

# iCode Duo 5200 Ultimate H1

Bring your original Atari 5200 controllers to life on modern devices — from PCs and Macs to Nintendo Switch, MiSTer FPGA, and beyond. The Duo 5200 Ultimate has two native Atari 5200 controller ports built in, so your controllers plug straight in with full button remapping, keypad mapping, mouse emulation, and a built-in color display. It even plays classic arcade games on its own screen.



iCode Duo 5200 Ultimate

No drivers needed. Just plug in and play.

Visit iCodeHub at <https://hub.icode.com> to unlock the full potential of your device — manage presets, fine-tune every setting, customize your buttons, and get the most out of your 5200 controllers!

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

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## Getting Started

**Step 1.** Plug the Duo 5200 Ultimate H1 into any USB port using the USB-C cable. The color display will light up. No drivers needed — your device is recognized as a standard USB gamepad.

**Step 2.** Connect your Atari 5200 controller to either port. Port 1 is on the left, Port 2 on the right. Both ports work simultaneously, so two players can each use

a full 5200 controller at once.

**Step 3.** Start playing! The default preset (Preset 0) is set up for the 5200 Hand Controller, with the analog stick mapped to the left analog stick. Fire A, Fire B, Start, Pause, Reset, and the full 12-key keypad all work out of the box. The six colored buttons on the device are active too.

**Step 4.** Visit **iCodeHub** in your browser to unlock the full potential of your adapter! Configure button and keypad mappings, fine-tune stick sensitivity, adjust the trackball response, enable mouse emulation, and much more — no software to install.

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## Know Your Device

Your Duo 5200 Ultimate H1 features six colored face buttons (Red, Green, Blue, Yellow, Black, White), an analog navigation stick that moves in every direction and clicks, and a gray Menu button. The large color display shows your controller state and menus, with a speaker alongside it.

You'll also find two Atari 5200 controller ports for connecting your controllers and a USB-C port on the bottom. Firmware recovery is handled through iCodeHub or the on-device firmware-update shortcut (see Firmware Updates below).

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## Using the Menu

Press the gray **Menu** button to open the on-screen menu. Press it again to close and return to normal operation.

Navigate using the **analog stick**: push up and down to move through items, push right or click the stick to select, and push left to go back. You can also use the colored buttons in menus — **Red** works like pushing right (select or increase a value) and **Green** works like pushing left (go back or decrease a value).

When you open the menu, you'll see four sections:

- **Settings** for your current preset configuration.
  - **USB Settings** for how the adapter talks to the host.
  - **General** for system-wide preferences.
  - **System** for diagnostics, reset, and firmware updates.
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## Supported Controllers

The Duo 5200 Ultimate H1 is built specifically for the Atari 5200, so the console is always Atari — there's nothing to select. Just pick the device type for each port.

**Hand Controller (CX-52)** — the standard Atari 5200 controller: analog stick, dual fire buttons (Fire A and Fire B), Start, Pause, Reset, and the full 12-key keypad. The analog stick runs through the jitter-free pipeline for smooth, drift-free movement. Both ports can run a full Hand Controller at once — keypad included — for true two-player 5200.

**Trackball (CX-53)** — the Atari 5200 CX-53 trackball, read directly for smooth, precise X/Y tracking. Pair it with Auto Center to use it like an analog stick and play games the trackball was never originally meant for, like Asteroids and Space Invaders.

## How to Change Your Controller Type

Press the gray **Menu** button, scroll to **Settings** and push right to enter it. Scroll to the port you want to configure (Port 1 or Port 2), push right, scroll to **Device**, and select **Hand Controller** or **Trackball**. Your choice takes effect immediately.

For a shortcut, hold **White + Menu** to jump straight to the port settings. Because both ports share one configuration, **Black + Menu** opens the same settings.

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## Fine-Tuning Your Controller

Once you've selected your device type, you can fine-tune how it behaves. These settings live inside the port configuration — press the gray **Menu** button, go to **Settings**, select the port, and you'll find them there. Everything is saved per-preset and per-port.

### Function Mapping

This controls how the analog stick's direction is reported to the host. Scroll to **Function** inside the port settings and push right to cycle through the options: **Left Analog** (left stick), **D-Pad** (digital hat switch), **Right Analog** (right stick), **Trigger Analog** (trigger axes), or **Buttons Only** (directions as button presses). Choose whichever your game or emulator expects.

### Stick & Trackball Settings

The 5200 analog stick and the CX-53 trackball share tuning options inside their port settings. Scroll through to adjust **Sensitivity**, **Acceleration** (Off to Very High), **Axis Orientation** (Normal or Flip options), **Behavior** (Linear or Circular), and **Resolution** (step size) until the response feels right. Turn on **Auto Center** for the trackball to make the cursor return to neutral when the ball stops moving, exactly like an analog stick — with six speed levels (Off, Very Slow, Slow, Medium, Fast, Very Fast).

## Fire Buttons

Each 5200 controller has two fire buttons — Fire A and Fire B — read independently. Scroll to the **Fire Buttons** section inside the port settings to configure them. You can assign up to 3 actions to each fire button so a single press triggers multiple things at once. You can also turn on rapid fire for automatic repeat — set the value higher for faster firing.

## Keypad

The 5200's 12-key keypad, plus Start, Pause, and Reset, are all fully mappable. Scroll to the **Keypad** section inside the port settings to assign each key to any gamepad button, directional action, or keyboard key — essential for games that use the keypad for weapon selection, options, and number entry.

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## Remapping Your Device Buttons

Want to change what the colored buttons do? Press the gray **Menu** button, go to **Settings**, then scroll down to **Duo 5200 Buttons** and push right to enter it. Select the button you want to change and you can set up to 3 action slots for it — this lets a single button press trigger multiple actions at the same time. You can also turn on **rapid fire** for automatic repeat on any button.

To control which USB gamepad receives your button presses, look for **Button Destination** at the top of the Duo 5200 Buttons section. Push right to cycle through Port 1, Port 2, or Both.

## What You Can Map To

You have a wide range of actions to choose from: **Gamepad Buttons 0–31** (standard USB gamepad buttons), **Gamepad Directions** (Up/Down/Left/Right), **Mouse Clicks** (Left/Right/Middle/Back/Forward), and **Keyboard Keys** (A–Z, 0–9, F1–F12, arrows, Enter, Esc, Space, Tab, symbols, and modifiers like Shift/Ctrl/Alt/GUI).

The 12 keypad keys plus Start, Pause, and Reset are each individually mappable the same way.

The **Joy-Con** section of Duo 5200 Buttons sets what the navigation stick's Up, Down, Left, Right, and Click do while you play — by default the four directions act as a D-pad and the click as Button 0. The gray Menu button only opens and closes the menu.

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## USB Settings

These settings control how your adapter presents itself to the host device. Press the gray **Menu** button and scroll down to **USB Settings** to find them.

## Port Mode

Scroll to **Ports Active** and push right to cycle through the options. **Both Ports On** keeps both ports active for two-player play. **Port 1 Only** and **Port 2 Only** disable the other port entirely — the device will reboot when you switch to these. A confirmation screen will appear where you can press **Red** or **Green** to confirm, or **Yellow** to cancel without rebooting.

## USB Emulation Mode

If your platform isn't recognizing the adapter, scroll to **USB Emulation** inside USB Settings and push right to cycle through the modes. Keep cycling until you find the one that works for your platform:

| Mode      | Best For                  |
|-----------|---------------------------|
| Standard  | Windows, Linux, emulators |
| Classic   | Retro gaming platforms    |
| Nintendo  | Nintendo Switch           |
| Legacy    | Older basic HID systems   |
| iOS       | iPhone, iPad              |
| Classic 2 | Atari Gamestation Pro     |

You can also switch emulation modes without opening a menu: hold **White** while plugging in the adapter to bring up the on-screen USB emulation picker.

## Playing on the Atari Gamestation Pro

Choose **Classic 2**. The Gamestation Pro then treats the adapter like its own joystick:

- Set **Function** to **D-Pad** so the 5200 stick's directions work as a joystick.
- Mouse and keyboard output are turned off automatically in this mode.

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## Mouse & Keyboard Emulation

Want to use your trackball or the 5200 stick as a USB mouse? Or map controller buttons to keyboard keys? Your adapter can output mouse and keyboard signals alongside the gamepad data.

To turn on mouse mode, press the gray **Menu** button, scroll to **USB Settings**, push right to enter it, then scroll to **Mouse** and push right to cycle through the options: **Off**, **On** (actively reports mouse data), or **Standby** (the host sees the mouse device but no data is sent until you need it). You can also adjust the sensitivity from Very Low (1×) up to Very High (8×).

To turn on keyboard mode, go to **USB Settings**, scroll to **Keyboard**, and push right to cycle through **Off**, **On**, or **Standby**.

Note that changing mouse or keyboard modes may require the device to reboot since the USB descriptors need to change.

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## Display Modes

Your adapter has two display modes. The quickest way to change them is to hold **Green + Menu** while the menu is closed — each press cycles to the next mode. You can also press the gray **Menu** button, go to **General**, scroll to **Display**, and push right to cycle through them.

**Off** turns the display off completely. **Animated** (the default) shows a real-time animated visualization of your controller — you'll see it respond as you move the stick, press fire, and use the keypad.

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## General Settings

These settings apply across all your presets. Press the gray **Menu** button and scroll to **General** to find them.

To adjust the **Volume**, scroll to Volume and push right to increase or left to decrease. It goes from 0 (muted) to 10 (maximum), with 5 as the default.

To change the **Menu Theme**, scroll to Menu Theme and push right to cycle through Sunset Haze (warm, default), Midnight Ocean (cool blue), Ember (deep red/orange), or Neon Terminal (bright green retro look).

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## Presets

Your Duo 5200 Ultimate H1 stores **10 presets** (numbered 0–9). Each preset remembers your entire setup — device type and settings for both ports, all button and keypad mappings, rapid fire settings, USB emulation mode, port mode, and mouse/keyboard settings.

To switch presets, press the gray **Menu** button, scroll to **Settings**, push right to enter it, then scroll to **Preset** and push right to cycle through the numbers 0–9. The new preset takes effect right away.

**Preset 0** is always available. To unlock presets 1–9, register your device with iCodeHub. You can also give each preset a custom name through iCodeHub, making it easy to remember what each setup is for.

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## Mini-Games

Your adapter includes three built-in games you can play right on the color display! The quickest way to launch them is to hold **Yellow + Menu** while the menu is closed. You can also press the gray **Menu** button, go to **General**, scroll to **Mini-Games**, and push right to enter.

**Iron Dome** is a Missile Command-style defense game. Use the analog stick to move your targeting cursor and click or press fire to launch interceptors. Protect your cities from incoming missiles across multiple difficulty levels.

**Brick Bash** is an Arkanoid-style paddle game. Move your paddle left and right and bounce the ball to destroy all the bricks. The ball speeds up as you progress through the levels.

**Jaw Cruncher** is a Pac-Man-style arcade game — guide your muncher through the maze, gobble the dots, grab the power pellets, and avoid the ghosts.

You can play with the analog stick or your connected 5200 controllers — including the CX-53 trackball for smooth analog control. High scores are saved on your device and can be synced to the iCodeHub leaderboard.

The Mini-Games menu also has **Arcade Games** — see the next section.

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## Arcade Games

Your adapter can also play 13 classic arcade games on its built-in display: **Pac-Man**, **Ms. Pac-Man**, **Galaga**, **Frogger**, **Donkey Kong**, **Donkey Kong Jr.**, **Dig Dug**, **Space Invaders**, **Pooyan**, **Time Pilot**, **Xevious**, **Super Cobra**, and **Scramble**. The games run from the original arcade ROM files, which you provide — **ROMs are not included**. Use only ROM files you are entitled to use.

To start, hold **Yellow + Menu** (or open **Mini-Games** from the General menu) and select **Arcade Games**. The adapter restarts into the arcade and shows the game list. While the arcade is running, the adapter works as a stand-alone arcade machine — it is not a game controller for your computer until you exit.

### Adding Your Games

The first time, the game list shows **No ROMs found**. To add games:

**Step 1.** In the game list, select **ROM Drive (USB)**. The adapter restarts as a USB drive.

**Step 2.** Connect the adapter to your computer. A drive called **ARCADE ROMS** appears.

**Step 3.** Copy the ROM zip files onto the drive — in the main folder or in a folder called **ROMS**. Keep the file names exactly as below.

**Step 4.** Eject the drive on your computer, then press **Menu** or **White** on the adapter to return to the game list.

| Game            | ROM file                                 |
|-----------------|------------------------------------------|
| Pac-Man         | puckman.zip                              |
| Ms. Pac-Man     | mspacman.zip                             |
| Galaga          | galaga.zip                               |
| Frogger         | frogger.zip                              |
| Donkey Kong     | dkong.zip                                |
| Donkey Kong Jr. | dkongjr.zip (US) or dkongjrj.zip (Japan) |
| Dig Dug         | digdug.zip                               |
| Space Invaders  | invaders.zip                             |
| Pooyan          | pooyan.zip                               |
| Time Pilot      | timeplt.zip                              |
| Xevious         | xevious.zip                              |
| Super Cobra     | scobra.zip                               |
| Scramble        | scramble.zip                             |

The adapter uses the **MAME** ROM set for each game — the parent set, non-merged, so the zip contains every file the game needs. The 512 KB drive holds all of them. A game only appears in the list once its zip is on the drive. If a zip isn't the right set, the game is listed in **red**; select it to see which file is missing or wrong.

Your games stay on the drive when you update the firmware.

## The Game List

Game names are shown in yellow. Move with the navigation stick or the 5200 controller on Port 1, and press **Fire** or **White** to select. Below the games you'll find:

**Display — Landscape** fits the game to the screen as the adapter sits; **Portrait** shows the game at full size — turn the adapter on its side. The adapter remembers your choice.

**Show FPS** — shows the frame rate beside the game.

**ROM Drive (USB)** — restarts as the USB drive to add or remove games.

**Volume** — push left or right to change it.

**Exit** — returns to the adapter. A quick press of **Menu** does the same.

## Playing

| Control                                         | Action                                             |
|-------------------------------------------------|----------------------------------------------------|
| 5200 stick (Port 1) or navigation stick         | Move                                               |
| 5200 Fire A (Port 1), Red, Blue, or stick click | Fire (A)                                           |
| 5200 Fire B (Port 1), Green, or Yellow          | Second button (B) — in one-button games, also Fire |
| White                                           | Start                                              |
| Black                                           | Insert coin                                        |
| Hold Menu (1 second)                            | Back to the game list                              |

Press **Black** to insert a coin, then **White** to start. **Xevious** (zapper / bomb), **Super Cobra** and **Scramble** (laser / bomb) use both buttons: **A** for the first, **B** for the second. You can also hold **White + Black** to return to the game list. The 5200 stick works as a joystick in the arcade — it learns its full range the first time you move it to the edges.

## High Scores

Each game keeps its high-score table, just like the arcade — but unlike the arcade, the adapter remembers it when you turn it off. Your scores are saved when you **leave the game** (hold **Menu**), so return to the game list before switching off. High scores are kept when you update the firmware.

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## Button Shortcuts

You can quickly access common features without opening the menu by holding button combinations while the menu is closed:

**Green + Menu** — Cycle through the display modes.

**White + Menu** — Jump straight to the port settings.

**Black + Menu** — Also opens the port settings (both ports share one configuration on the 5200).

**Yellow + Menu** — Launch the Mini-Games menu.

**Red + White + Menu** — Enter firmware update mode.

And at power-on: hold **White** while plugging in to open the USB emulation mode picker.

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## Diagnostics

If something isn't working right, the built-in diagnostics can help you see exactly what your controller is sending. Press the gray **Menu** button, scroll to **System**, push right, then scroll to **Diagnostics** and push right again. Each diagnostic can be toggled on or off:

| Diagnostic     | What It Shows               |
|----------------|-----------------------------|
| USB Heartbeat  | USB communication indicator |
| FPS Indicator  | Frames-per-second counter   |
| Show Positions | Numeric axis values         |
| Trackball Raw  | Raw trackball X/Y/delta     |

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## System Menu

Press the gray **Menu** button and scroll to **System** to find these options.

To **Reset Defaults**, scroll to Reset Defaults and push right. A confirmation screen will appear — this restores all settings across all presets to factory defaults.

To view **System Info**, scroll to System Info and push right. You'll see your product name, model, and firmware version.

To enter **Firmware Update** mode, scroll to Firmware Update and push right. This puts the device into update mode (same as holding Red + White + Menu).

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## Unlock the Full Potential — iCodeHub Web App

Your Duo 5200 Ultimate H1 has powerful features right out of the box, but the real magic happens when you connect it to the **iCodeHub** web app. This is where you can manage all 10 presets with custom names, fine-tune stick sensitivity and trackball response, remap every button and keypad key with multi-action slots and rapid fire, enable mouse and keyboard emulation, back up your configurations to the Cloud Vault, 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** or **Edge**, click Connect, select your device, and sign in.

Visit: <https://hub.icode.com>

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# Firmware Updates

## Via iCodeHub (Recommended)

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. Your arcade games and their high scores are kept.

## On-Device Firmware Update

To put the device into firmware-update mode without a computer, hold **Red + White + Menu** while the menu is closed (or use System → Firmware Update). The device appears as a USB drive, and iCodeHub device recovery can then install the firmware.

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## Troubleshooting

**Your controller isn't detected.** Make sure it's firmly plugged into the 5200 port. Press the gray Menu button, go to Settings, select the port, and check that you've selected the correct device type (Hand Controller or Trackball). Try the other port. You can also turn on diagnostics to see raw input data — press Menu, go to System, then Diagnostics.

**Your host device doesn't recognize the adapter.** Try a different USB cable or port. Press Menu, go to USB Settings, scroll to USB Emulation, and push right to try a different mode. Standard works for most platforms, but some require Classic, Nintendo, Legacy, iOS, or Classic 2.

**Buttons aren't responding.** Make sure you're not in the menu — press Menu to exit. Press Menu again, go to Settings, then Duo 5200 Buttons, and check that your buttons are mapped to the actions you expect. Also check the Button Destination setting. If something seems wrong, go to System and select Reset Defaults to start fresh.

**The display is blank.** Hold Green + Menu to cycle through display modes — it may be set to Off. If it's still blank, press Menu, go to System, and select Reset Defaults.

**Mouse or keyboard not working on your host.** Press Menu, go to USB Settings, scroll to Mouse or Keyboard, and make sure it's set to On (not Off or Standby). Your host may need a reboot after the USB descriptors change. Try disconnecting and reconnecting the adapter.

**No arcade games are listed.** Select ROM Drive (USB) in the game list and check that the zip files are on the ARCADE ROMS drive with the exact names shown in Arcade Games. A game listed in red has the wrong ROM set — select

it to see which file is missing or wrong.

**Arcade high scores were lost.** Scores are saved when you leave a game by holding Menu. Return to the game list before switching the adapter off.

**You see two gamepad devices on your host.** That's normal — the Duo 5200 presents two USB gamepads (one per port). If you only want one, press Menu, go to USB Settings, scroll to Ports Active, and set it to Port 1 Only or Port 2 Only.

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## Platform Compatibility

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

**PC** — Windows, macOS, Linux **Mobile** — iOS, Android **FPGA** — MiSTer FPGA **Consoles** — Nintendo Switch, Steam Deck, Atari Gamestation Pro **SBC Retro** — RetroPie, Batocera, RetroArch, EmuElec, Recalbox

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## Specifications

| Spec             | Detail                         |
|------------------|--------------------------------|
| Processor        | RP2350B dual-core, 200 MHz     |
| Controller Ports | 2× native Atari 5200           |
| USB              | USB-C, USB 2.0 Full Speed      |
| USB HID Devices  | Up to 4 (2 pads+mouse+kbd)     |
| Display          | 240×320 color TFT (ST7789)     |
| Audio            | Polyphonic speaker             |
| Storage          | On-board flash (LittleFS)      |
| Power            | USB bus-powered                |
| Console          | Atari 5200                     |
| Presets          | 10 device / 100 cloud          |
| Arcade           | 13 games, 512 KB USB ROM drive |

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*Duo 5200 Ultimate H1*

For web configuration and updates, visit <https://hub.icode.com> For help and assistance, visit <https://www.icode.com/support>