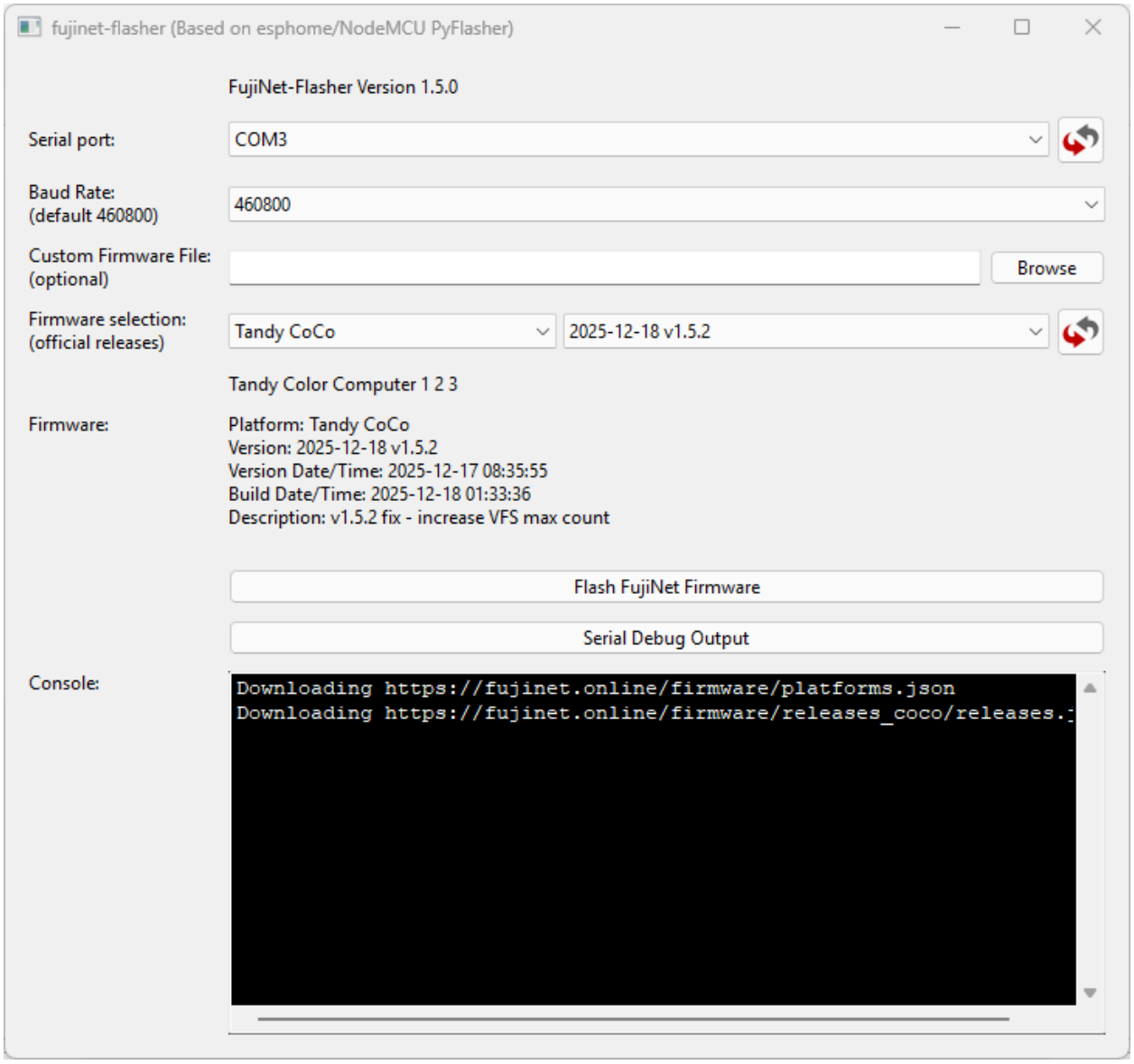
In order to update your firmware, you will need a USB-A to USB-mini cable to connect to your computer, and you will need to download the proper USB bridge driver to allow the USB connection in your FujiNet to be recognized by the Fujinet-Flasher program.

This can be found at: https://www.silabs.com/software-and-tools/usb-to-uart-bridge-vcp-drivers?tab=downloads.

For Windows users, the first “Universal” driver is sufficient. Unzip the file to a folder, then right click on the “silabser.inf” file and select “install” to install the driver.

Once you have the driver installed, download the latest FujiNet-Flasher for your operating system at: https://github.com/FujiNetWIFI/fujinet-flasher/releases

Power down your CoCo, connect the USB cable to your computer and the FujiNet, unzip the flasher zip file and click on the flasher executable to start. You’ll see this:



Select the serial port (there will likely be only the one) from the top dropdown. Leave the Baud Rate alone at 460800. To flash an official release version of the firmware, select “Tandy CoCo” from the bottom left dropdown, and the firmware version you wish to install (preferably the latest one) from the right.

Next, click on “Flash FujiNet Firmware”, and hold down the “A” button on your FujiNet (the one closest to the front if you have it plugged into your CoCo) until you see the firmware process actually start writing data to the FujiNet. Once that starts, you can release it.

Once the process completes, disconnect the cable before powering up your CoCo. Unless…

Debug Logging

If you wish, or if you need to debug a firmware issue, you can see a debug log of the activity of the FujiNet. Connect the USB cable, fire up the flasher, and click on the "Serial Debug Output" button. You will then see debug log messages as your CoCo accesses and uses the FujiNet.

> **NOTE:** For more details on the FujiNet-Flasher, see: https://github.com/FujiNetWIFI/fujinet-firmware/wiki/FujiNet-Flasher

TNFS

TNFS is a file server software that is used to allow software for FujiNet-enabled computers to be downloaded and run over the internet. It's very convenient to set up your own local TNFS server to access any software you may have on your local PC/Mac or Linux server. More details on setting up your own TNFS server can be found at:https://github.com/FujiNetWIFI/fujinet-firmware/wiki/Setting-up-a-TNFS-Server.

Software Development in C for FujiNet

Developing software in C for FujiNet requires the following:

CMOC C compiler: http://gvlsywt.cluster051.hosting.ovh.net/dev/cmoc.html

LWTools assembler linker: https://www.lwtools.ca
The Color Computer Toolshed (Utilities for creating and writing files to CoCo disk images): https://github.com/nitros9project/toolshed/releases
And, most importantly, the FujiNet-lib, a C library for connecting to and using the FujiNet: https://github.com/FujiNetWIFI/fujinet-lib
Fozztexx's MekkoGX build system is also highly recommended It's a system of Makefiles and scripts that make for easily structuring your code to write cross-platform compatible FujiNet programs: https://github.com/fozztexx/MekkoGX
Lastly, It's highly recommended to do all of your FujiNet development in Linux or a Linux VM.

If you have questions, come and ask about it on the FujiNet discord! (See below).

Resources and Community Links

For more information and to get in contact with other FujiNet users and developers, try:

FujiNet Web Site: http://fujinet.online

FujiNet Wiki: https://github.com/FujiNetWIFI/fujinet-firmware/wiki

FujiNet Users Group on Facebook: https://www.facebook.com/groups/fujinetusers

FujiNet Discord Server: https://discord.gg/6ts2XB3G