iCode Cart2600 Ultimate H1

Read, identify, back up and test your Atari 2600 cartridges. The iCode Cart2600 Ultimate reads an original cartridge, verifies the read, identifies the game from its built-in database, and saves a backup to SD card. A quick play check confirms the cartridge works, and the built-in tester checks your Atari joysticks, paddles, keypads and driving controllers. Connected to a computer, it turns your Atari controllers into USB gamepads and updates from the iCodeHub website. It also includes 13 classic arcade games.



iCode Cart2600 Ultimate

Getting Started

Step 1. Insert a microSD card (FAT32). The card is optional for reading and identifying cartridges, but it is needed for cartridge backups, cover art, ROM files and arcade games — see *Setting Up the SD Card* below.

Step 2. Connect power with a USB-C cable. A splash screen and startup tune play, then the Home menu appears (**A** skips them).

Step 3. Insert a cartridge into the slot on top, select **CARTRIDGE**, and press **A** — the cartridge is read and identified. Choose **SAVE** to back it up.

Step 4. To test a controller, plug it into Port 1 or Port 2 and open **CONTROLLERS**.

Know Your Device

Control	What it does
Analog stick	Moves through menus; joystick during a play check
A	Select / confirm in menus; fire button during a play check
B	Select in menus; fire button during a play check
START	Game Reset during a play check
SELECT	Game Select during a play check
MENU	Back to the previous screen
MENU + B	Save the game screen as the game's cover (2600 games)
Hold START + SELECT	Leave the game and return to the menu
Hold MENU (1 second)	Leave the game and return to the menu

You'll also find the cartridge slot on top, two Atari controller ports (Port 1 and Port 2) on the front, a microSD card slot, a speaker, and a USB-C port for power, firmware updates and the USB gamepad.

The Home Menu

The Home menu has six tiles in two rows — **CARTRIDGE**, **CONTROLLERS**, **SETTINGS** on top and **2600 ROMS**, **ARCADE**, **ABOUT** below. Move with the stick and press **A** or **B** to open one. (Joystick fire and **START** don't open menu items, so they stay free for a game on a computer.)

Tile	Purpose
CARTRIDGE	Read, identify and back up the inserted cartridge; quick play check
CONTROLLERS	Controller Test: joysticks, paddles, driving controllers and built-in controls
SETTINGS	Volume, JoyCon Paddle, USB Mode, USB Drive and firmware update
2600 ROMS	Quick play check of 2600 ROM files on the SD card
ARCADE	Play classic arcade games (or see how to add them)
ABOUT	Version and credits

The top-right corner shows the volume (or **MUTE**) and the firmware version. Below that, **SD ok** or **NO SD** shows whether a card was found at power-on.

Reading a Cartridge

Step 1. Push the cartridge firmly into the slot on top, label facing the front.

Step 2. Open **CARTRIDGE**. The device reads the cartridge twice, compares the two reads, and checks that the data looks like a valid game. It then shows the game's name, maker and year, with its box art when the cover-art pack is on the SD card, along with the cartridge's size, bank-switching type and CRC checksum.

Step 3. Choose an action with Left / Right and press **A**:

- **PLAY** — a quick play check (see below).
- **SAVE** — save the cartridge to the SD card's `2600` folder, named after the game (for example `Combat.a26`), so it appears in **2600 ROMS** right away. Shown only if the cartridge isn't already there; an existing file is never overwritten.
- **OPTIONS** — Game Options for this cartridge (see below).
- **RE-READ** — read the cartridge again, for example after swapping cartridges.

Reading a cartridge never saves it by itself — choose **SAVE** for each cartridge you want to keep. A cartridge the database doesn't recognize is saved as `Cart_<CRC>.a26`; you can rename the file on a computer.

Supported cartridges: standard 2K, 4K and 8K (F8) cartridges — which covers most of the 2600 library. If a cartridge can't be read, clean its contacts, reseat it and choose **RE-READ**.

Game Identification

The device recognizes over 3,600 titles from its built-in database. A cartridge that isn't in the database is still read and can be saved normally; it is just shown without a name.

Quick Play Check

PLAY runs the cartridge on the built-in screen so you can confirm that it boots and works — for example before buying, selling or shelving a cartridge. Use a joystick in Port 1 or the built-in stick and buttons. Each game starts with both difficulty switches on B; the new setting shows at the left of the screen for two seconds. To return to the menu, hold **START + SELECT** for half a second, or hold **MENU** for one second.

The play check is intended as a quick validation, **not for extended gameplay**. Most games run well, but the 2600 emulation is not yet perfect for every title — a few games may show graphics or sound glitches, or not run at all, even when the cartridge itself is fine. Games that use a special chip inside the cartridge, such as Pitfall II, are not supported. A good, verified read on the **CARTRIDGE** screen is the reliable test that the cartridge's data is intact.

Control	2600 function
Joystick / analog stick	Joystick
Fire, **A**, **B**	Fire (in paddle games: the paddle's fire button)
Paddle knob	Paddle (clockwise moves right)
START	Game Reset
SELECT	Game Select
Stick click + SELECT	Left (player 1) difficulty switch, A ↔ B
Stick click + START	Right (player 2) difficulty switch, A ↔ B
MENU (tap)	Color / B&W switch
MENU + B	Save the screen as the game's cover
Hold START + SELECT (½ second)	Leave the game
Hold MENU (1 second)	Leave the game

Paddle games such as Breakout, Super Breakout, Kaboom!, Warlords and Canyon Bomber are played with Atari paddles: a pair on Port 1 for players 1 and 2, and a pair on Port 2 for players 3 and 4. Each game's paddle range is set automatically, so turning the knob moves across the whole screen. Paddles plugged in or turned after a game starts are picked up within half a second.

No paddles? With no paddle plugged in for player 1, the built-in analog stick steers the paddle instead, and a real paddle takes over as soon as it is detected. **SETTINGS → JoyCon Paddle** chooses how the stick behaves: **Position** (the default — the stick's position is the paddle's position, centre is the middle of the screen) or **Speed** (tilt to move, further = faster; let go and the paddle stays put).

Keypad and driving games. Keypad games such as Star Raiders use an Atari keypad controller (Video Touch Pad) in Port 2 alongside a joystick in Port 1. In driving games such as Indy 500 a driving controller works as on the console; without one, the built-in stick steers — **Right / Down** turns one way, **Left / Up** the other.

ROM Files

2600 ROMS gives the same quick play check for ROM files on the SD card. Copy your 2600 ROM files (`.a26` or `.bin`) into the `2600` folder on the card — with **USB Drive** (below), on a card reader, or by saving cartridges with **SAVE** — open **2600 ROMS**, move through the list with Up / Down and press **A** or the joystick's fire to play (**B** opens Game Options). The highlighted game's details and cover appear beside the list. ROMs are not included.

Game Options

A few games put player 1 on the right controller port (one-player Basketball, Home Run, Wizard of Wor) or on the second paddle of a pair (Canyon Bomber, Video Olympics). The device knows these games from its database and swaps automatically. If a game still answers to the wrong controller, open **Game Options** — **B** in **2600 ROMS**, or **OPTIONS** on the **CARTRIDGE** screen — and set **Swap Ports** or **Swap Paddles** to **On** or **Off**. **Auto** follows the database. **Left Difficulty** and **Right Difficulty** set the difficulty switches the game starts with (**B** by default, **A** is usually harder). Options are saved per game on the SD card.

Cover Art

Games show their box art when the cover-art pack is on the SD card. A game without a cover gets one automatically: the first time you play it and press **START**, its title screen is saved as the cover. To use a different screen, hold **MENU** and press **B** while playing — the current screen replaces the cover. Covers are saved in the SD card's `covers` folder.

Controller Test

CONTROLLERS opens the Controller Test. Plug a joystick, a pair of paddles or a driving controller into Port 1 or Port 2 — each port shows **JOYSTICK**, **PADDLES**, **KEYPAD** or **DRIVING** automatically, depending on what is plugged in (a driving controller is recognized once you turn it).

- **Joysticks** — the stick and fire button are drawn as on an Atari CX40, and each direction and the fire button light up while held. A direction or button that doesn't light up, or flickers, points to a worn switch or a broken cable.
- **Paddles** — each paddle has a dial whose hand follows the knob, with its value (0–255) and its live jitter (**±**), and the paddle's fire button. The jitter is coloured by how steady the paddle is at that position: green is excellent, yellow good, orange average and red poor. Turn the knob slowly end to end — a healthy paddle sweeps smoothly across the whole dial.
- **Keypads and driving controllers** — a keypad shows its 12 keys, each filling while pressed; a driving controller shows a wheel that turns with the knob, a step count and its fire button.
- **Built-in controls** — A, B and the stick click light up when pressed. With no paddle on Port 1, the built-in stick is shown as player 1's paddle, as it works in games.

Paddle Jitter Test

Hold **START** for a guided test of the paddle you last turned:

Step 1. Turn the paddle all the way left, let go and press **A** (the green button); then all the way right and press **A**.

Step 2. Turn the dial's hand onto each target in turn — 9, 12 and 3 o'clock — let go without touching the paddle, and press **A**.

The result rates each position and the paddle overall, from **Excellent** to **Bad**, with advice: cleaning the pot often fixes an *Average* or *Poor* paddle; a *Bad* one may need its pot replaced. The slow (left) end of a paddle naturally jitters a little more, so each position has its own allowance. Press **A** to test again, **MENU** to go back.

Advanced

Hold **SELECT** for the detailed screen: raw readings of all four paddle inputs on a graph, with their ranges, and every input of the controller ports. It is meant for in-depth troubleshooting.

Press **MENU** to leave.

Arcade Games

ARCADE plays 13 classic arcade games on the built-in screen: Pac-Man, Ms. Pac-Man, Galaga, Frogger, Donkey Kong, Donkey Kong Jr., Dig Dug, Space Invaders, Pooyan, Time Pilot, Xevious, Super Cobra and Scramble.

Adding Your Games

The games run from the original MAME ROM files, which you provide. Copy the zip files — unchanged, with these exact names — into the `roms` folder on the SD card:

Game	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` (or `dkongjrj.zip`)
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`

Until the SD card holds at least one of these files, **ARCADE** opens a screen that explains how to add them. ROMs are not included.

The Game List

ARCADE lists the games whose zip files were found; press **A** or **START** to play. Below them: **Display** (landscape / portrait), **Show FPS**, **Volume** (Left / Right) and **Exit**. **MENU** also returns Home.

Playing

Control	Arcade function
Joystick / analog stick	Move
A / joystick fire	Fire
B	Insert coin — or the second button (bomb) in Xevious, Super Cobra and Scramble
SELECT	Insert coin
START	Start game
Hold START + SELECT (½ second)	Back to the game list
Hold MENU (1 second)	Back to the game list

High Scores

Each game's high-score table is saved to the SD card when you leave the game (hold MENU or START + SELECT) and restored the next time you play. Switching off in the middle of a game loses that session's new scores.

Volume

Set the volume in **SETTINGS** → **Volume** with Left / Right, in 10% steps; you hear a short tone at the new level. The default is 50%. In the arcade, use the **Volume** row in the game list. The volume is remembered when you switch the device off, and is shared between the 2600 side and the arcade games.

USB Gamepad

Connect the device to a computer with a USB-C cable and your Atari controllers work as USB gamepads — Port 1 and Port 2 appear as two separate gamepads, ready for emulators and PC games.

Each port picks joystick, paddles, keypad or driving by itself, from what is plugged in (a driving controller once you turn it).

Controller	Gamepad
Joystick	D-pad and left stick; fire = button 1
Paddles	First paddle of the pair = left stick X, second = left stick Y; their fire buttons = buttons 1 and 2
Keypad	Its 12 keys = buttons 1–12 (1 2 3 / 4 5 6 / 7 8 9 / * 0 #)
Driving	The wheel = left stick X (centred at start, stops at each end); fire = button 1
Device **START** / **SELECT**	Start / Select on the Port 1 gamepad (menus)
Device **A** / **B**	Buttons 5 / 6 on the Port 1 gamepad (Controller Test only)

The gamepads work while the device shows its menus or the Controller Test. While a game is playing on the device's own screen, it disconnects from USB, and reconnects when you leave the game.

SETTINGS → **USB Mode** chooses how the gamepads appear to the computer or console:

USB Mode	Appears as
Standard (default)	iCode gamepad — best for PCs and iCodeHub
Classic	Generic USB joystick
Nintendo	Nintendo Switch–compatible controller
Legacy	Older generic gamepad, for software that doesn't recognize Standard
iOS	iPhone / iPad–compatible controller
Classic 2	Controller for the Atari Gamestation Pro

Choose a mode with Left / Right and press **MENU**; the device restarts in the new mode.

USB Drive

Copy ROMs onto the SD card without taking it out. Connect the device to a computer with a USB-C data cable and open **SETTINGS** → **USB Drive** (or press **A** on the empty **2600 ROMS** screen). The SD card appears on the computer as a drive: copy 2600 ROMs into `2600`, arcade zips into `roms` and cover art into `covers`.

When you're done, press **MENU** on the device — it waits for any copy to finish and closes the drive on the computer — or eject the drive on the computer. The device restarts and your new games appear in **2600 ROMS**. While the drive is open, the device doesn't use the SD card itself.

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iCodeHub

Connect the device to a computer and open the **iCodeHub** website in Chrome or Edge to identify the device, try your controllers in its Live Test, and install firmware updates with one click. Use USB Mode **Standard** when connecting to iCodeHub.

Setting Up the SD Card

Use a microSD card formatted as **FAT32**. The device uses these folders:

Folder	Contents
`covers`	Optional cover-art pack
`2600`	2600 ROM files (`.a26` / `.bin`) for quick play checks, including cartridges you save
`roms`	Arcade ROM zip files

Insert the SD card before switching on — the card is detected at power-on. The `2600`, `roms` and `covers` folders are created automatically on a new card.

Cartridges saved by firmware 1.0 are in a `carts` folder. To play them from **2600 ROMS**, move them into the `2600` folder and rename them to `.a26`, or read the cartridge again and choose **SAVE**.

Settings

Setting	Description
Volume	Left / Right adjusts the volume (0–100%, or mute)
Voice	Spoken cartridge results on / off
Start Up	Screen after the splash: Home, Controllers, 2600 ROMS or Arcade
JoyCon Paddle	Left / Right chooses how the built-in stick steers a paddle when none is plugged in: **Position** (default) or **Speed**
USB Mode	Left / Right chooses how the USB gamepads appear (see *USB Gamepad*); the device restarts when you leave Settings
USB Drive	Opens the SD card on a connected computer (see *USB Drive*)
Firmware Update	Restarts the device into update mode (see *Firmware Updates*)

Firmware Updates

With iCodeHub (easiest): connect the device to your computer with a USB-C cable, open the iCodeHub website and follow its firmware update steps. Keep the device on its menus while updating.

By hand:

Step 1. Download the latest firmware file (`.uf2`).

Step 2. Connect the device to your computer with a USB-C cable.

Step 3. Open **SETTINGS** → **Firmware Update** and press **A** (or hold **MENU** while connecting power). The device appears on your computer as a USB drive.

Step 4. Copy the `.uf2` file onto that drive. The device updates and restarts by itself.

A single update file contains everything — the firmware, the game database and the arcade games. Your SD card is never touched. Your settings (volume, JoyCon Paddle and USB Mode) return to their defaults after an update.

Troubleshooting

Problem	Solution
Cartridge not read	Clean the cartridge contacts, push it in fully, and choose **RE-READ**. 16K and larger cartridges can't be read yet.
Game glitches or won't run in PLAY	The emulation isn't perfect for every game yet. If the cartridge read is good, the cartridge is fine.
Paddle doesn't respond in a game	Turn the knob — a paddle is picked up within half a second. Check it in **CONTROLLERS**.
Paddle dial jumps, won't reach both ends, or rates Poor / Bad	The paddle pot is worn or dirty — clean or replace it.
ARCADE shows "How to add games"	Copy at least one supported zip file into the `roms` folder on the SD card.
Computer doesn't see the gamepads	Use a USB-C data cable (not charge-only), keep the device on its menus, and try USB Mode **Standard**.
SD card doesn't appear on the computer in USB Drive	Use a USB-C data cable; the screen says **Connected** once the computer sees the device.
iCodeHub doesn't find the device	Set USB Mode to **Standard**, use Chrome or Edge, and leave any game on the device.
"LOAD FAILED" in the arcade	The zip file is incomplete or the wrong version — replace it with the correct MAME ROM set.
NO SD on the Home menu	Insert the card fully and switch the device off and on. Make sure it is formatted FAT32.
No sound	The volume may be muted — raise it in **SETTINGS** → **Volume**.
Can't leave a game	Hold **MENU** for one second, or **START + SELECT** together for half a second.

Specifications

Specification	Details
Processor	RP2350B dual-core
Flash	4 MB
Display	2.4" color LCD, 320 × 240
Audio	Built-in speaker with amplifier
Cartridge slot	Atari 2600 (2K, 4K, 8K F8 cartridges)
Controller ports	2 × Atari DB-9: joysticks, paddles (up to four), keypads, driving controllers
Built-in controls	Analog stick, A, B, START, SELECT, MENU
Storage	microSD (FAT32)
USB	USB-C: power, firmware updates, 2 × USB gamepad (6 modes), iCodeHub
Game database	3,600+ Atari 2600 titles