RETRO ENDEAVORS

Game I/O++ Adapter

User manual · firmware 0.9.3

For the Apple][,][+, //e and IIgs
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retroendeavors.com

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1 Introduction

What the adapter does, and what this manual covers.

The Game I/O++ Adapter plugs into the 16-pin GAME I/O socket of an Apple][,][+, //e or IIgs and lets it use modern game controllers: **Bluetooth controllers** such as the Xbox Wireless Controller and the DualShock 4, **USB controllers**, and **mice**. To the Apple, the adapter is four paddles (or a joystick) and the push buttons, so existing games work unchanged. It can also act as a **Sirius Joyport** with two Atari-style joysticks.

Most people only need a controller. A Mac or Windows computer is useful for changing settings and installing firmware updates. For that the adapter has a **console**: a text window on the computer where you type commands and the adapter answers. There are two ways to open it:

- **The Game I/O++ Console program** for Windows or Mac, downloaded from retroendeavors.com. It connects over a **USB cable** or over **Bluetooth**, and is needed for firmware updates. This is the recommended way.
- **A terminal program** you may already have - PuTTY on Windows, or the Terminal app on a Mac - connected over a **USB cable**. Every console command works this way too.

In this manual

- **Installing the adapter** and **Precautions** (chapters 2 and 3).
- **Pairing controllers**, **playing** in Apple and Atari modes, **USB controllers** and the **keyboard link** (chapters 4 to 7).
- **The Game I/O++ Console program**, **which Bluetooth pairing window** your computer needs, and **connecting a computer** over Bluetooth (chapters 8 to 10).
- **The console**: how commands work, every command, and the settings (chapters 11 to 13).
- **Firmware updates** and **troubleshooting** (chapters 14 and 15), and a one-page **quick reference** at the end.

This edition describes firmware 0.9.3. Controller buttons are named as on an Xbox controller (A, B, X, Y, View); on a DualShock 4 they are Cross, Circle, Square, Triangle and Share.

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2 Installing the adapter

Fitting the adapter in the Apple.

To be written. Fitting the adapter into the GAME I/O socket on the][,][+, //e and IIgs (pin 1 and orientation on each), routing the USB cable out of the case, and the keyboard link cable from a Keyboard][++.

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3 Precautions

Handling and safety.

To be written. Power off before plugging or unplugging anything inside the Apple; static; orientation of the adapter in the socket; the USB port is for a powered hub, not for powering other devices.

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4 Pairing controllers

Connecting a Bluetooth controller to the adapter, once.

A Bluetooth controller pairs with the adapter once; after that, switching the controller on connects it. No codes need typing. Up to two Bluetooth controllers can be connected at once, and four controllers in all with USB ones (chapter 6).

Putting a controller into pairing mode

CONTROLLER	PAIRING MODE
Xbox Wireless Controller	Hold the small pair button on top until the Xbox button flashes fast.
DualShock 4 (and clones)	Hold Share and the PS button until the light bar flashes.
Other controllers	See the controller's instructions; most have a pairing button or combination.

Three ways to pair

- **The first time:** while nothing is paired yet, the adapter looks for a controller in pairing mode by itself for 2 minutes after the Apple is switched on. Put the controller into pairing mode and wait for it to connect.
- **The BOOTSEL button:** a short press of the button on the adapter's Pico looks for a controller in pairing mode for up to 2 minutes and pairs the first one found. The light blinks fast meanwhile.
- **On the console:** `pair` searches for 10 seconds and lists the controllers found, numbered: type the number of yours (`Esc` cancels). `pair auto` pairs the first one found.

The light on the adapter blinks while no controller is connected, and stays on once one is.

Good to know

- `list` shows the paired controllers and computers, numbered; `forget` and a number forgets one, `forget` alone forgets them all (both ask first).
- **An Xbox controller paired with another device** (a Windows PC, a console) since it last connected to the adapter has lost its pairing with the adapter: the console says so. Pair it again. If Windows pops up a pairing message while you pair an Xbox controller near it, dismiss it.
- `bt off` switches Bluetooth off, controllers and computers alike; `bt on` switches it on again.
- `signal` shows the signal strength of each controller every second (again to stop): useful inside a closed case, such as the IIgs's.

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5 Playing: Apple and Atari modes

What each control does on the Apple.

The adapter starts in **Apple mode** every time the Apple is switched on: paddles and push buttons, as the Apple's own joystick. **Atari mode** makes it a Sirius Joyport with Atari-style joysticks, for the games written for one.

To switch, on any controller hold **View** (Back, or Share on a DualShock 4) and press **D-pad Up** for Apple mode or **D-pad Down** for Atari mode. On the console: `mode apple` or `mode atari`.

Apple mode

CONTROLLER	ON THE APPLE
Player 1 left stick, left/right and up/down	Paddles 0 and 1 (the joystick)
Player 1 right stick	Paddles 2 and 3, when there is no player 2
Player 1 D-pad	Paddles 0 and 1 at full travel (setting `dpad`)
A, B, X, Y	Buttons 0, 1, 2 and 3
Left and right triggers	Buttons 0 and 1
Player 2 left stick and D-pad	Paddles 2 and 3
Player 2 A, B	Buttons 2 and 3

Button 3 exists only on the IIgs. Paddle values run from 0 to 255 and the ends read exactly; the centre of a stick has a small dead zone (setting `deadzone`) so a resting stick reads as centred.

Players are numbered in the order the controllers connect, USB ones included.

Atari (Joyport) mode

Player 1 is joystick 1 and player 2 is joystick 2. The D-pad or the left stick gives the directions; A, B or a trigger is fire.

Mice

MOUSE	ON THE APPLE
Movement	Paddles 0 and 1, like turning paddle knobs
Left, right and middle buttons	Buttons 0, 1 and 2

The setting `mousespeed` sets how far the mouse moves for each paddle step.

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6 USB controllers and the USB port

Wired controllers, and how the adapter chooses what its USB port is for.

The adapter's USB port is the micro-USB socket on its Pico. It does one of two jobs, chosen when the Apple is switched on:

WHEN THE APPLE IS SWITCHED ON	THE USB PORT IS
A computer is connected to it	The **console**, for the computer (chapter 11)
Anything else, or nothing	A port for **USB controllers**; the console is then on Bluetooth only

So connect the computer before switching the Apple on. `usb` on the console says what the port is doing; `usb host` and `usb console` restart the adapter with the port in that role until the Apple is switched off (they ask first).

Connecting USB controllers

Controllers connect through a **USB OTG adapter** (micro-USB to USB-A) and a **powered USB hub**, even for a single controller: the adapter gives the hub only a little power, for its connection, not for the controllers.

WORKS OVER USB	
Game controllers that are standard USB devices	DualShock 4 and clones, most generic pads
Xbox One and Xbox Series controllers	With a USB cable
Xbox 360 wired controllers	The player light shows the player number
Xbox 360 wireless receiver for Windows	Up to four controllers
Mice	As over Bluetooth (chapter 5)

Keyboards are not used by the adapter.

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7 The keyboard link

Open Apple, Closed Apple and Shift from a Keyboard][++ on an Apple][or][+.

The Apple][and][+ have no Open Apple and Closed Apple keys: on later Apples they are wired to buttons 0 and 1. With a **Keyboard][++ Adapter** connected to the Game I/O++ by its link cable, the keyboard's Open Apple and Closed Apple keys press buttons 0 and 1, and Shift held down sets button 2 as the "shift key modification" expects.

The link works in Apple mode. It is on by default; `kblink off` switches it off.

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8 The Game I/O++ Console program

A console for the adapter on Windows and on a Mac.

Game I/O++ Console opens the adapter's console in a window. It also installs firmware updates, which a general-purpose terminal program (such as PuTTY or the Mac's Terminal, see the end of this chapter) cannot, and it is the best way to use the console over Bluetooth.



The program's icon

Getting it

Download Game I/O++ Console from the Game I/O++ page at **retroendeavors.com** (under *Products*), or from its *Downloads* page. There are three versions:

DOWNLOAD	FOR
Windows (`.exe`)	Windows 10 or 11, 64-bit
Mac, Apple silicon (`.dmg`)	Macs with an M1 or later chip; macOS 11 Big Sur or later
Mac, Intel (`.dmg`)	Macs with an Intel processor; macOS 11 Big Sur or later

To see which Mac you have, choose *Apple menu* > *About This Mac*: "Chip: Apple M..." is Apple silicon, and "Processor: ... Intel ..." is an Intel Mac. The same window shows the macOS version (Big Sur is version 11). On Windows, *Settings* > *System* > *About* shows the edition and "64-bit operating system".

> **The first time you open it**, Windows or macOS warns you about it. Game I/O++ Console is not yet signed by Microsoft or Apple, which is common for programs from small makers. Follow the steps below once; after that it opens normally.

Installing on Windows

1. Download the `.exe` file. If your web browser warns that the file is not commonly downloaded, keep it: in Microsoft Edge, choose **...** next to the download, then **Keep**, then **Show more**, then **Keep anyway**.
2. Move it from your Downloads folder to wherever you like to keep it, such as your Documents folder or the desktop.
3. Double-click it. The first time, Windows says *"Windows protected your PC"*. Click **More info**, then **Run anyway**. Windows remembers this, so it does not ask again.

Game I/O++ Console opens in a console window. If it stops with a message, for example because the adapter was not found, the window stays open until you press Enter.

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Installing on a Mac

1. Double-click the downloaded `.dmg` file. A window opens with Game I/O++ Console, a shortcut to the Applications folder, and a *Read Me First* file holding these same steps.
2. Drag **Game IO++ Console** onto **Applications**. (That is Game I/O++ Console's name in Finder: a Mac file name can't hold a slash.)
3. Open **Terminal** (in *Applications* > *Utilities*), paste this line into its window and press Return:

   ```
   xattr -dr com.apple.quarantine "/Applications/Game IO++ Console.app"
   ```

   It prints nothing when it works. If it says *Permission denied*, paste it again with `sudo` and a space in front, press Return, and type your Mac's password.
4. Eject the disk with the eject button beside it in Finder's sidebar.
5. Open Applications and double-click **Game IO++ Console**. It opens in a Terminal window.

Why step 3: Game I/O++ Console is not yet signed by Apple. Without that step, macOS refuses to open it, or keeps its icon bouncing in the Dock. The command tells macOS you trust this program. You only do it once, and again after installing a newer version.

The first time Game I/O++ Console uses Bluetooth, macOS asks whether it may: choose **Allow**. (If you said no, turn it on in *System Settings* > *Privacy & Security* > *Bluetooth*.)

Connecting

CONNECTION	WINDOWS	MAC
USB cable	Yes	Yes
Bluetooth	Yes, after pairing (chapter 10)	Yes, after pairing (chapter 10)

For the **USB cable**, connect the adapter's micro-USB socket to your Windows or Mac computer **before switching the Apple on** (chapter 6). Then start the program. The first time, if it finds more than one possible connection, it lists them and asks which to use; after that it remembers the choice.

To change connection - for example, from the USB cable to Bluetooth - press `F3` in the program: it lists the connections it can see, marks the one in use, and you type the number of the one you want. The new choice is remembered for next time. If the remembered connection is not there when the program starts, it lists the others instead.

Over **Bluetooth Low Energy**, the program connects only to a Game I/O++ adapter, even with other Retro Endeavors adapters (a Keyboard][++, say) switched on nearby, and remembers which one.

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In the program

Everything you type goes to the adapter, which answers in the window (chapter 11). The function keys belong to the program:

KEY	ACTION
`F1`	This help.
`F3`	Choose another connection: USB cable or Bluetooth.
`F5`	Update the adapter's firmware (chapter 14).
`F9`	Third-party software notices (chapter 16).
`F10`	Quit.

> **On a Mac**, function keys usually need `fn` held down (`fn`+`F10` quits).

If the connection drops - the Apple was switched off, or the computer moved out of Bluetooth range - the program says so and reconnects by itself when the adapter is back. `F10` still quits at once.

Using a terminal program instead

Over a USB cable the adapter appears to the computer as a serial port, so any terminal program can open the console. Commands and settings work the same way; firmware updates need Game I/O++ Console.

Windows: PuTTY

1. Connect the USB cable, then switch the Apple on. In *Device Manager > Ports (COM & LPT)*, note the new **USB Serial Device (COM*n*)**.
2. In PuTTY choose **Serial**, type that port (for example `COM5`) under **Serial line**, and click **Open**. The speed setting does not matter.
3. Press Enter to get the adapter's prompt.

Mac: Terminal

1. Connect the USB cable, switch the Apple on, and open **Terminal** (in *Applications > Utilities*).
2. Find the adapter's port: type `ls /dev/*.usbmodem*` and press Return. It is named like `/dev/cu.usbmodem1101`; the number differs from Mac to Mac.
3. Type `screen`, a space and that name - for example `screen /dev/cu.usbmodem1101` - and press Return, then press Return again to get the adapter's prompt.
4. To leave, press `Ctrl`+`A`, then `K`, then `Y`.

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9 Which pairing window do I use?

Low Energy for the Console program; Classic for a serial port.

A computer pairs with the adapter during a two-minute **pairing window**, opened from the console **over the USB cable**: the cable is needed once, to pair. There are two kinds. For Game I/O++ Console, on Windows and on a Mac alike, use the **Low Energy** window: the program then pairs by itself, with nothing to set up in the computer's Bluetooth settings. The **Classic** window is for a computer whose Bluetooth has no Low Energy, and for a terminal program that uses a Bluetooth serial (COM) port.

IF YOU USE	OPEN THIS PAIRING WINDOW	ON THE CONSOLE
Game I/O++ Console, on Windows or a Mac	**Low Energy**	`L`
An iPhone or iPad app	**Low Energy**	`L`
A computer without Bluetooth Low Energy, or a terminal program over Bluetooth	**Classic** (serial port)	`P`

Each window stays open for 2 minutes, and opening one closes the other.

A computer is paired **one way at a time**, Classic or Low Energy: pairing it the other way replaces its first pairing, on the adapter and in the computer's Bluetooth settings alike. When a window opens, the console names any computer already paired the other way.

Does my computer have Bluetooth Low Energy?

- **Mac:** yes. Every Mac that can run Game I/O++ Console (macOS 11 Big Sur or later) has Bluetooth Low Energy built in.
- **Windows PC:** almost certainly, if its Bluetooth is less than about ten years old. To check, open *Device Manager* and expand *Bluetooth*: a PC with Low Energy lists *Microsoft Bluetooth LE Enumerator*. If it is not there, use the Classic window or the USB cable.

If you opened the wrong window

WHAT YOU SEE	WHAT HAPPENED, AND WHAT TO DO
Game I/O++ Console cannot find the adapter over Bluetooth Low Energy, or says the computer has to pair first	The Low Energy window was not open. Type `L` on the USB console and choose *ble* with `F3` within 2 minutes.
The adapter was added in the computer's Bluetooth settings, but no Bluetooth serial port appears for it	The computer paired during the Low Energy window, which gives no serial port. Remove the adapter in the Bluetooth settings, then add it again during the Classic window (`P`).

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10 Connecting a computer over Bluetooth

Pairing once with the cable, then connecting without it.

Pairing with Game I/O++ Console (Windows or Mac)

1. Connect the USB cable, switch the Apple on, and start Game I/O++ Console: it connects over the cable.
2. Type `L` and Enter. The Low Energy pairing window is open for 2 minutes.
3. Press `F3` (`fn`+`F3` on a Mac) and choose *ble* (Bluetooth Low Energy). The program finds the adapter, pairs the computer and connects; on Windows it says *Pairing this PC with the adapter*.
4. On a Mac, if macOS asks whether the program may use Bluetooth, choose **Allow**; if it asks to confirm the pairing, accept. If the 2 minutes ran out meanwhile, press `F3`, go back to the USB cable, and start again.

Nothing needs doing in the computer's Bluetooth settings. Afterwards the computer connects over Bluetooth whenever the program starts, and the cable is no longer needed. (Windows then lists the adapter in *Settings > Bluetooth & devices*; that is normal.)

Pairing for a serial port: Classic window

For a computer whose Bluetooth has no Low Energy, or for a terminal program such as PuTTY over Bluetooth. The computer pairs in its own Bluetooth settings and gets a Bluetooth serial port for the adapter.

On Windows:

1. Open *Settings > Bluetooth & devices*, choose **Add device**, then **Bluetooth**. Leave the list open: Windows is now searching.
2. On the console, over the USB cable, type `P` and Enter. The Classic pairing window is open for 2 minutes, and the adapter appears in the list as **Game I/O++** within a few seconds.
3. Choose it. Windows pairs and says *Your device is ready to go*, then shows the adapter as *Not connected*. **That is normal:** Windows only connects when a program opens the adapter's serial port.
4. In Game I/O++ Console, press `F3` and choose the port marked *Bluetooth to Game I/O++*, or open the adapter's Outgoing COM port in your terminal program.

Windows makes two Bluetooth serial ports for the adapter. Use the **Outgoing** one (Game I/O++ Console finds it by itself); the **Incoming** one is never used and can be removed.

On a Mac:

1. Open *System Settings > Bluetooth* (*System Preferences > Bluetooth* on macOS 11 and 12).
2. On the console, over the USB cable, type `P` and Enter. The adapter appears in the list as **Game I/O++** within a few seconds.
3. Click **Connect** beside it. The Mac pairs, then shows the adapter as *Not Connected*. **That is normal.**

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4. In Game I/O++ Console, press `fn`+`F3` and choose */dev/cu.GameIO*, marked *Bluetooth serial port (Classic)*.

Good to know

- One computer can use the console over Bluetooth at a time, alongside up to two Bluetooth controllers.
- The console over Bluetooth is on by default; `btcon off` switches it off (and `btcon on`, over the USB cable, on again).
- `list` shows paired controllers and computers; `forget` forgets them. After `forget`, remove the adapter on each computer that was paired before pairing it again.

If pairing does not work

The usual cause is that the computer still remembers an earlier pairing with the adapter, while the adapter has forgotten it (after `forget`, for instance). To pair afresh:

1. On the computer, remove the adapter. On Windows: *Settings* > *Bluetooth & devices*, remove every *Game I/O++* entry. On a Mac: *System Settings* > *Bluetooth*, click ⓘ beside *Game I/O++* (it may be listed twice), then **Forget This Device**.
2. Pair again as above, over the USB cable.

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11 Using the console

How commands work.

On connecting, the adapter shows its firmware version and a `>` prompt:

```
[Game I/O++ Adapter 0.9.3 v3 ready – help (?) for the commands, status (s)]
>
```

Commands end with Enter

Type a command and press **Enter**. Nothing happens until Enter, so text typed by mistake does no harm: the adapter just says it is not a command. `Backspace` corrects a mistake, and `Ctrl`+`U` clears the line.

- Commands are words: `status`, `save`, `forget`.
- Many have a short form, which must be typed exactly as shown: `s` is status, `D` is diag.
- Settings take a value: `dpad off`, `deadzone 10`. A setting typed without a value shows what it is now.

Commands that ask first

A few commands are easy to regret: `forget`, `bootsel`, `usb host` and `usb console`, and switching Bluetooth or the console over Bluetooth off while connected over Bluetooth. They ask first:

```
> forget
That forgets every paired controller and computer. Each computer then
has to remove the adapter in its Bluetooth settings and pair again.
Go ahead? Type y and Enter (anything else cancels). 'forget now' skips this question.
```

Type `y` and Enter to go ahead; anything else cancels. Adding `now` to the command skips the question: `forget now`.

While `pair` is showing a list of controllers, type a controller's number to choose it, or press `Esc` to cancel.

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12 Command reference

Every console command.

Help and status

COMMAND	SHORT	WHAT IT DOES
`help`	?	List the commands.
`status`	s	Version, controllers, USB port, Bluetooth, settings.
`diag`	D	Firmware, board, clock, time since start, last restart.
`pads`		What each controller is doing now.

Controllers (chapters 4 and 5)

COMMAND	SHORT	WHAT IT DOES
`pair`		Search for a controller in pairing mode, choose by number.
`pair auto`		Pair the first controller found (as the BOOTSEL button).
`list`	k	Paired controllers and computers, numbered.
`forget` *N*		Forget entry N of the list (asks first).
`forget`		Forget every pairing (asks first).
`mode apple|atari`	m	Apple mode, or Atari (Joyport) mode.
`signal`		Signal strength of each controller and computer, every second.

Computers and Bluetooth (chapters 9 and 10)

COMMAND	SHORT	WHAT IT DOES
`L`		Low Energy pairing window, for Game I/O++ Console (2 minutes).
`P`		Classic (serial port) pairing window (2 minutes).
`bt on|off`		Bluetooth.
`btcon on|off`		The console over Bluetooth.

Settings (chapter 13)

COMMAND	SHORT	WHAT IT DOES
`deadzone` *PCT*	dz	Stick dead zone.
`dpad on|off`		The D-pad also moves paddles 0 and 1.
`mousespeed` *N*	ms	Mouse speed.

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`kblink on|off`	kb	The keyboard link.
`save`		Keep the settings after power-off.
`factory`	x	Back to the default settings (not kept until `save`).

USB port (chapter 6)

COMMAND	SHORT	WHAT IT DOES
`usb`		What is on the USB port.
`usb host`		Restart with the port for controllers (asks first).
`usb console`		Restart with the port as the console (asks first).

Firmware (chapter 14)

COMMAND	SHORT	WHAT IT DOES
`update`	U	Receive a firmware update (Game I/O++ Console's F5 does this for you).
`bootsel`		Restart ready for a firmware file to be copied on (asks first).
`trace on|off`		Show every report a controller sends (for fault finding).

The adapter also has service commands for testing and calibrating the paddle circuits (`service` lists them). They are for Retro Endeavors support; changing them can make the paddles read wrongly. `factory` puts them back.

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13 Settings

How the adapter behaves, and how to keep it.

Changes take effect immediately but are not stored permanently until you enter `save`. Unsaved changes are lost when the Apple is switched off. `status` lists all the settings and says whether they are saved.

SETTING	WHAT IT DOES	DEFAULT
`deadzone` *PCT*	**Stick dead zone**, 0-50 %: how far a stick moves from the centre before the paddle value changes.	8
`dpad on|off`	**D-pad paddles.** In Apple mode, player 1's D-pad also moves paddles 0 and 1 to full travel (player 2's, paddles 2 and 3).	on
`mousespeed` *N*	**Mouse speed**, 1-64: mouse movement per paddle step (times 4).	8
`kblink on|off`	**Keyboard link** from a Keyboard][++ (chapter 7).	on
`bt on|off`	**Bluetooth.** Off: the radio stays off; USB controllers still work.	on
`btcon on|off`	**Console over Bluetooth** for a paired computer.	on

`factory` puts every setting back as above, without saving; `save` then makes that the power-on state. Pairings are not affected by either. Apple or Atari mode is not a setting: the adapter always starts in Apple mode.

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14 Firmware updates

Installing new firmware.

With Game I/O++ Console

1. Connect Game I/O++ Console to the adapter, by USB cable or Bluetooth. The computer needs to be on the internet.
2. Press F5. The program asks retroendeavors.com for the newest firmware.
3. If there is newer firmware, the program shows its version and what is new, and asks *Install it?* Type `y` and Enter. If the adapter already has the newest firmware, the program says so; press Enter.

The program downloads the firmware and sends it to the adapter. The adapter checks that it is genuine Retro Endeavors firmware for this adapter, installs it, and restarts (about 10 seconds, during which the controllers do not respond). Then the program reconnects and confirms the new version. Settings and pairings are kept. If anything goes wrong, the adapter keeps its current firmware.

The program checks for new firmware only when F5 is pressed, never by itself. If it says the connection reaches another adapter (a Keyboard][++, say), press F3 and choose the Game I/O++.

From a file

If Retro Endeavors support (**retroendeavors.com/contact**) sends you a firmware file (ending `.kfw`): press F5, then type `f` and Enter at the question, and choose the file. If the computer can't reach retroendeavors.com, the program says so and offers a file instead. The adapter accepts only genuine firmware files from Retro Endeavors.

By copying a file (BOOTSEL)

For recovery only, with a `.uf2` file from Retro Endeavors support:

1. With the Apple switched off, connect the adapter's USB cable to the computer.
2. Hold the **BOOTSEL** button on the adapter's Pico while switching the Apple on. A drive called **RPI-RP2** appears on the computer.
3. Copy the `.uf2` file onto it. The adapter restarts with the new firmware.

The console's `bootsel` command (it asks first) does the same as holding the button.

> If power fails while an update is being installed, the adapter starts with the RPI-RP2 drive by itself. Ask Retro Endeavors support for the `.uf2` file and copy it on as above. An update cannot leave the adapter unusable.

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15 Troubleshooting

When something does not work.

PROBLEM	TRY
A controller does not connect	Check the light: blinking means no controller is connected. Switch the controller on; if it was paired with another device since, pair it again (chapter 4).
An Xbox controller says it needs pairing again	It was paired with a Windows PC or a console meanwhile: pair it with the adapter again.
A stick at rest makes the game drift	Raise the dead zone: `deadzone 12`.
The joystick does nothing in an Atari game	Switch to Atari mode: hold View and press D-pad Down.
USB controllers do nothing	They need a powered hub (chapter 6). `usb` says what the port is doing: if the computer was connected when the Apple was switched on, it is the console.
No console on the USB cable	Connect the computer before switching the Apple on (chapter 6), or use `usb console` over Bluetooth.
The adapter does not appear when pairing a computer	Open the right pairing window over the USB cable (chapter 9) and pair within 2 minutes; then see *If pairing does not work* in chapter 10.

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Game I/O++ Console can no longer connect over Low Energy	The computer may have been paired with the Classic window since, which replaces its Low Energy pairing. On the console, `list` shows how it is paired: `forget N` that entry, then `L` and pair again (chapter 9).
The computer shows the adapter as *Not connected*	Normal until a program connects to it.
Windows says *Windows protected your PC* when Game I/O++ Console starts	Click **More info**, then **Run anyway** (chapter 8).
A Mac will not open Game I/O++ Console, or its icon keeps bouncing in the Dock	Force Quit it if it is bouncing, then do step 3 of *Installing on a Mac* (chapter 8): the `xattr` line in Terminal.
A command does not work	Commands end with Enter, and short forms are case-sensitive: `help` lists them.

If the adapter restarts by itself

If the firmware ever stops responding, the adapter restarts by itself within a few seconds, and the console says why (*note: restarted after …*). `status` and `diag` show it too. Please report that line to Retro Endeavors with what you were doing.

Getting help

If something here does not solve it, contact Retro Endeavors support through **retroendeavors.com/contact**. Saying which firmware the adapter has (`diag` shows it), which Apple and which controllers you use, and what you were doing helps.

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16 Third-party software

The open-source software inside the adapter and the program, and where its licences are.

The Game I/O++ Adapter firmware and Game I/O++ Console are Copyright © 2026 Patrick Montelo, all rights reserved. They are built with open-source software from others, each under its own licence, listed below. The licences ask that their full texts come with the software: they are at **retroendeavors.com/legal/game-iopp**, and Game I/O++ Console shows its own with F9. On a Mac they are also in the disk image, as *Third-Party Notices.txt*.

In the adapter's firmware

SOFTWARE	LICENCE
Raspberry Pi Pico SDK	BSD 3-Clause
TinyUSB (Ha Thach)	MIT
BTstack (BlueKitchen GmbH)	Raspberry Pi's licence for its chips
cyw43-driver (George Robotics)	Raspberry Pi's licence for its chips
micro-ecc (Kenneth MacKay)	BSD 2-Clause
Monocypher (Loup Vaillant)	BSD 2-Clause
MD5 (Solar Designer), Rijndael (Philip J. Erdelsky)	Public domain

In Game I/O++ Console

SOFTWARE	LICENCE
Python	Python Software Foundation License
OpenSSL (in Python)	Apache 2.0
pyserial (Chris Liechti)	BSD 3-Clause
bleak (Henrik Blidh)	MIT
PyObjC (Mac) or the Python WinRT packages (Windows)	MIT
certifi (web site certificates)	Mozilla Public License 2.0; source at github.com/certifi/python-certifi
Nuitka runtime (Kay Hayen)	AGPL 3.0 with the Nuitka Runtime Library Exception, which lets programs built with it be distributed under any terms

Quick reference

The commands and keys used most.

Console: commands end with Enter

`help` / `?`	help
`status` / `s`	status
`pair` / `pair auto`	pair a controller
`list` / `forget N`	pairings
`mode apple|atari`	Apple or Joyport
`L` / `P`	pair a computer: Low Energy / Classic
`usb`	what the USB port is doing
`save`	keep settings for every power-on
`factory`	back to the defaults (until `save`)

Settings

`deadzone 8`	stick dead zone (%)
`dpad on|off`	D-pad moves paddles
`mousespeed 8`	mouse speed
`kblink on|off`	keyboard link
`bt` / `btcon on|off`	Bluetooth / its console

On a controller

View + D-pad Up	Apple mode
View + D-pad Down	Atari (Joyport) mode
BOOTSEL (short press)	pair the first controller found

Game I/O++ Console

`F1`	help
`F3`	choose another connection
`F5`	firmware update
`F9`	third-party notices
`F10`	quit (Mac: `fn` + key)

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