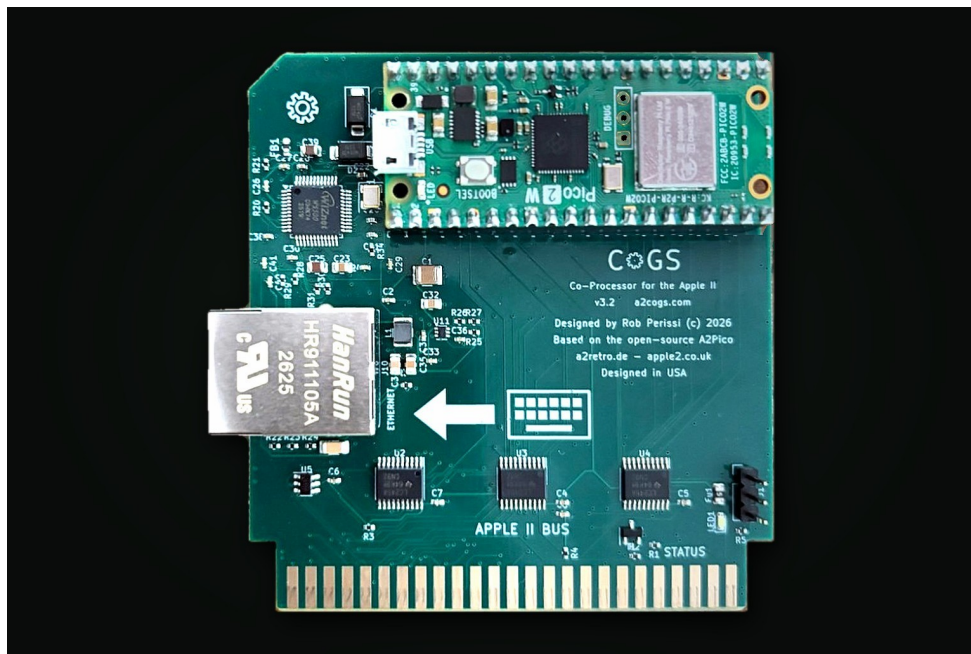


COGS

CoGS Owner's Manual

Installing and using the CoGS card in an Apple II



Describes firmware 1.14 (9/20/2026). Manual revision 5, built 2026-09-20.
a2cogs.com

Copyright 2026 Rob Perissi. Apple, Apple II, Apple IIGS, GS/OS, ProDOS, and Finder are trademarks of Apple Inc. Raspberry Pi is a trademark of Raspberry Pi Ltd.

Contents

About This Manual	1
1 Read This First	2
1.1 The card	3
1.2 What you need	3
1.3 What is in the box	3
1.4 Before you install	3
2 Quick Start	4
2.1 1. Install the card	4
2.2 2. Tell the IIGS about the card	4
2.3 3. Join your network	4
2.4 4. Boot a disk	5
2.5 5. The next time you turn it on	5
2.6 Where to go next	5
3 Installing the Card	6
3.1 Choosing a slot	6
3.2 Installing in an Apple IIGS	6
3.3 Installing in an Apple //e or][+	7
3.4 Connecting Ethernet	7
3.5 Checking that the card is seen	7
4 The CoGS Menu	8
4.1 Moving around	9
4.2 Wi-Fi/Network	10
4.3 Network Tools	11
4.4 Browse Disks	12
4.5 Disk Drives	13
4.6 Image/Audio Source	14
4.7 Card Status	15
4.8 Clock & Time	15
4.9 About / Update	16
4.10 Factory Reset	16
5 Disks	17
5.1 Where disk images come from	17
5.2 Browsing the catalog	17
5.3 Booting a disk image	17
5.4 Several drives at once	18
5.5 Your own disk images	18
5.6 Writing to a disk	18
5.7 Disk image formats	18
6 Audio (IIGS)	19
6.1 Opening the player	19
6.2 The audio catalog	19
6.3 Playing a track	21
6.4 Volume and equalizer	22
6.5 Internet radio	22
6.6 Playing in the background	23
6.7 Sound tools	23
7 Pictures (IIGS)	24
7.1 Box art for a disk	24

7.2	The picture catalog	24
7.3	Slideshow	25
7.4	Picture formats	25
8	Using the Card from GS/OS	26
8.1	CoGS Config	26
8.2	The CoGS Control Panel device	27
8.3	The CoGS Status desk accessory	27
8.4	Marinetti	27
8.5	The ready-to-boot disk	28
9	Sharing Your Own Disks	29
9.1	Installing the Image Manager	29
9.2	Tools for conversion	30
9.3	Sharing your library	31
9.4	Your folders on the Apple II	31
9.5	What Image Manager converts	33
9.6	Pointing the card at your share	35
9.7	Writable disks	35
9.8	Using another web server	35
10	Updating the Firmware	36
10.1	Finding the installed version	36
10.2	Updating from the menu	36
10.3	Updating over USB	37
10.4	If an update fails	37
11	Troubleshooting	38
11.1	First checks	38
11.2	The computer does not see the card	38
11.3	The card cannot join Wi-Fi	38
11.4	Browse shows no catalog	38
11.5	A disk will not boot	39
11.6	Audio problems	39
11.7	CoGS Config is missing	39
11.8	Messages	39
12	Specifications	40
12.1	Card	40
12.2	Disk	40
12.3	Audio and pictures (IIGS)	40
	Appendix A. Credits and Licenses	41

About This Manual

This manual describes the CoGS card running firmware 1.14 (9/20/2026). It covers installing the card in an Apple II, joining a network, booting and browsing disk images, playing audio, viewing pictures, using the card from GS/OS, keeping the firmware current, and solving problems.

It is written for anyone who owns a CoGS card. No programming knowledge is needed. Programmers who want the register map, the protocol, and the firmware internals should read the companion book, the *CoGS Technical Reference*.

How this manual is organized

Chapter 1, *Read This First*, is two pages on what the card is and what you need. Chapter 2, *Quick Start*, gets a card from the box to a running disk image. The chapters after that cover one part of the card each, in the order you are likely to meet them. The last two chapters are *Troubleshooting* and *Specifications*.

Conventions

Keys you press are written as they appear on the keyboard: Return, Esc, the arrow keys, and combinations such as Ctrl-OpenApple-Esc. Menu items, buttons, and screen names are in **bold**. Text you type, file names, and anything the screen shows verbatim are in monospace.

NOTE

A note gives information that helps but is not required to complete the task.

TIP

A tip is a shortcut or an easier way to do something.

WARNING

A warning tells you about something that can lose data, damage the card or the computer, or is hard to undo.

Revision history

Table 1. Manual revisions

Revision	Firmware	Change
1	1.03	First draft chapters.
5	1.14	Launch edition. Menu keys, boot menu, late CDA, one disk image per drive, recent disks on Browse R and Disk Drives R, Image Manager, update, and troubleshooting filled against the shipping screens.

CHAPTER 1

Read This First

The CoGS card is a network card and a co-processor for the Apple II family. It plugs into any slot of an Apple][+, Apple //e, or Apple IIGS, connects to your network over Wi-Fi or a wired Ethernet cable, and gives the computer three things it did not have before.

A disk library on the network. The card appears to the Apple II as an ordinary disk drive. The disk it serves is a disk image file fetched over the network, one block at a time, from the a2cogs.com catalog of over a thousand boot-tested disk images or from a folder you share from your own computer. Your Apple II boots from it the way it boots from a floppy or hard disk. Nothing is installed on the Apple II and no storage card is needed.

Modern internet access. The card carries the parts of the modern internet that an Apple II cannot run itself. It performs TLS encryption, fetches pages and API responses over HTTPS, resolves names, and keeps the clock set from network time. Programs on the Apple II talk to it through a few slot registers and receive plain text.

Audio and pictures on the IIGS. On an Apple IIGS the card also plays music and internet radio through the Ensoniq sound chip and shows box art and title screens in Super Hi-Res, HGR, and double hi-res, all served from the network. This part is IIGS only, and it runs from the **CoGS Config** desk accessory once GS/OS is at the Finder. The startup menu and the 8-bit machines have disks and networking, not audio or pictures.

The card's own screens live in the card. You do not install a program on a boot disk before you can use disks, Wi-Fi, or the card menu. On a IIGS the card also puts a desk accessory named **CoGS Config** on the machine after GS/OS reaches the Finder. Chapter 8 covers the optional Control Panel files and Marinetti.

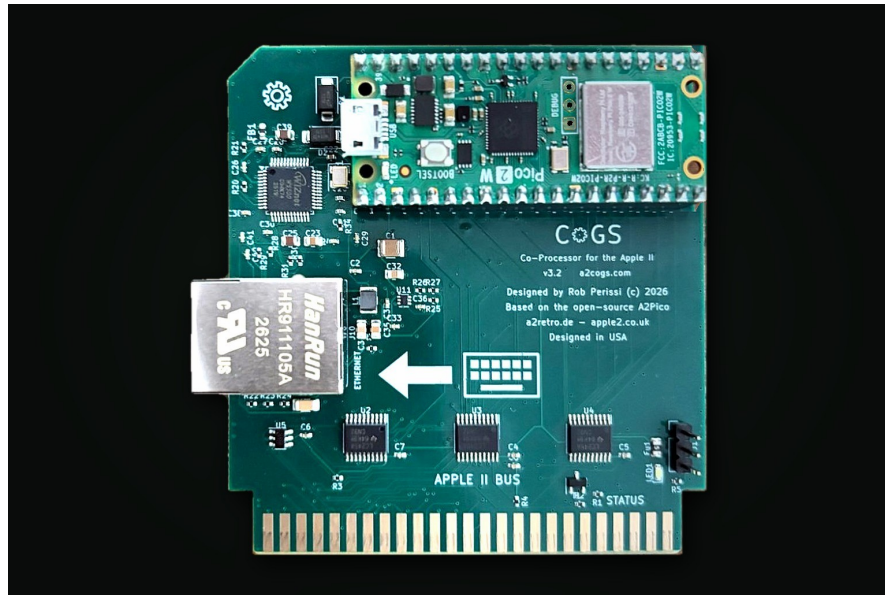


Figure 1-1. The CoGS card

The card

The board is a single slot card. The edge connector goes into the slot. The Raspberry Pi Pico 2 W sits on the card and is the processor and the Wi-Fi radio. The Ethernet jack is on the front edge, the end toward the keyboard. The Pico's USB connector is used only when you update the firmware from a computer. Do not press on the Pico or on the small parts around it.

What you need

- An Apple][+, Apple //e, or Apple IIGS with a free slot. On a IIGS, any slot from 1 to 7 works. Slot 7 is a good default because nothing built into the IIGS uses it. Slot 3 works, but the card then presents four drives instead of eight.
- A Wi-Fi network (2.4 GHz, WPA2) or a wired Ethernet connection with a spare cable. The card supports both. When both are up, the card uses Ethernet.
- The name and password of your Wi-Fi network, if you are using Wi-Fi.

You do not need a boot disk, a storage card, an SD card, or a second computer.

What is in the box

- The CoGS card, already assembled.
- This manual, or a card pointing to it at a2cogs.com/manual.

A finished card ships with firmware on it. A kit that you assemble from an A2Pico carrier and a Pico 2 W needs the firmware file from a2cogs.com or the GitHub Releases page before it will talk to the Apple II. Chapter 10 covers flashing.

Before you install

WARNING

Turn the computer off and unplug it before you open the lid or touch a slot. Installing a card with the power on can damage the card and the computer.

Handle the card by its edges.

Quick Start

This chapter takes a new card from the box to a running disk image. It assumes an Apple IIGS. The differences on an Apple //e or][+ are noted where they occur. Read Chapter 1 first if you have not.

1. Install the card

1. Turn the computer off and unplug it.
2. Open the lid. On a IIGS, press the two latches at the rear corners and lift.
3. Choose a slot. Slot 7 is the usual choice on a IIGS and a //e. If slot 7 is taken, any free slot from 1 to 7 works. Remember the number.
4. Hold the card by its top edge, line the edge connector up with the slot, and press straight down until it seats.
5. If you are using wired Ethernet, bring the cable in through one of the openings in the back panel, loop it forward inside the case, and plug it into the jack on the card's front edge, the end toward the keyboard. A cable with a slim, low-profile plug fits the openings more easily. Chapter 3 has the details and a tidier option.
6. Close the lid, plug the computer in, and turn it on.

2. Tell the IIGS about the card

On a IIGS the slot has to be set to **Your Card** in the Control Panel before the card is visible. Skip this step on a //e or][+.

1. Hold Ctrl-OpenApple and press Esc to open the Desk Accessories menu, then choose **Control Panel**.
2. Choose **Slots**.
3. Set the slot you installed the card in to **Your Card**.
4. Set **Startup Slot** to the same slot number. This makes the computer boot from the card.
5. Press Return, then Esc until you are back at the menu, and restart with Ctrl-OpenApple-Reset.

3. Join your network

When the computer starts from the card for the first time, the card has no network to join and no disk to boot, so it shows its own menu (Chapter 4 has a picture of it and covers every page).

1. Press 1 for **Wi-Fi/Network**, then Return to scan. The card lists the networks it hears, strongest first.
2. Press the number of your network.
3. Type the password and press Return. Passwords are case sensitive.
4. When the screen shows the card is connected with an address, the card is online. It saves the network and rejoins it every time it starts. Press Esc to return to the menu. The **Status** column now shows the link.

If you plugged in an Ethernet cable, the card uses it in preference to Wi-Fi and no Wi-Fi setup is needed. **Card Status** (press 8) shows which connection is active.

TIP

If you missed the menu because a disk was already configured, hold M while the computer starts from the card. The menu opens before anything boots. C does the same, and leaves M free if a CFFA3000 is still in the machine.

4. Boot a disk

1. Press 3 for **Browse Disks**. The card fetches the a2cogs.com catalog and asks what you want to do. Press F for Featured, G for a game, or another letter for a shelf. A is the full list A to Z. L finds by name.
2. Move through the list with the arrow keys. Press V on an entry that shows a V to see its box art (IIGS only).
3. Press Return on an entry. The card makes it the boot disk, mounts it in drive 1, and the computer boots from it.

That is the whole procedure. The disk image streams over the network as the program runs.

5. The next time you turn it on

The disk you booted stays set as the boot disk. The next time the computer starts from the card it boots that disk without stopping at the menu. To boot something else, hold M as the computer starts, press 3, and pick again. Or hold the drive number 1 through 8 (1 through 4 on an 8-bit machine) through power-on to boot that drive.

Disk Drives (press 6) shows what is mounted in each drive. From there you can point any drive at a disk image, clear it, pick one from the last twelve you used (R) and put it on the selected drive, or turn on a short boot menu that lists the drives at power-on. Browse Disks has the same twelve under Featured (R), as a list like Featured.

Where to go next

- Chapter 4 covers every screen of the card's menu.
- Chapter 5 covers disks in depth: several drives, your own disk images, writable volumes.
- On a IIGS, Chapter 6 (Audio) and Chapter 7 (Pictures) cover what the card can do from the GS/OS desktop. Wait about ten seconds after the Finder appears, then open **CoGS Config** with Ctrl-OpenApple-Esc.

Installing the Card

The card fits any slot of an Apple][+, Apple //e, or Apple IIGS. This chapter covers the physical installation in each machine, the Ethernet connection, the IIGS slot settings, and how to check that the computer sees the card.

Choosing a slot

Any slot from 1 to 7 works.

On a IIGS, slot 7 is the usual choice. Nothing built into the machine uses it, and it is easy to reach. Slot 5 is also common. Slot 3 works, but the card then presents four drives instead of eight, because slot 3 is the slot ProDOS treats as a four-drive card.

On a //e or][+, slot 7 is again the usual choice. The Autostart ROM looks for a bootable disk from slot 7 down to slot 1. If you want the machine to boot from CoGS without typing a command, put the card in the highest-numbered slot that has a disk controller. If another disk card sits in a higher slot, that card wins the boot scan. You can still start CoGS with `PR#n` from BASIC, where `n` is the slot number.

Do not put two cards in the same slot. Do not force the card. If it does not seat, pull it, check the connector, and try again.

Installing in an Apple IIGS

1. Turn the computer off and unplug it.
2. Press the two latches at the rear corners of the lid and lift the lid off.
3. Hold the card by its top edge. Line the gold edge connector up with the slot. The components face the same way as the other cards.
4. Press straight down until the connector is fully in the slot. A seated card sits level with the other cards.
5. If you are using Ethernet, connect the cable now (see below) before you close the lid.
6. Put the lid back on, plug the computer in, and turn it on.

Then set the slot in the IIGS Control Panel.

1. Hold Ctrl-OpenApple and press Esc. Choose **Control Panel**, then **Slots**.
2. Set the CoGS slot to **Your Card**. Any other setting leaves the slot's I/O closed and the card is invisible.
3. To boot from the card, set **Startup Slot** to that same number.
4. Leave the Control Panel with Return and Esc, then restart with Ctrl-OpenApple-Reset.

WARNING

If the slot is not **Your Card**, the IIGS will not talk to the card. The boot menu will not appear, Browse will not run, and GS/OS will not see the drives. This is the first thing to check when a new install looks dead.

Installing in an Apple //e or][+

1. Turn the computer off and unplug it.
2. Remove the lid. On a //e, pull the lid toward you and lift. On a][+, lift the lid off the case.
3. Seat the card the same way as on a IIGS. The components face the rear on a //e and a][+.
4. Connect Ethernet if you are using it, close the lid, plug the computer in, and turn it on.

There is no **Your Card** setting on these machines. If the card is the highest disk controller, the machine boots from it. Otherwise type `PR#n` from BASIC, where `n` is the slot, or hold `C` or `M` as the machine starts from the card to open the menu.

Audio and pictures are IIGS only. An 8-bit machine still gets disks, Wi-Fi, Ethernet, Browse, the clock, and firmware update.

Connecting Ethernet

The Ethernet jack is on the card's front edge, facing the keyboard, so the cable enters at the back of the case and loops forward to the card.

1. Choose one of the openings in the back panel. On an Apple //e and IIGS these are covered by plastic plates that pull out from inside. They are old and brittle, so work them loose gently. Tape the plate to the inside of the case so it is not lost.
2. Thread the cable through the opening. The openings are sized for D-sub connectors, and a standard RJ45 boot can be a tight fit. A cable with a slim, low-profile plug fits easily.
3. Loop the cable forward inside the case and plug it into the jack on the card. If the cable reaches the jack without looping back, the card is in backwards.
4. Close the lid. The cable can be plugged in or unplugged with the computer running. The card notices the link within a few seconds either way.

TIP

If you expect to connect and disconnect the cable often, a short panel-mount Ethernet extension (Adafruit product 909 is one) puts a jack in a back-panel opening so the lid stays closed. On its own the panel mount sits in front of a slot. A DB25 back plate with a small opening (JCM sells one) mounts the jack over the power supply without covering any slot.

When both Ethernet and Wi-Fi are available the card uses Ethernet. **Card Status** shows `Path: Ethernet (Wi-Fi is fallback)`. Unplug the cable and the card falls back to the saved Wi-Fi network.

Checking that the card is seen

On a IIGS with **Startup Slot** set to the CoGS slot and no boot disk saved, the card menu appears as the machine starts. On a later visit, hold `M` through power-on to force the menu. `C` does the same.

On a //e or][+, `PR#n` from BASIC opens the same menu if the card is answering.

Once you are in the menu, press 8 for **Card Status**. A live card shows the slot number, the firmware version on **About / Update** (press 0), and either a Wi-Fi or Ethernet address after you join a network.

If the menu never appears, work through Chapter 11, starting with the slot setting and the seating of the card.

The CoGS Menu

Everything the card does is reached from its own menu, built into the card and shown on the Apple II's text screen. This chapter covers every screen of the menu. The menu appears when the computer starts from the card's slot and has nothing to boot, and at any time you hold M while it starts from the card. C opens the same menu. M is the CFFA3000 key, so it stays familiar if you move off that card. If you keep both, start from the CFFA and hold M for that menu. Start from CoGS and hold C, and M stays with the CFFA. On a IIGS the same pages are also in **CoGS Config** after the Finder is up (Chapter 8).



Figure 4-1. The main menu at startup, from the card's ROM

The menu is in three groups. **Network** holds Wi-Fi/Network and Network Tools. **Media** holds Browse Disks, Disk Drives, and Image/Audio Source, and on a IIGS under GS/OS also Browse Audio and Browse Pictures. **System** holds Card Status, Clock & Time, About / Update, and Factory Reset. The column on the right shows the link, the card's address, and the slot.

The same menu comes up in two places, and they are not quite the same. The startup menu runs from the card's ROM on any Apple II, before anything has booted. On a IIGS the menu is also the **CoGS Config** desk accessory, opened with Ctrl-OpenApple-Esc once GS/OS has reached the Finder. The desk accessory carries two rows the startup menu does not, **4 Browse Audio** and **5 Browse Pictures**. Audio and pictures run only there, and only on a IIGS. The startup menu cannot play or view, and an 8-bit machine has no sound chip or Super Hi-Res to use, so the rows do not appear in either case. The other items keep the same numbers everywhere.



Figure 4-2. The same menu as the CoGS Config desk accessory under GS/OS, with the Audio and Pictures rows

Moving around

Press the item's digit (or X for Factory Reset), or move with the Up and Down arrows and press Return. Esc leaves a page. From the main menu, Esc on a machine that was about to boot continues the boot.

Table 4-1. Main menu keys

Key	Opens
1	Wi-Fi/Network
2	Network Tools
3	Browse Disks
4	Browse Audio (CoGS Config on a IIGS)
5	Browse Pictures (CoGS Config on a IIGS)
6	Disk Drives
7	Image/Audio Source
8	Card Status
9	Clock & Time
0	About / Update
X	Factory Reset

Wi-Fi/Network



Figure 4-3. Picking a network

This page shows the network the card is on, or that it is not joined. Return starts a scan. The card lists the networks it hears, strongest first. Pick one, type the password (case sensitive), and Return. The card saves the network and rejoins it on every start.

F forgets the saved network. That does not erase mounts or the catalog source.

Press I for the **Card IP** page. That is the card's own address, not the Apple's. The top of the page shows the address, mask, gateway, and DNS the card holds right now and how it got them. The card takes an address from your router (DHCP) unless you set one here. M switches the mode between DHCP and Static. Rows 1 to 5 hold the IP, mask, gateway, and two DNS servers. Press the row number and type digits and dots. Return sets the row. Tab sets it and moves to the next row. DNS1 empty means the gateway answers DNS. DNS2 is an optional backup. S saves and applies. One static address covers both ways onto the network. Wi-Fi uses it, and if a cable is plugged into the wired port the wired port takes it over until the cable comes out.

NOTE

On a IIGS that also runs Marinetti, the GS has its own address (Chapter 8). Do not set that address to the same numbers as the card. Two stacks on one address break both.

Network Tools



Figure 4-4. Network Tools

These tools run on the card. They need a live network (Wi-Fi joined or Ethernet with an address).

Table 4-2. Network Tools

Key	Tool
L	DNS Lookup
P	Ping (four echoes)
T	Ping, continuous, until Esc
R	Traceroute
C	TCP port check
S	Connectivity self-test (DNS, TCP, TLS)
D	Speed test, 256 KB HTTPS to the card. This is the card's WAN path, not the Apple II bus.

Each tool asks for a host name or address if it needs one. A good self-test ends with DNS, TCP, and TLS all working. Use these before you chase a Browse or boot failure that is really a network problem.

Browse Disks

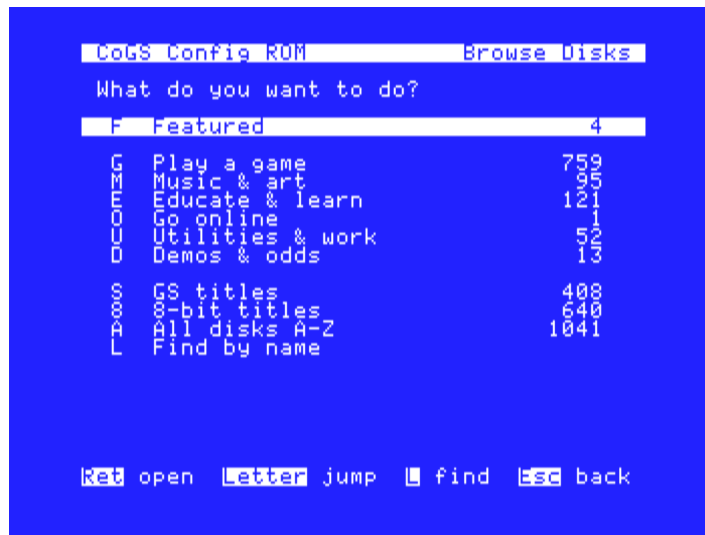


Figure 4-5. The Browse hub

Browse Disks opens on **What do you want to do?** The first letters are the keys.

Table 4-3. Browse Disks hub

Key	Shelf
F	Featured
R	Recent (the last twelve disks you mounted or booted). Return boots, 1-8 mounts.
G	Play a game
M	Music and art
E	Educate and learn
O	Go online
U	Utilities and work
D	Demos and odds
S	GS titles (IIGS only)
8	8-bit titles (IIGS only)
A	All disks A to Z
L	Find by name (searches the a2cogs catalog)
Y	Your source, when you have saved one (Chapter 9)

On an 8-bit machine the list is already limited to titles that machine can run, and the GS / 8-bit extra rows are omitted.

Y opens your share's folders as categories when the share offers them (Image Manager does; Chapter 9), numbered 1 through 9, then 0, X, Z, with All A-Z and Find below. A share without folders opens as the plain A-Z list.

Inside a list, Up and Down move, N and P turn the page, G jumps to a page, L finds. Return on an entry makes it the boot disk and mounts it on drive 1. A digit 1 through 8 (1 through 4 on an 8-bit host, or in slot 3) mounts that disk image on that drive without changing the boot disk. V shows box art when the

row has a V (IIGS). A B on the row means the disk image boots. An 8b mark is 8-bit software. A Dn mark means that disk image is already on drive n.

NOTE

The card will not put the same disk image on two drives. GS/OS cannot hold one volume twice. If you try, the card leaves the first mount alone and tells you which drive already has it.

Chapter 5 covers sources, several drives, and writing.

Disk Drives



Figure 4-6. Disk Drives

This page is the table of drives the card is presenting. Eight drives in most slots, four in slot 3 or on an 8-bit host that the card has capped.

The boot drive is drive 1. Return on a later drive that has a disk image swaps it with drive 1 so that disk image becomes the boot disk. E edits the URL on the selected drive. R opens the last twelve disks you mounted or booted and puts the one you pick on the selected drive. X clears the drive. D jumps to Browse Disks.

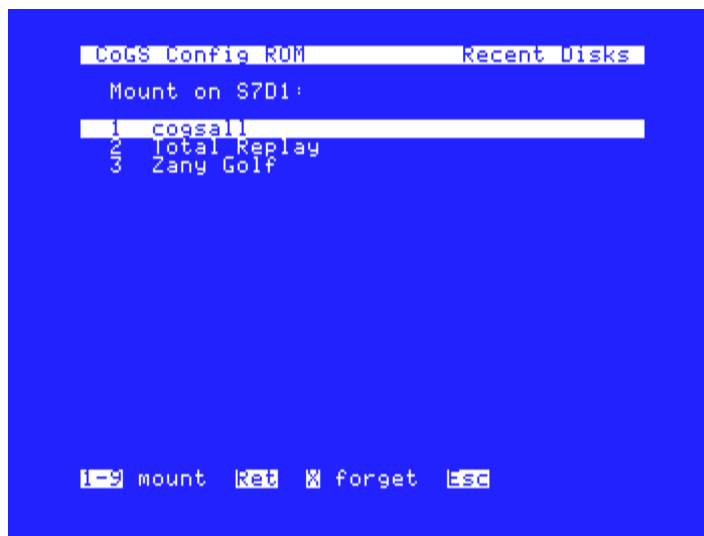


Figure 4-7. Recent Disks

The recent list is newest first. A name comes from Browse when the card had one, otherwise from the filename in the URL. Press 1 through 9 (0, A, B if there are more) or Return to mount. X forgets that row. Esc goes back. Factory Reset clears the list.

B turns the power-on **Boot Menu** on or off. Off (the default) boots drive 1 at once. On, the card shows **CoGS Boot Menu** for 5, 10, or 15 seconds (B cycles those times). Press 1 through 8, or move and press Return, to boot that drive. M opens the full CoGS menu. Up and Down pause the countdown so a cursor move cannot boot drive 1 under you. Holding a drive number through power-on still works when the countdown is off.

A change to a mount is live for GS/OS. ProDOS 8 needs a restart from the CoGS slot before it sees a new drive.

Image/Audio Source

The catalog you see in Browse comes from a2cogs.com unless you point a source at your own share. This page has three slots: disks, audio, and pictures. Each is a base URL. One Image Manager folder can fill all three. S scans the LAN for Image Manager shares and fills the slots from the one you pick. D, A, and P edit a slot by hand; C clears all three. Save a slot empty to remove Your source for it. When a share is saved, Browse grows a Y row for it, and Y opens on the share's folders when it has them.

Chapter 9 lists the file types Image Manager accepts and what it converts (MP3 to PCM, JPEG to SHR, disks as-is).

Card Status

```

CoGS Config ROM      Card Status

Link: UP - SSID: CoGS-Net
Slot: 7 IIGs (8 drv; P8 1.x sees 2)
IP: 192.168.8.64
Mask: 255.255.255.0
GW: 192.168.8.1
DNS: 192.168.8.1 8.8.4.4
MAC: 02:C0:05:6C:00:01
RSSI: -55 dBm
Pub: <!DOCTYPE html PUBLIC "-//W3C//D
Time: sync'd (NTP)
Mem: 400 KB free
Temp: 41.5 C / 106.7 F
+5V: 5.00 V
Up: 0m 16s
Boot: power-on 150 MHz

P: ping the image host

[ ] ping  [ESC] back

```

Figure 4-8. Card Status

Read-only. Link, address, mask, gateway, DNS, MAC, and whether the path is Ethernet or Wi-Fi. Public address if the lookup works. Clock sync (HTTPS waits on it). If Marinetti is up, a line for the GS address. Come here first when something looks offline.

Clock & Time

```

CoGS Config ROM      Clock & Time

Time: sync'd (NTP)
UTC: 2026-09-20 20:42:21
Local: 2026-09-20 20:42:21 UTC
[ ] Set GS clock when Wi-Fi connects
    (network time, no boot/app needed)

O: UTC offset  A: auto-sync on/off
W: write GS clock now

[O] offset  [A] auto  [W] write  [ESC]

```

Figure 4-9. Clock and time

The card gets time from the network (NTP, or HTTP if NTP is blocked). TLS and HTTPS wait until that clock is set, so a Browse failure right after join can be “time not synced yet” rather than a bad catalog.

O sets the offset from UTC (-5, +1, +9:30). A turns auto-write of the Apple clock on or off when Wi-Fi connects. W writes the network time to the IIGS clock now (Y to confirm). On a machine with no clock the page still keeps the offset for the Local line.

About / Update

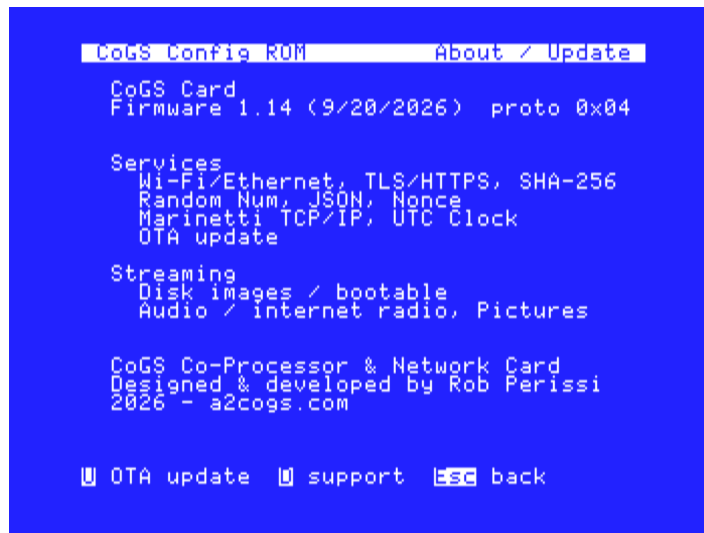


Figure 4-10. About / Update

Firmware version and date, the services this card has, and the streaming faces. U opens the updater (Chapter 10). D shows support text.

Factory Reset

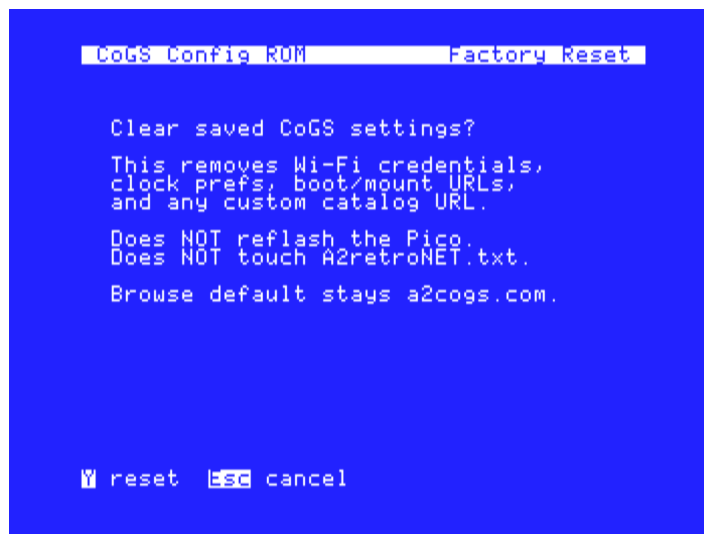


Figure 4-11. Factory Reset

X from the main menu, then Y to confirm. This clears saved Wi-Fi, clock prefs, boot and mount URLs, the recent-disk list, and any custom catalog URL. Browse goes back to a2cogs.com. It does not reflash the Pico and it does not change the firmware. There is no undo other than joining the network and mounting disks again.

Disks

The card presents itself to the Apple II as a disk controller with several drives. Each drive holds a disk image that the card fetches over the network, block by block, as the computer reads it. This chapter covers where disk images come from, how to mount and boot them, how several drives work at once, and how writing to a disk works.

Where disk images come from

Two places, both HTTP or HTTPS with range requests.

The a2cogs.com catalog. Read-only, boot-tested, more than a thousand titles. Browse Disks opens on it unless you have replaced the disk source. Rows that can boot show a B. Games inside Total Replay are listed by name.

Your own share. A folder on a Mac running CoGS Image Manager (Chapter 9), or any web server that can serve the disk image files and a small catalog. Those disk images appear under **Your source** (Y), sorted into your own folders when the share offers them. They can be writable.

The card does not keep a copy of the whole disk image. It fetches the blocks the Apple II asks for and remembers recent ones so a warm boot of the same disk image is fast.

Browsing the catalog

From the card menu press 3, or open **CoGS Config** and choose Browse Disks. The hub and list keys are in Chapter 4.

L finds by name. Type part of a title. The list is the matches, same Return and digit keys as the A to Z list.

If the hub cannot be fetched (no path to a2cogs.com), Browse falls back for that session. With Your source saved it opens on your folders, or on the plain A to Z list of the share when the share has no folders to offer.

Booting a disk image

Return on a Browse row does three things. It mounts the disk image on drive 1, it marks that mount as the boot disk, and it starts the computer from it.

The first time after you pick a new boot disk, the card may spend a few seconds opening the disk image while Wi-Fi finishes joining. If you just powered on, wait for **Card Status** to show an address before you decide the catalog is empty.

Holding a drive number through power-on boots that drive. Holding M opens the menu. The optional Boot Menu on Disk Drives (Chapter 4) lists the drives for a few seconds so you can pick without holding a key.

Several drives at once

Most slots present eight drives, D1 through D8. Slot 3 presents four. An 8-bit host sees four.

D1 is the boot disk when the computer starts from the card. D2 through D8 are extra volumes. On a IIGS they show up on the Finder desktop once GS/OS has seen them. Mount a data disk from Browse with a digit, type a URL on Disk Drives with E, or press R on Browse (under Featured) or on Disk Drives for the last twelve disks you used.

One disk image, one drive. The card refuses a second mount of the same URL. Eject or clear the first drive if you meant to move it.

TIP

A title that wants a data disk in drive 2 is a Browse pick on the program, Return, then Browse again and press 2 on the data disk image.

Your own disk images

Share a folder with CoGS Image Manager and save that URL as the disk source (Chapter 9). Browse then has a Y row. Those disk images boot the same way catalog disk images do. Image Manager does not convert disk files. Drop .2mg, .po, or .hdv.

Saves, high scores, and GS/OS desktop files land in the disk image file on your computer when the share is writable. Keep a copy of anything you care about. The card does not grow a disk image and does not create a new file. It only writes blocks inside a disk image that already exists.

Writing to a disk

Catalog disk images from a2cogs.com are read-only. The Finder may try to write a desktop database. That write does not stick, and it is harmless.

A writable share accepts those writes. If you replace a disk image file on the share with another file of the same size and the same name, the card may keep serving the old blocks until you wipe its cache from the USB console (the w key) or power the card off long enough to lose that cache. Prefer a new name, or a new size, when you replace a file.

Disk image formats

The card serves ProDOS-order disk images.

Table 5-1. Disk image formats the card serves

Kind	Typical name	Notes
2MG	.2mg	Header plus ProDOS blocks. Usual GS/OS size.
PO	.po	Raw ProDOS order.
HDV	.hdv	Same as PO under another name.

Volume size is up to 32 MB per disk image. DOS 3.3 and nibble disk images are not supported. A file that is not a ProDOS volume will not show a B and will not boot.

Audio (IIGS)

On an Apple IIGS the card plays music and internet radio through the computer's Ensoniq sound chip. The player is part of **CoGS Config** and works from the GS/OS desktop or from any program that allows the Desk Accessories menu. This chapter covers the audio catalog, the player controls, internet radio, and background play.



Figure 6-1. Browsing the audio catalog

Audio is IIGS only and needs GS/OS and the desk accessory. The Browse Audio row is not on the card's startup menu, and an 8-bit machine never shows it; it appears in **CoGS Config** after the Finder is up. Wait about ten seconds after the desktop appears, then open the Desk Accessories menu.

Opening the player

1. From the Finder (or from a program that yields), hold Ctrl-OpenApple and press Esc.
2. Choose **CoGS Config**.
3. Press 4 for **Browse Audio**, or choose it with the arrows and Return.

You do not put Tool 226 or Tool 219 in System:Tools. The card supplies them when play needs them. They stay loaded until you restart.

The audio catalog

Browse Audio opens on **What do you want to hear?**

Table 6-1. Browse Audio hub

Key	Shelf
S	SoundSmith misc
D	Demos and scene
P	Pop covers
H	Holiday
M	PCM songs
A	All tracks A to Z
L	Find by name (searches the a2cogs catalog)
Y	Your source, when you have saved an audio URL
R	Internet radio

Y opens on the share's folders that hold audio, then All tracks A-Z and Find (Chapter 9).



Figure 6-2. Your source on the Audio hub

PCM tracks and SoundSmith songs both just play. You do not pick an engine. The list footer tells you PCM is streamed audio and SoundSmith is DOC.

Your own folder uses the same Image Manager share as disks (Chapter 9). Drop an MP3, WAV, or the other formats that chapter lists. Image Manager converts each one to the PCM the player wants. If those files are skipped, open **Conversion tools...** in Image Manager and Copy the ffmpeg line. Save the share URL on the Audio slot of **Image/Audio Source**.

Playing a track



Figure 6-3. Now playing

Return on a track starts it. The Now Playing page shows the title, time, and volume bar.

Table 6-2. Player keys

Key	Action
Space	Pause and resume
Esc	Stop
Plus or minus	Volume, the IIGS system volume
N / P	Next or previous in the list or playlist
. / ,	Skip about 15 seconds, catalog tracks
B	Keep playing after you leave the desk accessory
E	Bass and treble
G	Graphic equalizer

Mark tracks in the list and press Return to play the marked set in list order, or S to shuffle that set.

Volume and equalizer

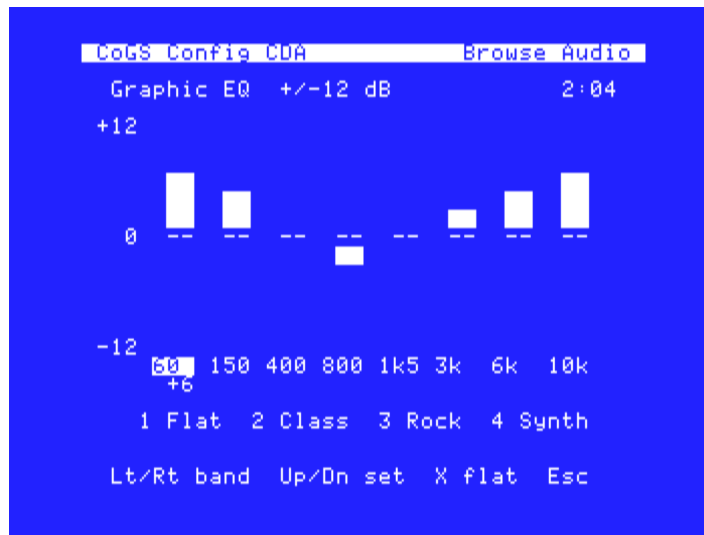


Figure 6-4. The graphic equalizer

The card's + and - keys are the same volume the IIGS Control Panel uses. A change you make here is the system volume.

E opens bass and treble. G opens eight bands from 60 Hz to 10 kHz, each in 2 dB steps. Esc leaves the equalizer and keeps the settings for the session.

Play forces the IIGS to Fast for the session and puts your System Speed back when you stop. Leave System Speed on Fast if you want the rest of the machine that way too.

Stereo tracks play in stereo when a stereo card is present and the machine is fast enough. On a stock IIGS, high-rate stereo is mixed down to mono so it does not drop out. An accelerator keeps real stereo.

Internet radio



Figure 6-5. Internet radio

R on the audio hub opens the station list. Search from that list. Play is the same Now Playing page. The card decodes the stream. Buffering shows as the load bar filling before sound starts.

Playing in the background

B from Now Playing leaves **CoGS Config** and keeps the music going. Open **CoGS Config** again and you land on Now Playing, not the hub. S or Esc stops. A program that takes the sound chip for itself will interrupt playback. Stop from the player before you launch something that needs the Ensoniq.

Sound tools

Programs that call Tool 226 (PCM) or Tool 219 (SoundSmith) work on a boot disk that does not have those files, once the card has loaded them. They stay in memory until restart. You do not copy them onto every boot volume.

Pictures (IIGS)

The card serves box art and title screens for the disks in the catalog and shows them on the IIGS in Super Hi-Res, HGR, and double hi-res. This chapter covers viewing the picture for a disk, browsing the picture catalog, and running a slideshow.

Pictures, like audio, are IIGS only and run from **CoGS Config** after the Finder is up. The Browse Pictures row is not on the card's startup menu. Wait about ten seconds, then Ctrl-OpenApple-Esc and choose **CoGS Config**. Press 5 for **Browse Pictures**.

Box art for a disk

From Browse Disks, press V on a row that shows a V. The still opens in the viewer. Esc or Return leaves it and you are still in Browse Disks.

That is the fast way to see whether a title is the one you meant, without leaving the disk list.

The picture catalog

Browse Pictures opens on **What do you want to see?**

Table 7-1. Browse Pictures hub

Key	Shelf
B	Box art
T	Title screens
S	SHR 320 by 200
H	HGR 280 by 192
D	DHGR 560 by 192
A	All pictures A to Z
L	Find by name (searches the a2cogs catalog)
Y	Your source, when you have saved a pictures URL
M	Misc scanned images, by week

Y opens on the share's folders that hold pictures, then All pictures A-Z and Find (Chapter 9).



Figure 7-1. Your source on the Pictures hub

Return or V opens the still. N and P walk the list. Esc returns to the list.

M is its own store (scanned pictures grouped by week), not part of Find or the A to Z index. Open a week, then N or P to the next week. L from the week list searches every week.

Slideshow

Mark stills in the list, then S. The show walks the marks. Esc stops it and puts you back on the list.

Picture formats

The viewer speaks SHR, HGR, and DHGR. Those are the three format rows on the hub. 3200-color stills are not shown. An 8-bit machine does not have this menu.

Your own stills use the same Image Manager share (Chapter 9). Drop a JPEG, PNG, or the other formats that chapter lists. Image Manager converts each one to a 320 by 200 SHR. If those files are skipped, open **Conversion tools...** in Image Manager and Copy the python3 line. Save the share URL on the Pictures slot of **Image/Audio Source**. Native .shr files go through as-is.

Using the Card from GS/OS

On an Apple IIGS running GS/OS the card is also present on the desktop. This chapter covers **CoGS Config**, the CoGS device in the Control Panels window, the CoGS Status desk accessory, and using the card as the network interface for Marinetti.

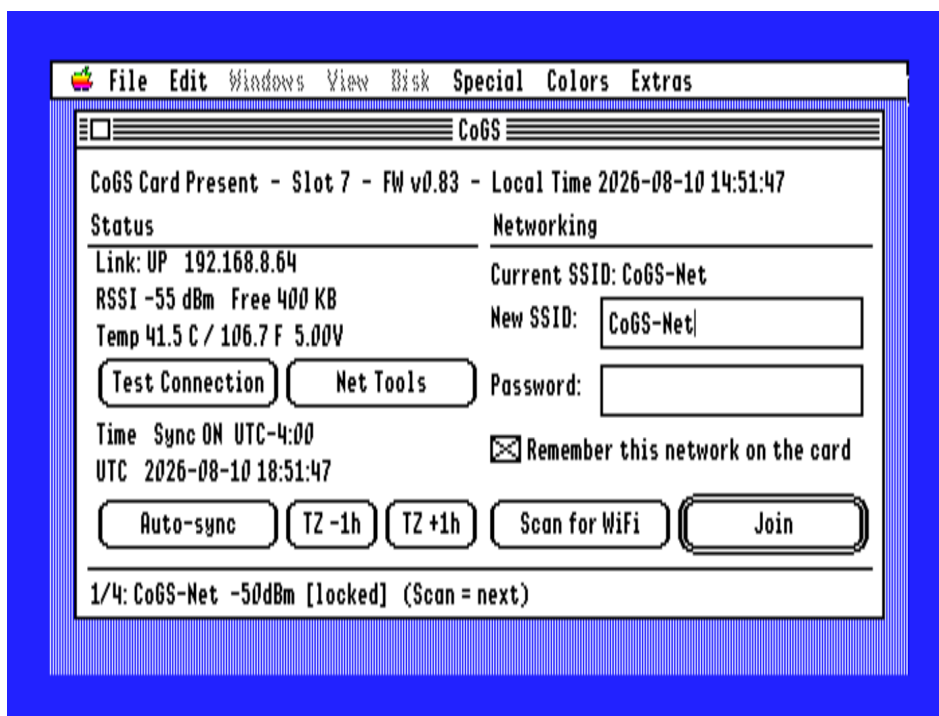


Figure 8-1. The CoGS control panel

CoGS Config

The card installs a classic desk accessory named **CoGS Config**. It is not a file on the boot disk. About ten seconds after the Finder desktop settles, it appears in the Desk Accessories menu (Ctrl-OpenApple-Esc).

If you open that menu too early, **CoGS Config** is not there yet. Leave the menu, wait at the desktop, and open it again. Sitting in the Desk Accessories list will not install it. The card needs the machine to be polling the slot, and the list is a modal that stops that.

The pages inside **CoGS Config** are the same card menu as Chapter 4, plus play for audio and pictures. Use this face for Browse Audio, Browse Pictures, Network Tools, and everyday disk work while GS/OS is up.

WARNING

An older file named `COGS.CDA` (“CoGS Config Console”) in `System:Desk.Accs` predates the card-installed accessory. Delete it. Two CoGS entries in the menu fight each other, and the file one is the obsolete face.

The CoGS Control Panel device

The **CoGS** CDev lives in `System:CDevs` on a boot volume. It is a file. The ready-to-boot disk `cogsall.2mg` already has it. The install kit `cogsutil.2mg` has it for copying onto your own boot disk. `Read.Me` on the kit lists the destinations.

Open **Control Panels** from the Apple menu and choose **CoGS**. The panel is the GS/OS home for status and a few settings. You do not need it for the card to work. **CoGS Config** is enough for disks, audio, and Wi-Fi.

The CoGS Status desk accessory

CoGS Status is a new desk accessory in the Apple menu, file type for `System:Desk.Accs`. It is a small live-status window (link, address, clock) over whatever you are running. Config stays in **CoGS Config** or the CDev.

Marinetti

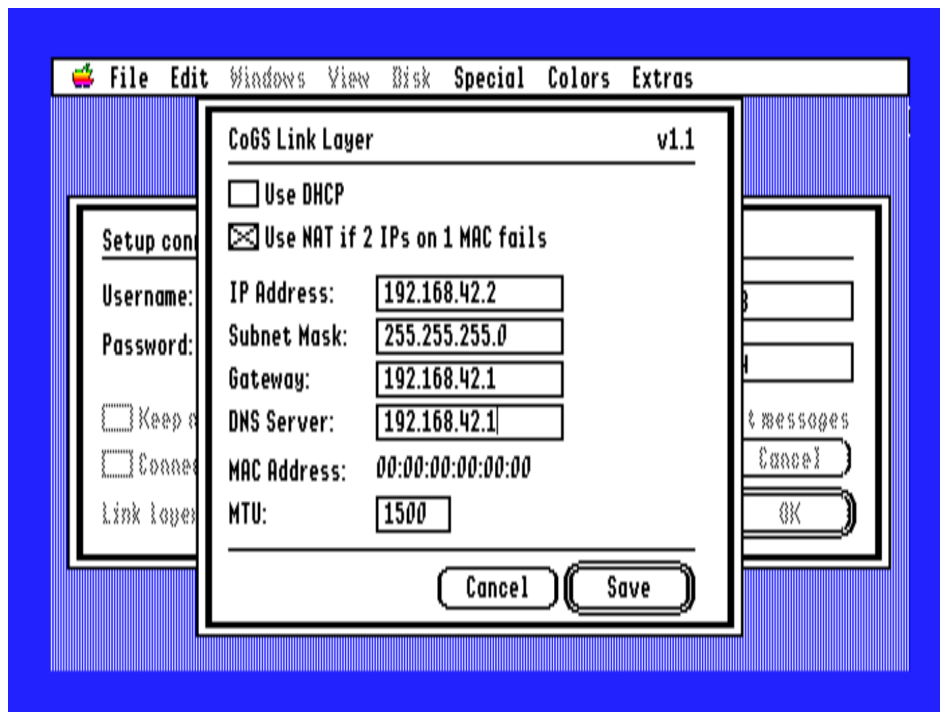


Figure 8-2. Marinetti link layer setup

The card is a slot-native alternative to an Uthernet II for the Marinetti TCP/IP stack. Existing Marinetti programs then run over the card.

1. Copy the CoGS link layer into `System:TCPIP` from `cogsall.2mg` or the install kit.
2. Open the **TCP/IP** control panel.
3. Set the link layer to **CoGS** and Connect.

The IIGS gets its own address on the LAN (the card is a second host). **Card Status** shows an LL line with that address when the link layer is up.

WARNING

Give the GS a different address from the card. If both use the same numbers, each stack resets the other's connections. DHCP on both, or a static on the GS that is not the card's static, is fine.

Spectrum, browsers, mail, and other Marinetti programs then use the card. They do not need a change.

The ready-to-boot disk

`cogsall.2mg` from the Downloads page is a GS/OS volume with the CDev, the Status NDA, and the Marinetti link layer already in place. Boot it from the card (Browse, or a saved boot disk). The card still installs **CoGS Config** itself. You do not add a CDA file to that disk.

Sharing Your Own Disks

The CoGS Image Manager is a program for your Mac that shares one folder, subfolders included, with the card over your local network. The folder can hold three kinds of files: disk images, audio, and pictures. Image Manager converts the modern audio and picture files so **CoGS Config** can play and show them. Disks appear under Browse Disks, tracks under Browse Audio, stills under Browse Pictures, all as **Your source**.

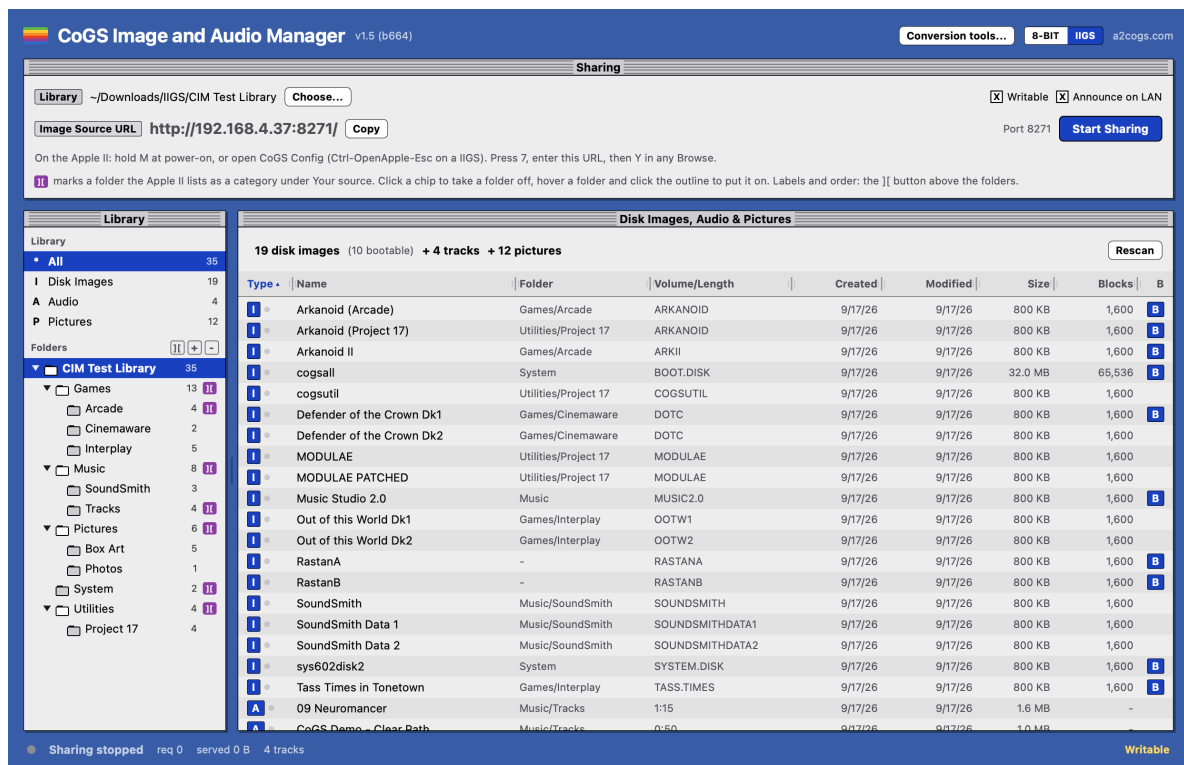


Figure 9-1. The CoGS Image Manager

Installing the Image Manager

Download **CoGS Image Manager** from a2cogs.com (the Downloads page points at the current build). Open the .app. There is no installer and nothing is copied into /Applications unless you drag it there yourself.

The first time macOS may refuse an unidentified developer. Control-click the app, choose Open, then Open again.

The window has two looks, switched with the **8-BIT** and **IIGS** buttons in the title bar. IIGS is the platinum Finder look; 8-bit is green phosphor text on black, in the style of a II+ or IIe screen. The choice is appearance only and is remembered between launches. Nothing about what is shared or how the card sees it changes.

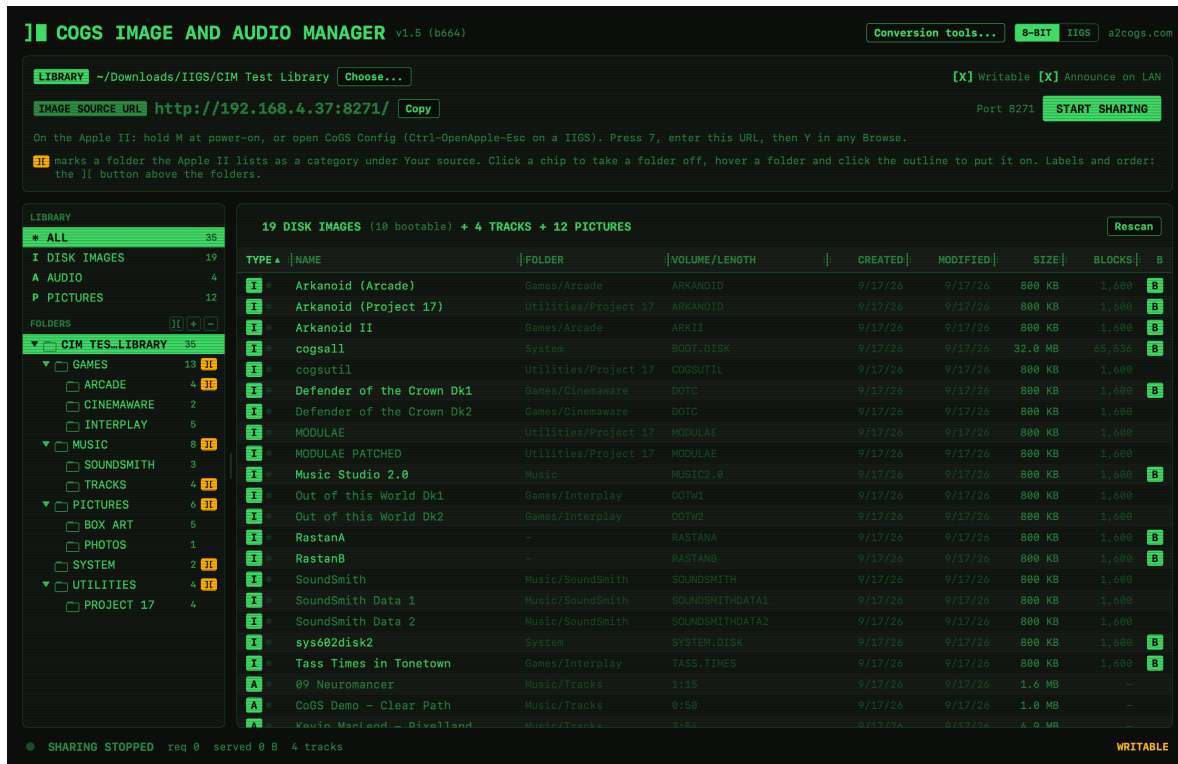


Figure 9-2. The 8-bit look

Disk images work with no extra software. Audio and picture conversion use tools on the Mac. Image Manager does not install those for you. It shows a **Conversion tools** sheet with the commands and a Copy button.

Tools for conversion

Open **Conversion tools...** in the title bar, or Help > Conversion Tools. The sheet also opens the first time you launch Image Manager if ffmpeg or the picture converter is missing. Yellow skip lines in the file list open the same sheet.

Each row is Ready or Need. Copy the Need line, paste it in Terminal, wait until that command finishes, then click **Recheck**. You do not have to quit Image Manager. Disks stay Ready with nothing extra.

Image Manager looks in /opt/homebrew/bin and /usr/local/bin first, so Homebrew's copies are the ones it will see. Apple's /usr/bin/python3 is skipped. It is often a stub that asks for Xcode.

1. Homebrew, if the sheet says Need

The sheet copies this:

```
/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"
```

When it finishes, follow the “Next steps” it prints so brew is on your PATH (on Apple silicon that is usually two lines that add /opt/homebrew/bin to ~/.zprofile). Open a new Terminal window, then Recheck.

2. Audio (MP3, WAV, and the rest)

```
brew install ffmpeg
```

Recheck. The yellow line for skipped mp3/wav should be gone, and those files convert to PCM.

3. Pictures (JPEG, PNG, and the rest)

```
brew install python3 && python3 -m pip install numpy Pillow
```

Recheck. The yellow line for skipped jpg/png should be gone, and those files convert to SHR.

TIP

The sheet also has one line for both conversions after Homebrew is installed:

```
brew install ffmpeg python3 && python3 -m pip install numpy Pillow
```

Then Recheck.

Without ffmpeg, only .pcm audio is shared. Without python3 plus numpy and Pillow, only .shr pictures are shared. Disks are not affected.

Sharing your library

1. Choose the folder. Subfolders are included, so point it at the top of the collection you already keep. Mix disk images, audio, and pictures anywhere under it; the type comes from the file, not the folder.
2. Click **Start Sharing**. Conversion of new audio and pictures runs in the background. A row stays dim until it is ready.
3. Copy the URL the window shows, for example `http://192.168.1.50:8271/`.

The program builds the catalogs the card already understands. Bootable disks get a B in Browse. Writes go back into existing disk images only. Read-only is a checkbox if you do not want that.

The sidebar lists the library by kind (All, Disk Images, Audio, Pictures) and then your folders, as they are on disk. Click one to see only that part; the card always gets the whole library as one A-Z list per kind. If two disk images in different folders would show the same name, the one in the subfolder gets the folder in parentheses on the Apple II, so “Work Disk” and “Work Disk (Project 17)” stay apart. Find on the card matches folder names too.

Your folders on the Apple II

Your folders can be categories on the Apple II. Press Y on any Browse hub and Your source opens on them, one row per folder with a count, then **All A-Z** and **Find by name**. Rows are numbered 1 through 9, then 0, X, Z; the number opens the row, Return opens the highlighted one. A folder lists everything in it and below it, flattened, so `Utilities/Project 17/Disk 1` sits under Utilities. Only folders that hold that kind of file appear, so a folder of pictures is on the Pictures hub and not the Disks hub. Esc from a list returns to your folders; Esc again returns to the a2cogs.com hub.



Figure 9-3. Your source opens on your folders



Figure 9-4. A folder, listed and mountable like any catalog page

Out of the box every top-level folder is a category and deeper folders are not. The purple [I] chip in the sidebar marks the folders the card will show. Click a chip to take that folder off; hover a folder without one and click the outline to put it on. Right-click a folder for the same switch.

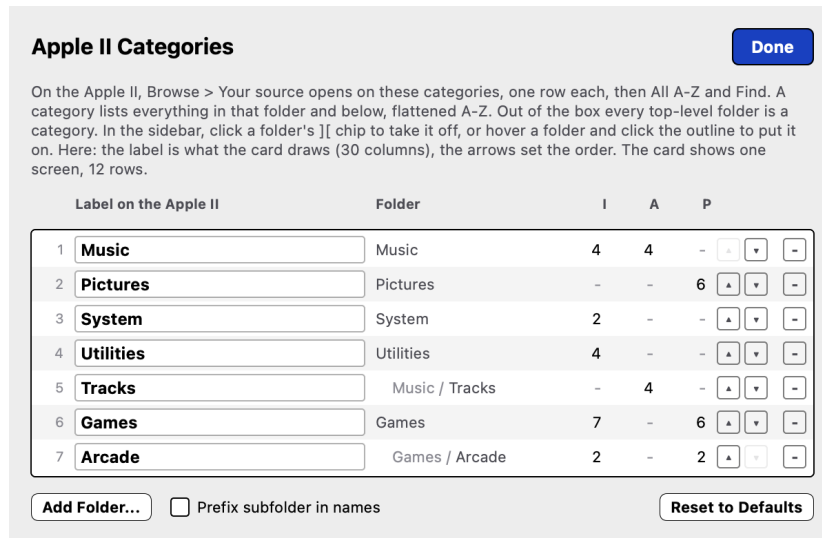


Figure 9-5. Apple II Categories

Apple II Categories (the **⌘I** button above the folder list, or **Help > Apple II Categories**) is the full list. Each row has the label the card draws, prefilled with the folder name, so type over it to rename (“Project 17” can read “Work”). A renamed folder shows its label in quotes beside the folder name in the sidebar. The up and down buttons set the order the card shows, **Add Folder** brings in a nested folder, and **Prefix subfolder in names** makes items below a category carry their subfolder (“Project 17: Disk 1”). The card shows twelve rows, so keep the list to what you reach for; the sheet dims rows past that. **Reset to Defaults** goes back to the top-level folders.

Requires firmware 1.13 or later. Older firmware ignores the categories and Y opens the plain A-Z list.

Right-click a disk image for **Show in Finder** and **Snapshot**. Snapshot copies the disk image next to itself with the date and time in the name, a cheap save point before you try something on the Apple II. The small light beside each row is the drive LED: green while the card reads that file, amber while it writes.

If your router rennumbers the Mac, the URL the card saved stops answering. The card notices on the first fetch: it looks for the share on the LAN while it waits, and when the share turns up at a new address the page says so and Return re-points every saved slot at it. If nothing turns up (Image Manager not running, or the LAN blocks Bonjour), press S on that page to open Image/Audio Source and scan again. A DHCP reservation for the Mac avoids the question. On the Source page, D, A, and P edit the disk, audio, and picture URLs by hand, and C clears all three.

NOTE

The share is for your LAN. It is not an internet server. Keep the a2cogs.com catalog for anything you want reachable off your own network.

What Image Manager converts

The card never sees an MP3 or a JPEG. Image Manager turns those into the formats **CoGS Config** already plays and blits. Conversion happens once on the Mac. The original file stays in your folder. Change the original and Image Manager converts it again.

Disks (no conversion)

Table 9-1. Disk files Image Manager shares

You drop in	The card gets
.2mg	That disk image, block by block
.po	That disk image
.hdv	That disk image (same as .po)

ProDOS-order images only, up to 32 MB. Image Manager does not translate DOS 3.3 or nibble files. A volume that actually boots gets a B in Browse.

Audio (to PCM)

The player wants unsigned 8-bit mono PCM at 21973 Hz, the rate Tool 226 uses. A .pcm file that is already that format is served as-is.

Table 9-2. Audio files Image Manager shares

You drop in	The card gets
.mp3	PCM, same title
.m4a	PCM
.wav	PCM
.aif or .aiff	PCM
.flac	PCM
.ogg	PCM
.pcm	Served as-is

Browse Audio lists the track. Return plays it like a catalog PCM. Stereo sources become mono. The length you see is the PCM length.

Pictures (to SHR)

The viewer blits a 32712-byte Super Hi-Res still (320 by 200, sixteen palettes). A .shr file that is already that blob is served as-is. Everything else is converted to that SHR.

Table 9-3. Picture files Image Manager shares

You drop in	The card gets
.jpg or .jpeg	SHR 320 by 200
.png	SHR
.gif	SHR
.webp	SHR
.bmp	SHR
.tif or .tiff	SHR
.shr	Served as-is

Browse Pictures lists the still. Return or V opens it like catalog box art. The conversion fits the picture into 320 by 200 and reduces it to the IIGS palette. You can tweak saturation, contrast, and dither in Image Manager and reconvert one still without leaving the app.

Image Manager's share is SHR. HGR and DHGR stills in the a2cogs.com catalog are a different source. Drop those native files on a2cogs, not in this folder, if you want those formats.

Pointing the card at your share

1. Open the card menu (hold M at power-on) or **CoGS Config**.
2. Press 7 for **Image/Audio Source**.
3. Enter the URL on the Disks row, the Audio row, and the Pictures row. One URL serves all three.
4. Open Browse Disks, Browse Audio, or Browse Pictures and press Y. Your folders come up first; A is the whole share A-Z.

The card remembers the sources across restarts. Save a row empty to remove Your source for that kind and go back to a2cogs.com only.

Writable disks

With writes allowed, Finder copies, preference files, and game saves land in the disk image on the Mac. Image Manager will not grow a file and will not create one. If a program needs more blocks than the disk image has, use a larger disk image.

Audio and pictures on the share are not written back. Only disk images accept PUTs.

Back up the folder. A share is as easy to overwrite as a floppy.

Using another web server

Any HTTP or HTTPS server that supports range requests can host files the card already understands (the disk images, the PCM, the SHR). The catalog shape is in the *CoGS Technical Reference*. For a folder of MP3s and JPEGs on a Mac, Image Manager is the path that does the conversion so you do not have to.

Updating the Firmware

The card's firmware can be updated from the card's own menu over the network, or by copying a file to the card over USB. This chapter covers both, and how to see which version is installed.

Settings survive an update. The saved network, disk image and media sources, boot volume, and extra mounts stay.

Finding the installed version

From the card menu or **CoGS Config**, press 0 for **About / Update**. The first status line is the firmware version and its date.

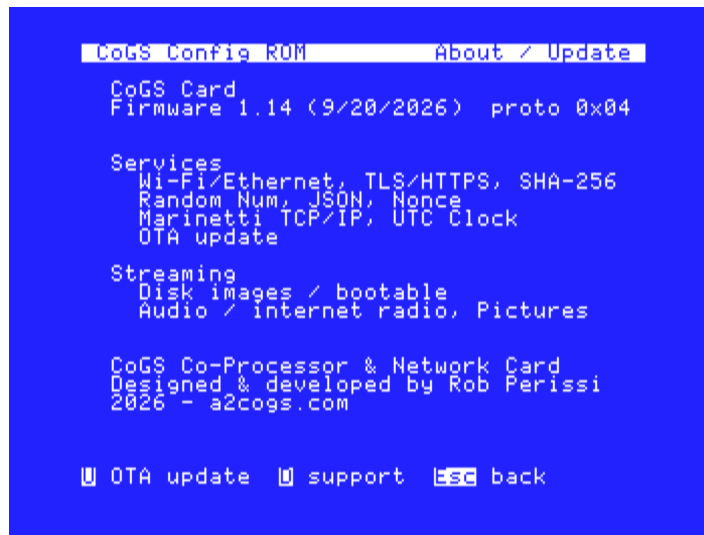


Figure 10-1. About and Update

Updating from the menu

You need a live network.

1. On **About / Update**, press U.
2. The card fetches the list from a2cogs.com.
3. Pick a version and Return. The card downloads the firmware, writes it, and restarts.

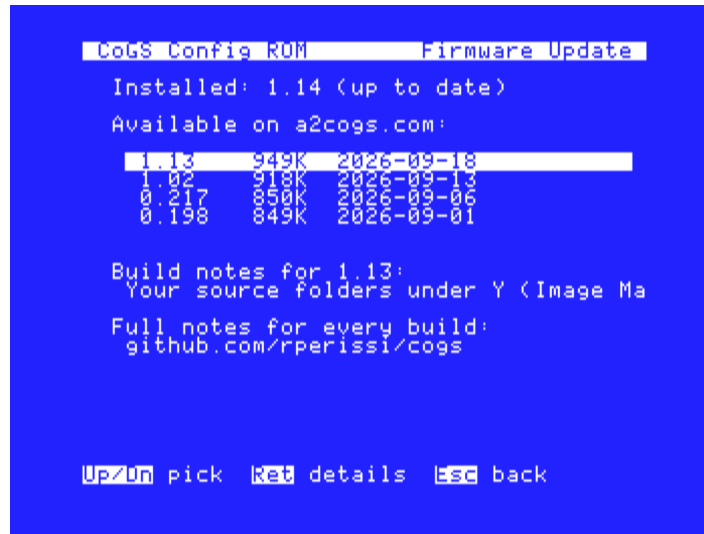


Figure 10-2. Firmware update list

Stay on that page until it tells you to restart the Apple II. A typical update is a few seconds of download and a short write. Esc cancels before the write starts.

The in-menu list is the published builds. A bench build that is not on a2cogs.com will not appear here. Use USB for those.

Updating over USB

1. Download `cogs-<version>.uf2` from a2cogs.com or the GitHub Releases page. Use the file that matches this card (the shipping card is the Pico 2 W radio build).
2. The first time a Pico has ever been flashed, hold the **BOOTSEL** button on the Pico while you plug USB into a computer. A drive named `RP2350` appears. Copy the UF2 onto it. The drive closes and the card restarts.
3. After that first flash, you do not need BOOTSEL. The in-menu updater is the usual path. If the menu updater cannot run, hold BOOTSEL again and copy the UF2 the same way.

WARNING

Flash the radio build on this card. A Lite or USB-bridge UF2 uses a different bus map and the Apple II will not see the card.

If an update fails

The card is still the previous firmware if the write never started. Try the menu updater once more after a power cycle.

If the card no longer answers the Apple II after a write, recover with USB and BOOTSEL. Copy a known-good UF2 from the Downloads page. Settings in flash usually survive. If they do not, join Wi-Fi and mount disks again (Chapter 2).

A failed download (network drop) does not reflash. Restart the GS and the card, then retry.

Troubleshooting

This chapter lists the problems you are most likely to meet, what causes them, and what to do. Start with the first section, which covers the checks that solve most problems.

First checks

1. The computer is off when you reseal the card. Then power on.
2. On a IIGS, the CoGS slot is **Your Card** and, if you want to boot from it, **Startup Slot** is that number.
3. **Card Status** (press 8, or hold M at power-on first) shows a Wi-Fi or Ethernet address.
4. **Clock & Time** shows time synced if you are about to use Browse or HTTPS.
5. You are not waiting inside the Desk Accessories list for **CoGS Config**. Leave it, wait at the Finder, open it again.

The computer does not see the card

Table 11-1. Card not seen

What you see	What to do
IIGS starts from another slot	Set Your Card and Startup Slot . Restart.
No menu when you hold M or C	Reseat the card. Confirm the slot number. Try PR#n on a //e.
Menu appears, About shows no version	Power cycle the computer. If it stays blank, recover firmware over USB (Chapter 10).
GS/OS desktop, no CoGS drives	The boot disk is not the card, or the mounts are empty. Hold M, check Disk Drives.

A finished card ships with firmware. A carrier you assembled yourself needs a UF2 on the Pico before any of the above can work.

The card cannot join Wi-Fi

The radio is 2.4 GHz WPA2. A 5 GHz-only network will not appear. A hidden SSID can be typed on the Wi-Fi page after a scan fails.

Wrong password is the usual miss. Passwords are case sensitive. F forgets the saved network so you can join again.

Ethernet with a link and an address skips Wi-Fi. Unplug the cable if you meant to test radio.

Browse shows no catalog

Join the network first. If **Card Status** says time is still syncing, wait. HTTPS waits on that clock.

If a2cogs.com is blocked on your LAN, set **Image/Audio Source** to a local share (Chapter 9). Browse then uses Your source. The hub may fall back to a plain list.

A disk will not boot

Table 11-2. Disk will not boot

What you see	What to do
No B on the row	That disk image is not a self-booting ProDOS volume. Mount it as data with a digit.
Boot starts, then hangs	Try another title. Confirm Card Status still has an address.
Same disk image on two drives	Clear one. The card will not mount a duplicate.
8-bit machine, GS title	Use the 8-bit list, or a title marked 8b.
ProDOS 8 does not see a new drive	Restart from the CoGS slot. GS/OS sees live mounts.

Audio problems

Wait for **CoGS Config** to appear, then open Browse Audio from there, not from a file CDA.

If play is choppy, System Speed was Normal. Play forces Fast for the session. After you stop, set Fast in the IIGS Control Panel if you want it to stay.

A program that owns the Ensoniq will cut off background play. Stop from the player first.

Delete COGS.CDA if both that file and **CoGS Config** are in the menu.

CoGS Config is missing

This is expected for about ten seconds after the Finder appears, and the whole time you sit in the Desk Accessories menu. Go back to the desktop. Open the menu again.

If it never appears, the card is not being polled (wrong slot setting, or the machine never reached a desktop that talks to the slot). Boot a disk from the card so GS/OS sees the drives.

Messages

These are the lines you will see most often.

Table 11-3. Common messages

Message	Meaning
Wi-Fi connected with an address	Join succeeded.
Time: syncing... (HTTPS waits on it)	Clock is not set yet. Wait before Browse.
Path: Ethernet (Wi-Fi is fallback)	The cable is the live path.
Not saved: that image is on drive n	Duplicate mount refused.
Not a bootable image	Return on a data disk. Mount it with a digit.
CoGS settings cleared	Factory Reset finished. Firmware is unchanged.
LL: ... = CARD IP! use another	Marinetti and the card share one address. Change one of them.
Your source moved	The Mac's address changed. Save the new URL.

Specifications

Card

Table 12-1. Card specifications

Item	Specification
Host computers	Apple][+, Apple //e, Apple IIGS. Any slot 1 to 7
Processor	Raspberry Pi Pico 2 W (RP2350, 200 MHz, 520 KB SRAM, 4 MB flash)
Wi-Fi	802.11n, 2.4 GHz, WPA2
Ethernet	10/100BASE-T, RJ45 (W5500)
Bus interface	Three 74LVC245 transceivers, sixteen I/O registers, slot and shared ROM
Update	Over the network from the card menu, or USB (UF2)

Disk

Table 12-2. Disk specifications

Item	Specification
Interface presented	SmartPort / ProDOS block device
Disk image formats	2MG, ProDOS-order PO and HDV
Volume size	Up to 32 MB per disk image
Drives	Eight units. Four in slot 3, and four on an 8-bit host
Sources	a2cogs.com catalog, any HTTP(S) server with range requests, Image Manager

Audio and pictures (IIGS)

Table 12-3. Audio and picture specifications

Item	Specification
Audio output	Ensoniq DOC through the IIGS audio output. Stereo with a stereo card
Audio formats	SoundSmith songs. PCM tracks. Internet radio decoded on the card
Tool sets	Tool 226 and Tool 219, supplied by the card
Picture viewer	Super Hi-Res 320 by 200, HGR 280 by 192, double hi-res 560 by 192
Not shown	3200-color stills

Appendix A. Credits and Licenses

The CoGS project

CoGS is an open source, open hardware project. Firmware, card ROM, GS/OS software, and hardware design files are published at github.com/rperissi/cogs. Designed and developed by Rob Perissi.

Hardware

The bus interface follows the A2Pico design: firmware library by Oliver Schmidt (MIT), hardware by Ralle Palaveev. The a2cogs catalog is built on the What is the Apple IIGS? collection and 4am's Total Replay.

Software included on the card

Table A-1. Included software

Component	Author	License
Tool 219, SoundSmith player	Huibert Aalbers and FTA; v2.1 by Brutal Deluxe Software	Freeware, unmodified
Tool 226, PCM player	Derived from Petar Puskarich's Tool225, on NinjaTracker Plus (Ninjaforce, Brutal Deluxe, FTA)	Used with permission
pico-sdk, lwIP, mbedTLS, minimp3	Raspberry Pi, the lwIP project, Arm, Lion	BSD-3, BSD-3, Apache-2.0, CC0

Catalog content

Disk images in the a2cogs.com catalog are mirrored from public archives and identified by source in the Browse screen. Audio tracks carry their attributions in the audio catalog.