iCode Duo Ultimate SE H1-CX

A compact adapter that brings your classic Atari controllers to life on modern devices — from PCs and Macs to Nintendo Switch, MiSTer FPGA, and beyond. Dual DB9 ports, two status LEDs, and two configurable buttons in a streamlined design with no screen — all advanced settings are configured through the iCodeHub web app.

No drivers needed. Just plug in and play.

Visit iCodeHub at **https://hub.icode.com** to unlock the full potential of your device — fine-tune every setting, customize your buttons, and get the most out of your classic controllers!

For help and assistance: https://www.icode.com/support

Getting Started

Step 1. Plug the Duo Ultimate SE into any USB port using the USB-C cable. You'll see both LEDs blink green three times, then settle into solid colors showing your current mode.

Step 2. Connect your Atari controller to either DB9 port. Port 1 is on the left, Port 2 on the right. Both ports work simultaneously.

Step 3. Start playing! The default setting is Auto mode with Standard USB emulation — it detects joysticks, paddles, keypads, driving controllers, and trackballs by itself. Your joystick directions map to the left analog stick and the fire button maps to Gamepad Button 0.

Step 4. Visit **iCodeHub** in your browser to unlock the full potential of your adapter! Fine-tune paddle sensitivity, configure button mappings, adjust jitter control, enable mouse emulation, and more — no software to install.

Supported Controllers

The Duo Ultimate SE supports four Atari controller types. Each one works on both DB9 ports simultaneously.

Auto

The most versatile mode and the default. Plug in a joystick, paddles, a keypad, a driving controller, or a trackball and the adapter detects it and switches to it — you don't need to tell the adapter which one is plugged in. LED 2 (right) shows what it found (see the color table below).

- **Paddles** and **keypads** are detected as soon as they're plugged in.
- A **driving controller** is detected once you turn the wheel.
- A **trackball** (in trackball mode) is detected once you roll the ball up or down.
- Swapped back to a **joystick**? Just move it.

The modes below are still there if you'd rather fix the controller type yourself.

Driving

For the Atari driving (steering wheel) controller used in games like Indy 500. It provides continuous rotation input. Make sure to review Mouse settings in iCodeHub as some emulators will work with Driving controller only if mouse is turned on.

Trackball

For the CX-22 and CX-80 Atari trackball controllers, providing X and Y axis tracking. Make sure your trackball is in trackball mode. Also review Mouse settings in iCodeHub as some emulators will work with trackball only if mouse is turned on.

Keypad

For the Atari keypad controller used in games like Star Raiders. Each of the 12 keys can be individually mapped to any action through the iCodeHub web app.

Changing Your Controller Type

If you're switching from a joystick to a trackball or driving controller, you'll need to change the active controller type. Press and hold **both BLACK and WHITE** buttons together for about 2 seconds while the adapter is running. The controller type advances through:

Auto → Driving → Trackball → Keypad → Auto

You'll know it worked by watching **LED 2 (the right LED)** — it changes color to reflect the new controller type:

LED 2 Color	Controller Type
Green	Auto — joystick
Dark Red	Auto — paddles detected
Blue	Driving Controller (or Auto — detected)
Purple	Trackball (or Auto — detected)
Yellow	Keypad (or Auto — detected)

When the color changes, the switch is complete and you can release the buttons. The change applies to both ports at once and saves automatically, so your adapter will remember your choice the next time you plug it in.

You can also change the controller type through the iCodeHub web app.

USB Emulation Modes

The USB Emulation Mode determines how your adapter identifies itself to the host device. Most of the time, the default Standard mode works fine — but if your platform isn't recognizing the adapter, you'll want to switch to the mode designed for it.

Standard — Works with Windows, Linux, and most emulators. This is the default.

Classic — Designed for retro gaming platforms and classic-style emulator setups.

Nintendo — Use this for Nintendo Switch and RetroArch with Nintendo button mapping. In this mode, the joystick function automatically switches from Left Analog to D-Pad, since Nintendo devices expect D-Pad input. When you switch away from Nintendo mode, it reverts back to Left Analog.

Legacy — For older systems and emulators that need basic USB HID descriptors.

iOS — For iPhone, iPad, and Apple TV.

How to Change It

Hold the **BLACK** button while plugging in the USB cable. Both LEDs will blink blue three times to confirm, and the mode advances to the next in sequence:

Standard → Classic → Nintendo → Legacy → iOS → Standard

The setting saves automatically and the device reboots into the new mode after a 2-second delay. Keep holding BLACK and re-plugging until you see the right color on **LED 1 (the left LED)**:

LED 1 Color	Emulation Mode
Yellow	Standard
Blue	Classic
Red	Nintendo
Green	Legacy
White	iOS

You can also change the emulation mode through the iCodeHub web app.

Unlock Full Potential — iCodeHub Web App

Your Duo Ultimate SE is ready to play right out of the box, but the real magic happens when you connect it to the **iCodeHub** web app. This is where you can tame paddle jitter, dial in mouse sensitivity for your trackball, fine-tune how your driving controller responds, remap your buttons to do exactly what you want, and so much more. If you want to get the absolute best experience from your adapter, iCodeHub is the place to do it.

The best part? There's nothing to install. iCodeHub runs right in your browser. Just open it in **Chrome**, **Edge**, or **Opera**, click Connect Device, and select the Duo Ultimate SE from the browser's device picker. The app loads your device's current configuration and you're ready to customize.

The web app has three configuration tabs:

Ports Configuration

This is where you set up your controllers. You can select your controller type (Auto, Stick, Paddles, Driving, Trackball, or Keypad) for each port, choose the Function mapping (how directional input maps to USB output — Left Analog, D-Pad, Right Analog, Trigger, or Buttons Only), and configure Paddle Settings including Dual Paddles mode (Combined or Split), Resolution, Range, Jitter Control, and Jitter Averaging. You can also set up Fire Button Actions — each fire button (A and B) supports up to 3 simultaneous action slots.

Duo Ultimate SE Buttons

Here you can remap the BLACK and WHITE device buttons. Each button supports up to 3 simultaneous actions — choose from gamepad buttons (0–31), D-Pad directions, keyboard keys, or mouse actions. You can also set the Button Destination to control which port receives the button signals: Port 1 Only, Port 2 Only, or Both Ports.

USB Settings

This tab controls how the adapter communicates with your host device. **Mouse Emulation** lets you enable HID mouse output — you can set Paddles Mouse Mode (Off, On, or Standby) and Driving & Trackball Mouse separately. **Keyboard Emulation** lets you enable HID keyboard output (Off, On, or Standby). **USB Emulation** lets you choose how the device appears to the host: Standard (DInput), Classic (DragonRise), Nintendo (Switch), Legacy (Retro), or iOS (DS4). Note that switching mouse, keyboard, or emulation modes requires a device reboot.

Firmware Updates

Via iCodeHub

Plug your adapter into USB, open your browser, and go to **https://hub.icode.com**. The app will let you know if an update is available — just follow the on-screen instructions.

Important: Your settings and presets are not preserved during updates. Save them to your iCodeHub Vault before updating, and reload them afterward.

Forced Update Mode (Via Pinhole)

If iCodeHub updates aren't available or the device is unresponsive, you can update manually:

1. Hold **both BLACK and WHITE** buttons 2. While holding, plug in the USB cable 3. The device appears as a USB drive named **RPI-RP2** 4. if your dont see the new USB drive, turn off the device and use a pin on the pinhole found on top of the device to press and hold the recovery switch inside the unit, and tirn on the device again. 5. Drag the new `.uf2` firmware file onto the drive 6. The device reboots automatically with the new firmware

Checking Your Firmware Version

Hold the **WHITE** button while plugging in. The LEDs will display your firmware version as a blink sequence: green blinks for the major version, blue blinks for the first minor digit, and magenta blinks for the second minor digit. A zero is shown as a brief pause with no blinks. For example, version **1.02** shows as: 1 green blink, pause (zero), 2 magenta blinks.

Troubleshooting

No LED activity when plugged in. Check the power on/off switch on the device and your USB cable and try a different USB port. Make sure the cable supports data — some cables are charge-only.

LEDs blink green but your controller isn't detected. Make sure the controller is fully seated in the DB9 port. If using paddles, make sure they were connected before powering on, or cycle the function by holding both buttons for 2 seconds to the correct contoller mode.

Paddles aren't detected (LED 2 stays green instead of dark red). Make sure the adapter is in Auto mode (hold both buttons for 2 seconds to cycle back to Auto), then unplug and reconnect the paddles. On Auto, turn a driving controller's wheel or roll a trackball up or down so it's detected.

Your game or emulator doesn't recognize the adapter. Try a different emulation mode — hold BLACK while plugging in to cycle through them. Check LED 1 to see which mode you're in. Nintendo mode uses D-Pad input; Standard uses analog stick.

The web app can't find your device. Make sure you're using Chrome, Edge, or Opera. Try a different USB port. Make sure no other browser tab is already connected to the device.

Buttons seem mapped wrong. Use the iCodeHub web app to check the button mapping for your active preset. You may need to adjust the mapping to match what your game expects.

Platform Compatibility

Your adapter works with any device that supports USB HID gamepads:

PC — Windows, macOS, Linux **Mobile** — iOS (use iOS mode), Android **FPGA** — MiSTer FPGA **Consoles** — Nintendo Switch (use Nintendo mode), Steam Deck **SBC Retro** — RetroPie, Batocera, RetroArch, EmuElec, Recalbox

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Specifications

Feature	Detail
Microcontroller	RP2350 dual-core
Controller Ports	2× DB9 (Atari compatible)
USB	USB-C, Full-Speed (12 Mbps)
Buttons	2 (Black, White)
LEDs	2× NeoPixel RGB
Emulation Modes	5 (Standard, Classic, Nintendo, Legacy, iOS)
Controller Types	Joystick, Paddles, Driving, Trackball, Keypad
Configuration	iCodeHub web app
Firmware Update	UF2 drag-and-drop
Power	USB bus-powered