The CardPulse

User Manual

Real-Time TCG Card Price Tracker

Version 5.6 | March 2026

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1. What Is The CardPulse?

The CardPulse is a dedicated desktop device that tracks the real-time market price of a trading card game (TCG) card. It displays live pricing data, historical statistics, and market mood analysis on a built-in colour display, while providing visual LED alerts and audio cues whenever the card's price moves.

Supported games include Pokémon, Magic: The Gathering, Yu-Gi-Oh!, One Piece Card Game, Digimon, Disney Lorcana, Dragon Ball Super: Fusion World, Gundam Card Game, Star Wars: Unlimited, Grand Archive TCG, Union Arena, Flesh and Blood, Hololive Official Card Game, Riftbound, and more. Price data is provided through the JustTCG API.

> **Note:** The CardPulse tracks a single card and is designed to display it proudly in the included card holder. For tracking multiple cards simultaneously, see The CardPulse Tracker.

> **Note:** Requires a free JustTCG API key and a WiFi connection. See Section 4 for setup instructions.

2. In the Box

- The CardPulse base unit (display, speaker, controls)
- Card holder with LED wings
- USB-C power cable

> **Note:** A USB power adapter (5V, 1A minimum) is required but not included. A standard phone charger is sufficient.

3. Physical Overview

Base Unit

The base unit houses the display, speaker, and controls. Dimensions: 115mm wide x 50mm deep x 40mm high.

Component	Description
Display	Colour LCD screen showing price, statistics, and mood data. Flush-mounted on the front face.

Speaker	Audio alert speaker. Located on the right side of the base unit, facing right.
BOOT Button	Front-accessible button. Used to enter Setup Mode or trigger a Factory Reset at startup.
TOP Button	Front-accessible button. Used to manually rotate screens or trigger a manual price refresh.
Volume Button	External button on the back. Cycles through audio volume levels.
Brightness Button	External button on the back. Cycles through LED brightness levels.
USB-C Port	Power input. Connect to a 5V USB power adapter or PC USB port.

Card Holder

The card holder displays your card with illuminated LED wings on either side. Dimensions: 155mm high x 100mm wide x 40mm deep. Designed to accommodate raw cards, sleeved cards, and approximately 90% of graded slabs.

Component	Description
Card Slot	Central slot for your card or slab. Cards simply rest in the holder.
Left LED Wing	Vertical LED strip inside the left wing, illuminates the card from the left side.
Right LED Wing	Vertical LED strip inside the right wing, illuminates the card from the right side.

4. First-Time Setup

Step 1 — Get a JustTCG API Key

The CardPulse uses the JustTCG API to retrieve card pricing data. You will need a free account and API key before proceeding.

1. Visit justtcg.com/dashboard/plans in a web browser.
2. Create a free account and log in.
3. Copy your API key from the dashboard. Keep it safe — you will enter it in the next steps.

> **Note:** The free JustTCG tier allows 1,000 requests per month and 100 per day, which is more than sufficient for single-card usage.

Step 2 — Find Your Card's TCGplayer ID

Each card is identified by a unique TCGplayer ID number. To find it:

4. Go to tcgplayer.com and search for your card.
5. Open the card's product page.
6. Look at the URL — the number at the end is the TCGplayer ID. For example: tcgplayer.com/product/219042 has the ID 219042.
7. Copy this number — you will enter it during setup.

Step 3 — Enter Setup Mode

On first boot, The CardPulse automatically enters Setup Mode. Simply plug it in via USB-C and it will enter Setup Mode on its own.

To manually enter Setup Mode on a device that has already been configured:

8. Power off the device by unplugging the USB-C cable.
9. Hold the BOOT button.
10. Plug the USB-C cable back in while continuing to hold BOOT.
11. Release BOOT after 2 seconds. The display will show a Setup Mode screen.

Step 4 — Connect to the Setup Portal

12. On your phone or computer, open WiFi settings.
13. Connect to the WiFi network named "CardPulse-Setup".
14. Open a web browser and navigate to 192.168.4.1.

15. The CardPulse Setup Portal will load.

> **Tip:** If the portal does not load, ensure you are connected to "CardPulse-Setup" and not your home WiFi.

Step 5 — Configure and Save

Fill in all required fields in the Setup Portal (see Section 5), then tap Save & Restart. The device will reboot, connect to your WiFi, and fetch the first price automatically.

> **Note:** The first price fetch may take up to 30 seconds after reboot depending on your WiFi speed.

Factory Reset

16. Hold the BOOT button while plugging in the USB-C cable.
17. Keep holding BOOT. After about 1.5 seconds the display will show a Factory Reset confirmation.
18. Continue holding until the reset completes.

> ⚠ **Warning:** A Factory Reset permanently erases your WiFi credentials, API key, card ID, and all saved settings. This cannot be undone.

5. The Setup Portal

The Setup Portal is a web page served directly by The CardPulse. It is accessible any time the device is in Setup Mode by navigating to 192.168.4.1.

WiFi & API Settings

Setting	Description
WiFi SSID	The name of your home or office WiFi network.
WiFi Password	Your WiFi password. Leave blank to keep the existing password when updating other settings.
JustTCG API Key	Your personal JustTCG API key.
TCGplayer ID (Card ID)	The TCGplayer product ID number for the card you want to track.

Display & Theme Settings

Setting	Description
Theme Mode	Per-Game themes (each TCG has its own colour palette) or Standard theme (consistent neutral palette).
Night Signature Theme	When Night Mode is active, enables a special purple and cyan colour palette on the display and a magenta-to-blue gradient on the LEDs.
Mood Market Screen	Enable or disable the Mood Market screen in the rotation.

Idle LED Color

Controls the colour of the LED wings when no alert effect is active.

Setting	Description
Solid Colors (0-9)	A fixed colour for both LED strips. Options include White, Ice Blue, Warm Amber, Electric Violet, Soft Cyan, Neon Pink, Emerald Green, Sunset Orange, Deep Sky Blue, and Royal Purple.
Slow Rainbow	Animated. The full colour spectrum rotates smoothly around both strips approximately every 8 seconds.

| Fast Rainbow | Animated. Same as Slow Rainbow but approximately 3x faster. |
| Breathing Pulse (select color below) | Animated. The LEDs gently fade in and out. A secondary color picker appears when selected. |

Screen Rotation

Setting	Description
Price Screen Duration	How long the Price screen displays before rotating. Options: 1, 3, 5 (default), or 10 minutes.
Stats Screen Duration	How long the Stats and Mood screens display. Options: 15, 30, 60 (default), or 120 seconds.
Rotation Order	Price → Stats → Mood (default), Price → Mood → Stats, or Disable auto-rotation.

Price Refresh Interval

How often The CardPulse fetches a fresh price. Options: every 30 minutes, 1 hour, 2 hours (default), or 4 hours.

Night Mode

Setting	Description
Enable Night Mode	Master switch. Off by default.
Night Start / End	The time window (24-hour format) during which Night Mode is active.
Brightness Cap	Maximum LED brightness during Night Mode.
Time Zone	Your local time zone, used to correctly apply the Night Mode window.

Alert Thresholds (%)

Controls how large a price move needs to be before each alert tier fires. All thresholds apply symmetrically to both gains and losses.

Threshold	Description

Small Move (default 3%)	Triggers the UP Pulse or DOWN Pulse LED effect and a subtle audio alert.
Big Move (default 8%)	Triggers the Card on Fire UP or DOWN LED effect.
Medium-Large Move (default 12%)	Triggers the Green Siren (gain) or Robbery (loss) LED effect.
Huge Move (default 20%)	Triggers the Double Rainbow (gain) or Bloodfall (loss) LED effect.

Tip: For high-value cards lower all thresholds. For inexpensive bulk cards raise them to avoid constant alerts on noise.

6. Understanding the Screens

The CardPulse rotates through up to three screens automatically, or you can cycle through them manually using the TOP button.

Shared UI Elements (all screens)

Element	Description
WiFi Signal Bars	Four small bars in the top-left corner. Green = strong, Yellow = fair, Red = weak, Grey = no signal.
Moon Icon	Appears in the bottom-right corner when Night Mode is active.
Lock Icon	Appears in the bottom-right corner when auto-rotation is disabled.

Price Screen

Element	Description
Current Price	Large display of the card's current market price in USD.
Trend Arrow	Indicates whether the price has moved up, down, or stayed flat since the last fetch.
Delta Line	Shows the dollar amount and percentage change since the last fetch. Green for gains, red for losses.
Last Updated	The date and time when the price was last fetched from JustTCG.
Countdown Bar	A thin horizontal bar above the Last Updated line. Fills left to right as the next refresh approaches. Green → yellow → red.

Stats Screen

Stat	Description
7 Day Range	The lowest and highest prices recorded in the last 7 days.
30 Day Trend	The direction of the price trend over the last 30 days (UP, DN, or FLAT).
All-Time High	The highest price ever recorded for this card variant, with the date it occurred.

All-Time Low	The lowest price ever recorded for this card variant, with the date it occurred.

Mood Market Screen

A fun, personality-driven interpretation of the card's market data. Can be enabled or disabled in the Setup Portal.

Section	Description
Card Mood (7d)	How the card has been performing over the last 7 days. Labels range from Rocket fuel and On a heater through to Freefall.
Volatility (7d)	How stable or erratic the card's price has been. Labels range from Calm through Wiggly and Choppy to Unhinged.
Market Mood (30d)	The 30-day market context. Labels range from Bull run and Recovery through Cooling to Capitulation.
You & This Card	Compares current price to when you first set up this card. Labels range from Soulmates to Bad breakup energy.

7. Buttons Reference

Front Buttons

Button	Action	Result
BOOT	Hold during power-on (<1.5s)	Enters Setup Mode
BOOT	Hold during power-on (>1.5s)	Factory Reset — erases all settings
TOP	Short press (while running)	Advances to the next screen (Price → Stats → Mood → Price).
TOP	Long press >2 seconds (while running)	Forces an immediate manual price refresh and resets the countdown timer.

Back Buttons

Button	Action	Result
Volume Button	Short press	Cycles audio volume: Mute → 25% → 50% → 75% → 100% → Mute. A short beep plays at the new level.
Brightness Button	Short press	Cycles LED brightness: 10% → 30% → 50% → 80% → 10%. Takes effect immediately.

> **Note:** Volume and brightness settings are saved automatically and restored on next power-on.

8. LED Indicators

The CardPulse has two LED strips — one inside each wing of the card holder. They are always on when the device is powered.

Idle Mode

Idle Mode	Description
Solid Color	Both strips glow a fixed colour. Choose from 10 presets.
Slow Rainbow	The full colour spectrum rotates smoothly around both strips over approximately 8 seconds per cycle.
Fast Rainbow	Same as Slow Rainbow but approximately 3x faster.
Breathing Pulse	The chosen colour gently fades in and out. A soft glow remains visible at all times.

Alert Effects

When a price change is detected, the LEDs switch to an alert animation for 30 seconds before returning to idle.

Effect Name	Trigger & Description
UP Pulse (green)	Small gain. A steady green pulse on both strips.
DOWN Pulse (red)	Small loss. A steady red pulse on both strips.
Card on Fire UP	Big gain. An intensifying orange-red fire effect climbing the strips.
Card on Fire DOWN	Big loss. Same fire effect in cooler blue tones.
Green Siren	Medium-large gain. Alternating bright green flashes.
Robbery / Police Lights	Medium-large loss. Alternating red and blue police-style flashing.
Double Rainbow	Huge gain. A full multi-colour rainbow sweeps repeatedly across both strips.
Bloodfall	Huge loss. Deep red drips cascade down the strips in a Tetris-like stacking effect.

Note: Night Mode applies a brightness cap to all LED effects during your configured quiet hours.

9. Alert System

The CardPulse checks the card's price on every fetch. If the price change crosses a threshold, an alert fires — simultaneously triggering the LED effect and audio alert.

How Thresholds Work

Thresholds are evaluated from largest to smallest. Only the highest matching tier fires. All thresholds are symmetric — the same percentage applies to both gains and losses.

Default Alert Thresholds

Tier	Default Threshold	LED Effect (Gain / Loss)
Small Move	±3%	UP Pulse / DOWN Pulse
Big Move	±8%	Card on Fire UP / Card on Fire DOWN
Medium-Large Move	±12%	Green Siren / Robbery
Huge Move	±20%	Double Rainbow / Bloodfall

Thresholds are fully adjustable in the Setup Portal under Alert Thresholds (%).

Debug / Preview Mode

The Setup Portal includes a Debug Test page (accessible via the /test URL while in Setup Mode) that lets you preview any alert effect and audio combination without waiting for a real price move.

10. Audio Alerts

Each alert tier has a unique set of audio sounds that play with the LED effect. Three variations are included per tier, selected randomly each time.

Tier	Sound Theme
Small Gain	Small Gain sounds
Small Loss	Small Loss sounds
Big Gain	Card Fire Up sounds
Big Loss	Card Fire Down sounds
Medium-Large Gain	Green Siren sounds
Medium-Large Loss	Heist / Robbery sounds
Huge Gain	Double Rainbow sounds
Huge Loss	Bloodfall sounds

Volume Control

Press the Volume button on the back to cycle through five volume levels: Mute, 25%, 50%, 75%, and 100%. A short beep plays at the new level. The setting is saved automatically.

Night Mode Audio

When Night Mode is active, all audio is automatically muted regardless of the volume setting.

Startup Sound

A startup sound plays when the device boots into normal operating mode. This sound is built into the firmware.

11. Night Mode

Night Mode automatically reduces LED brightness and mutes audio during a configurable quiet window.

Night Mode Settings

Setting	Description
Enable Night Mode	Master switch. Off by default.
Start Time	The time Night Mode begins each day (24-hour format, e.g. 23 = 11pm).
End Time	The time Night Mode ends each day (e.g. 7 = 7am).
Brightness Cap	Maximum LED brightness during Night Mode. A value of 5 produces a very dim ambient glow.
Time Zone	Required for Night Mode to operate correctly.
Night Signature Theme	Optional. Replaces the display colour palette and idle LED colour with a special purple and cyan theme.

Note: Night Mode requires a successful NTP time sync at startup. Ensure your WiFi is working on boot.

12. Audio File Management

The CardPulse stores alert audio files on its internal storage partition (FFat). Alert sounds come pre-loaded from the factory.

Accessing the File Manager

While in Setup Mode, navigate to 192.168.4.1/list to view all files on the device. From this page you can see file names and sizes, and delete individual files.

Uploading Audio Files

Navigate to 192.168.4.1/upload while in Setup Mode to upload new WAV files. Audio files must meet the following requirements:

- Format: WAV (PCM, 16-bit, mono)
- Sample rate: 22050 Hz
- File names must match the expected names exactly (see below)

> ⚠ **Important:** Internal storage space is limited. Check available space before uploading.

Expected Audio File Names

Each alert tier expects exactly 3 WAV files numbered 1, 2, and 3. Files must be placed in the /alerts/ folder.

Alert Tier	Expected File Names
Small Gain	/alerts/small_gain_1.wav, _2.wav, _3.wav
Small Loss	/alerts/small_loss_1.wav, _2.wav, _3.wav
Big Gain	/alerts/big_gain_fire_1.wav, _02.wav, _3.wav
Big Loss	/alerts/big_loss_fire_1.wav, _2.wav, _3.wav
Medium Gain	/alerts/medium_gain_siren_1.wav, _2.wav, _3.wav
Medium Loss	/alerts/medium_loss_heist_1.wav, _2.wav, _3.wav
Huge Gain	/alerts/huge_gain_rainbow_1.wav, _2.wav, _3.wav
Huge Loss	/alerts/huge_loss_bloodfall_1.wav, _2.wav, _3.wav

Customizing Alert Sounds

You can replace any or all of the pre-loaded alert sounds with your own custom audio files. This section walks through the full process from creating your sound to hearing it play on the device.

Step 1 — Create or Source Your Sound

Your replacement sound can be anything — a recorded voice clip, a sound effect, or a music snippet. The recommended free tools are:

- Audacity (audacityteam.org) — free, cross-platform audio editor. Best for recording, editing, and exporting in the exact format required.
- Freesound.org — large library of free royalty-free sound effects available for download.
- ZapSplat.com — another free royalty-free sound library with a wide variety of alert and notification sounds.

> **Tip:** Keep alert sounds short — 2 to 4 seconds is ideal. Longer files take up more storage space and the alert LED effect only lasts 30 seconds total.

Step 2 — Export in the Correct Format

The device only plays WAV files in a specific format. If your sound is in any other format, use Audacity to convert it. In Audacity:

19. Open your audio file in Audacity (File → Open).
20. If the track shows as stereo (two waveforms), go to Tracks → Mix → Mix Stereo Down to Mono.
21. Go to Tracks → Resample and set the rate to 22050 Hz. Click OK.
22. Go to File → Export → Export as WAV.
23. In the export dialog, set Encoding to Signed 16-bit PCM.
24. Save the file.

> **Note:** The required format is: WAV, PCM, 16-bit, Mono, 22050 Hz. Files in any other format will be skipped silently by the device.

Step 3 — Name Your File to Match the Expected Name

The device looks for files with specific names in the /alerts/ folder. Your custom file must be named exactly as shown below to replace the corresponding alert. Each alert tier has 3 variations (numbered 1, 2, and 3) — the device picks one at random each time the alert fires. You can replace just one variation, two, or all three.

Alert Tier	Required File Names
Small Gain	small_gain_1.wav / small_gain_2.wav / small_gain_3.wav

Small Loss	small_loss_1.wav / small_loss_2.wav / small_loss_3.wav
Big Gain	big_gain_fire_1.wav / big_gain_fire_02.wav / big_gain_fire_3.wav
Big Loss	big_loss_fire_1.wav / big_loss_fire_2.wav / big_loss_fire_3.wav
Medium Gain	medium_gain_siren_1.wav / medium_gain_siren_2.wav / medium_gain_siren_3.wav
Medium Loss	medium_loss_heist_1.wav / medium_loss_heist_2.wav / medium_loss_heist_3.wav
Huge Gain	huge_gain_rainbow_1.wav / huge_gain_rainbow_2.wav / huge_gain_rainbow_3.wav
Huge Loss	huge_loss_bloodfall_1.wav / huge_loss_bloodfall_2.wav / huge_loss_bloodfall_3.wav

> **Note:** Note the Big Gain second variation uses _02 not _2. This must match exactly: big_gain_fire_02.wav

Step 4 — Enter Setup Mode

The file manager and uploader are only accessible when the device is in Setup Mode.

25. Power off the device by unplugging the USB-C cable.
26. Hold the BOOT button.
27. Plug the USB-C cable back in while continuing to hold BOOT.
28. Release BOOT after 2 seconds.
29. On your phone or computer, connect to the WiFi network named CardPulse-Setup.
30. Open a browser and navigate to 192.168.4.1.

Step 5 — Delete the Existing File

Before uploading your replacement, delete the existing file to free up space and avoid conflicts.

31. In the Setup Portal, navigate to 192.168.4.1/list.
32. Find the file you want to replace in the list (e.g. /alerts/small_gain_1.wav).
33. Click the Delete button next to that file.
34. Confirm the deletion. The file will be removed immediately.
35. Repeat for any other files you are replacing.

Step 6 — Upload Your Custom File

36. In the Setup Portal, navigate to 192.168.4.1/upload.
37. Set the upload destination to /alerts/.
38. Choose your renamed WAV file.
39. Tap Upload. The file will be written to the /alerts/ folder on the device.
40. Navigate back to 192.168.4.1/list and confirm your file appears with the correct name and a non-zero file size.
41. Repeat for any additional files you are replacing.

⚠ **Important:** Check the remaining free space shown at 192.168.4.1/list after each upload. If storage runs low the device may not function correctly.

Step 7 — Test Your Sound

You can preview any alert sound without waiting for a real price move.

42. In the Setup Portal, navigate to 192.168.4.1/test.
43. Find the alert tier you replaced (e.g. Small gain).
44. Click the Preview link next to it.
45. The device will immediately play one of the three variations for that tier and trigger the matching LED effect. Press Preview multiple times if needed — the device picks randomly so you may need a few tries to hear your new file.
46. Adjust volume using the Volume button on the back of the device if needed.

Tip: If your custom sound does not play, check that the file name matches exactly (including the _02 exception for big_gain_fire), the format is WAV PCM 16-bit mono 22050 Hz, and the file appears correctly at 192.168.4.1/list.

13. Troubleshooting

Display shows "WiFi Failed"

- Confirm your WiFi SSID and password are entered correctly in the Setup Portal.
- Ensure your router is broadcasting a 2.4 GHz network. The CardPulse does not support 5 GHz WiFi.
- Move the device closer to your router and try again.

Display shows "PRICE ERROR"

- Confirm your JustTCG API key is entered correctly with no extra spaces.
- Confirm the TCGplayer ID is a numeric ID only (e.g. 219042), not a URL.
- Check your JustTCG account dashboard to confirm you have not exceeded your daily or monthly API request limit.
- Try a manual refresh using the TOP button long press.

No Sound

- Press the Volume button on the back to cycle through volume levels. Mute is one of the levels.
- Confirm Night Mode is not active (a moon icon appears on the display during Night Mode).
- Check the Setup Portal file manager at 192.168.4.1/list to confirm alert WAV files are present.

LEDs Not Working

- Press the Brightness button on the back to cycle brightness. The lowest level is dim but visible.
- Confirm the device is fully powered via USB-C.

Night Mode Not Activating

- Confirm Night Mode is enabled in the Setup Portal and your time zone is set correctly.
- Night Mode requires a successful NTP time sync at startup. Check that the device connected to WiFi on boot.

Device Keeps Rebooting

- This usually indicates corrupted firmware. Enter BOOT mode (hold BOOT, unplug, replug, release BOOT) and reflash the firmware.

14. Technical Specifications

Specification	Detail
Microcontroller	ESP32-S3, dual-core 240 MHz
Display	1.9" colour LCD, 170 x 320 pixels
Connectivity	WiFi 802.11 b/g/n (2.4 GHz only)
Audio	I2S digital amplifier (MAX98357A), mono speaker
LED Strips	2x WS2812B RGB strips, 16 LEDs each (left and right wings)
Power	USB-C, 5V DC, 1A minimum
Base Unit Dims	115mm W x 50mm D x 40mm H
Card Holder Dims	100mm W x 40mm D x 155mm H
Card Compatibility	Raw cards, sleeved cards, and ~90% of graded slabs
Cards Tracked	1 (single card display and tracking)
Storage	FFat partition for audio files (internal flash)
Data Source	JustTCG API v1 (justtcg.com)
Supported Games	Pokémon, Pokémon Japan, Magic: The Gathering, Yu-Gi-Oh!, One Piece Card Game, Digimon, Disney Lorcana, Dragon Ball Super: Fusion World, Gundam Card Game, Star Wars: Unlimited, Grand Archive TCG, Union Arena, Flesh and Blood TCG, Hololive Official Card Game, Riftbound, and more
Firmware Version	5.6.0

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