

altairsim — A FujiNet on CP/M 2.2b

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The **FujiNet** is a small WiFi adapter that plugs into a serial port. This machine is an Altair 8800 with **CP/M 2.2b**. The adapter is on the second channel of the **88-2SIO** serial board. Four CP/M tools use the network device of the FujiNet. They list a directory on a **TNFS** server, copy files to and from it, and fetch a file from a web address.

```
cd examples/fujinet
altairsim fujinet.toml
```

The machine boots CP/M from drive A. You land at the `A>` prompt:

```
56K CP/M 2.2b v2.3

For Altair 8" Floppy

A>
```

Name your serial device first

`fujinet.toml` names the serial device of one computer. Change the `connect` line at the end of the file to the device of your computer:

Host	Value of <code>connect</code>
macOS	<code>serial:/dev/cu.usbserial-XXXXXXX</code> (use <code>cu.</code> , not <code>tty.</code>)
Linux	<code>serial:/dev/ttyUSB0</code> or <code>serial:/dev/ttyACM0</code>
Windows	<code>serial:COM3</code> (Device Manager > Ports shows the number)

On Linux, add your user to the `dialout` group. If the name is wrong, altairsim lists the serial ports that it can see.

The baud rate of the machine is 76800. The baud rate of the FujiNet must be the same. Set `baud` in the `[Serial]` section of `fnconfig.ini` on the adapter, or on its web page. After you change it, turn the adapter off and on.

No adapter

FujiNet-PC is the FujiNet firmware for a desktop computer. Use its RS232 build with an empty `[Serial]` `port=` setting. Change the `connect` line of the machine file to a socket:

```
connect = "socket:localhost:1985"
```

The machine

`fujinet.toml` is a small change to the `default` machine:

Part	Setting
Processor	8080, 2 MHz
Memory	56K of RAM
Console	88-2SIO channel A, ports 10H and 11H
FujiNet	88-2SIO channel B, ports 12H and 13H, 76800 baud
Drive A	<code>FUJINET.DSK</code> , CP/M 2.2b and the FujiNet tools
Drive B	<code>PRN.DSK</code> , the printed listings of the tools

The guest has no clock. It counts instructions. At full speed, its time-outs end in a few microseconds of real time, and the tools decide that the FujiNet does not answer. For this reason, the machine file sets the processor to its real 2 MHz.

Both disks are mounted **read/write**. CP/M writes to them. Copy an image before you change it, or restore it with `git checkout`.

The tools

The tools on drive A are `FUJIDIR`, `FUJIGET`, `FUJIPUT` and `WGET`. They are by **trgeuy**. The source, the manual for the tools and the bring-up notes for a real adapter are at <https://github.com/trgeuy/fujinet-cpm22>.

Command	What it does
<code>FUJIDIR N1:TNFS://<server>/*.COM</code>	List the files on a TNFS server.
<code>FUJIGET N1:TNFS://<server>/FILE.EXT</code> <code>FILE.EXT</code>	Copy a file from the server to the current drive.
<code>FUJIPUT FILE.EXT</code> <code>N1:TNFS://<server>/FILE.EXT</code>	Copy a file from the current drive to the server.
<code>WGET FILE.EXT</code>	Fetch a file from a web address to the current drive. <code>WGET</code> asks for the address at a <code>URL:</code> prompt, so that the case of the address stays the same.

Type the name of a tool with no argument to print its usage. The FujiNet must have a WiFi connection before a tool can reach a server.

The disks

Drive A has `FUJIDIR`, `FUJIGET`, `FUJIPUT` and `WGET` as `.ASM`, `.HEX` and `.COM` files. `WGETURLS.TXT` lists the web addresses of the source files. Drive A also has the CP/M tools `ASM`, `LOAD`, `MAC`, `DDT`, `ED`, `PIP`, `STAT`, `SUBMIT`, `XSUB`, `DUMP`, `SYSGEN` and `MOVCPM8`, and the small tools `LS`, `CRC`, `SURVEY`, `PCGET`, `PCPUT`, `ACOPY`, `AFORMAT` and `NSWP`. The host bridge utilities `R`, `W` and `HDIR` are there too. They copy files between the CP/M disk and the host folder.

Drive B has `FUJIDIR.PRN`, `FUJIGET.PRN`, `FUJIPUT.PRN` and `WGET.PRN`.

`MAKE.SUB` assembles and loads the four tools again:

```
A>SUBMIT MAKE
```

What the machine file does

- `startup = ["RUN FF00"]` starts the boot PROM. The machine boots at once.
- `bsdel = "bs"` in `[console]` makes the Backspace key of your terminal erase a character at the `A>` prompt.

- The `.DSK` files are 337,664 bytes. That is 96 bytes more than an 8" floppy, because the XMODEM transfer that read them off a real machine added padding. The 88-DCDD board accepts this size.

Press `Ctrl-E` to return to the `altairsim>` monitor. CP/M keeps `Ctrl-C` for its warm boot.