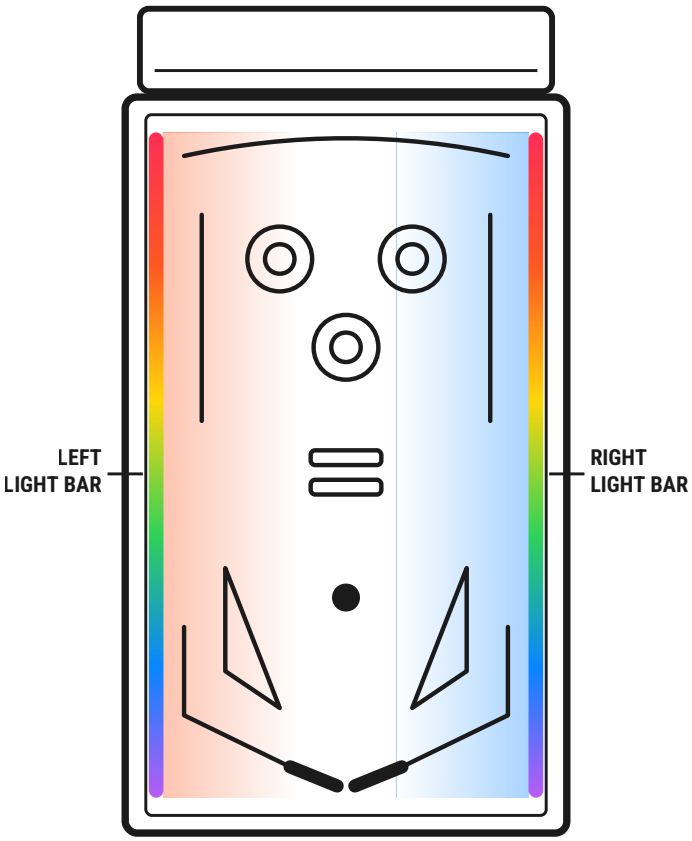
Pinlights

PINLIGHTS PRO

RGB CABINET LIGHTING FOR PINBALL



OWNER'S MANUAL

Manual Version 1.1 — November 2026

Important Safety Instructions

WARNING To reduce the risk of fire, electric shock or damage to your game, always switch off and unplug your pinball machine before opening the cabinet, raising the playfield or making any connection.

CAUTION Pinball machines contain voltages that can injure you, including line voltage at the service outlet and high-voltage display supplies in the backbox. Only connect Pinlights Pro inputs to the low-voltage circuits described in this manual.

1. Read and follow all instructions in this manual.
2. Use only the 5 V power supply included with Pinlights Pro.
3. Never connect INPUT 1–4 to a source greater than 48 V. Coil and flasher voltages vary between manufacturers and eras, so check your game's documentation or measure first.
4. Never connect any Pinlights Pro connector to line (mains) voltage.
5. Route all cables away from moving parts such as flippers, slingshots, ball troughs, motors and the playfield hinge.
6. Secure every connection with the included zip ties so that no wire can contact a coil, a lamp or the playfield mechanism.
7. When using metal cabinet brackets, the metal must **never** touch the playfield glass.
8. Do not modify the light bars or controller board, and do not operate them if they are damaged or wet.
9. Refer servicing of your pinball machine's own electronics to qualified personnel.

Legal Notices

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Pinlights reserves the right to change the features and specifications of its hardware, firmware and app at any time. Screenshots in this manual were made with app versions 1.1.1 to 1.1.3 and firmware versions 0.3.7 to 0.3.9, and may differ slightly from what you see.

A Manual for Online and Print Use

This manual is designed to be read on a computer, tablet or phone, and printed. Cross-references such as "see Rule Priority on p. 21" are clickable links in the PDF, and the bookmarks panel of your PDF reader shows the chapter list. Updates to the app and firmware often add new effects and features; check pinlights.net/support for the newest version of this manual.

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1 INTRODUCTION

WELCOME TO PINLIGHTS PRO

Pinlights Pro adds two RGBW light bars to the inside walls of your pinball cabinet and drives them with a programmable rules engine. When the game is on, the bars light the playfield with the general illumination (GI) color you choose and dim along with your game's own GI. When something exciting happens, such as a flasher firing, a magnet grabbing the ball or the start button being pressed, Pinlights Pro plays a light effect across the bars.

You decide what happens and when. Each **rule** watches the game, either through the four wired hardware inputs or, on Stern SPIKE™ games, by listening to the machine's own node bus. When a rule's conditions are met, it plays its **effects**: one picked at random, or several in sequence. Rules are arranged in priority order, so the most important moments in your game always win.

Everything is configured from the free Pinlights app for iOS and Android over Bluetooth. No laptop, no cables and no programming are required. If you don't want to build a light show yourself, you can install one that another owner of your game has shared with the community.

For the quickest path from the box to a working light show, go straight to Installation on p. 5 and the Quick Start Guide on p. 8.

FEATURE SUMMARY

- Two RGBW addressable light bars (left and right) with a dedicated white channel for clean, natural whites.
- General illumination (GI) mode that follows your game's own GI. The bars dim, brighten and switch off with the machine.
- Four optically isolated hardware inputs that accept 5–48 V AC or DC. INPUT 1 senses GI and game power, and INPUTS 2–4 trigger effects from flashers, coils, motors, buttons or lamps.
- Native Stern SPIKE 1, SPIKE 2 and SPIKE 3 integration through the included splitter (experimental). Trigger effects from any named switch or coil in the game, follow the game's own GI lamp without a GI cable, and color effects to match the game's RGB inserts, with no extra wiring.
- A priority-based rules engine. Higher-priority rules instantly interrupt lower ones, and conditions can be combined so that rules fire only when, for example, the game is on.
- More than 80 built-in effects, including blinks, strobes, wipes, comets, Larson scanners, fire, fireworks, rainbows, heartbeats and ocean waves. Speed, colors, repeats, run time, direction, fade and size are all adjustable.
- Several effects on one rule are either chosen at random each time the rule fires, so your light show never gets stale, or played one after another as a sequence.
- Independent GI brightness and effect (FX) brightness controls.
- Test Effect and Test Sequence preview your effects on the light bars instantly while you edit.
- The Input Monitor shows live input states and, on SPIKE games, a running log of switches, coils and rules as they fire.
- Community presets let you browse, install and share complete light shows for your game title.
- Optional cloud account to sync your game library across phones.
- Firmware updates over Bluetooth from within the app.

WHAT'S IN THE BOX

Your Pinlights Pro kit contains:

- Pinlights Pro controller board (red)
- 5 V power supply
- Left and right light bars, with flexible adhesive mounting strips attached

- Two 3-pin light bar cables
- Four 2-wire input cables
- Red/white alligator clips and wire taps for making input connections
- Two wire routing clips
- Zip ties
- Alcohol prep wipes

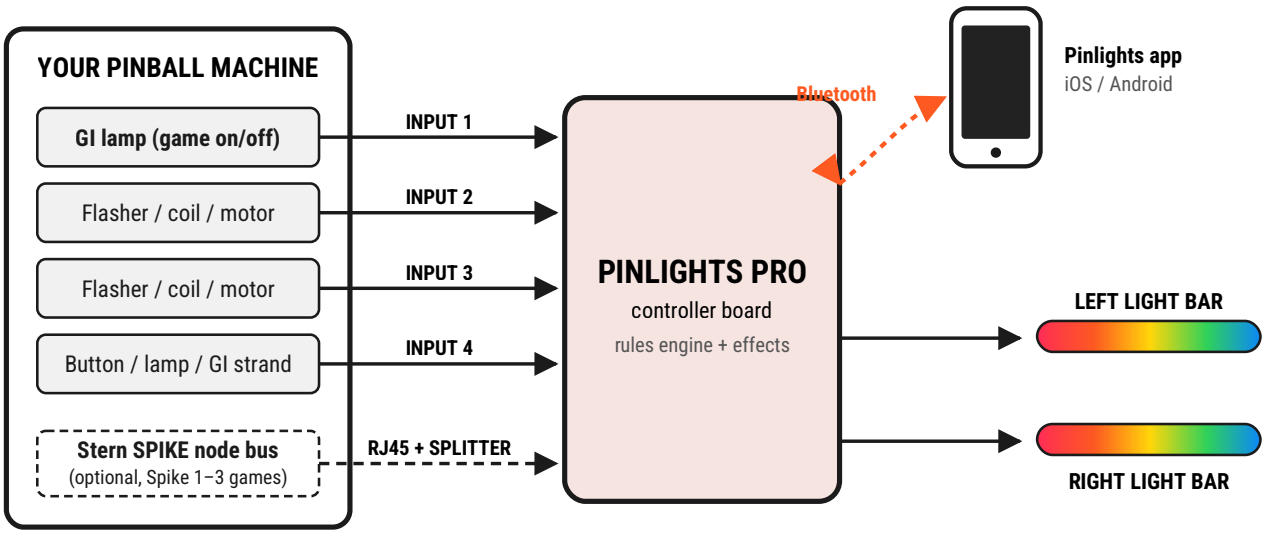
Depending on your order, your kit may also include metal cabinet mounting brackets, a manufacturer-specific connection kit, or the **Stern SPIKE splitter kit** (the splitter and two CAT5 cables).

QUICK TIP

Manufacturer-specific connection kits and instructions for many games are available at pinlights.net/support. If your kit came with its own instructions, follow those for the wiring steps.

HOW PINLIGHTS PRO WORKS

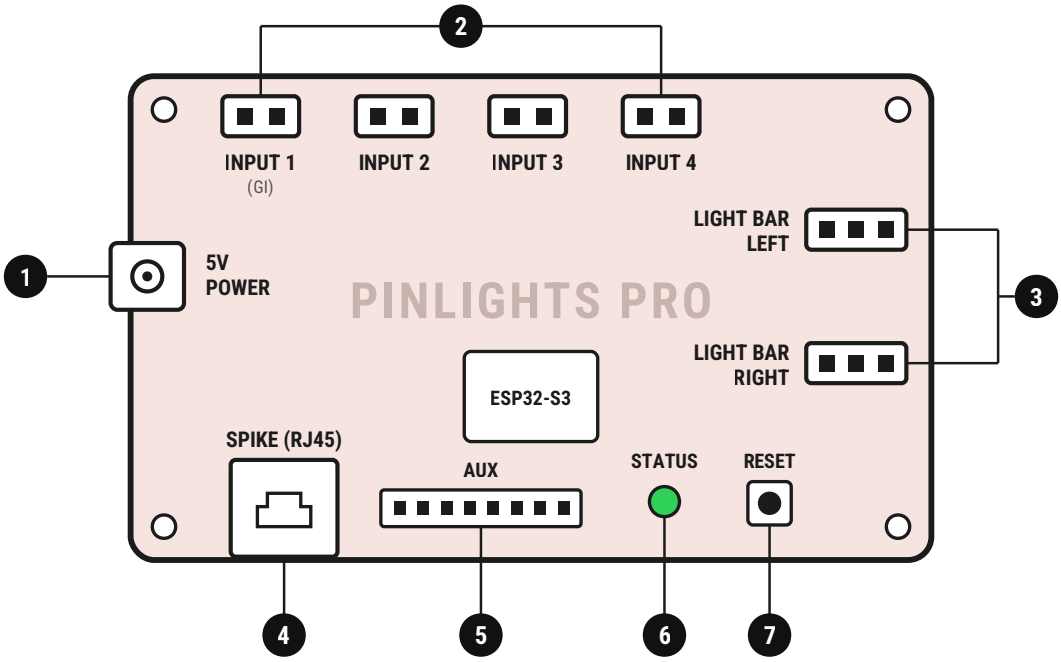
The diagram below shows the whole system. Signals from your game reach the controller board through the four hardware inputs and, on SPIKE games, through the node bus. The rules engine on the board decides what to show, and the two light bars display it. The app talks to the board over Bluetooth to change settings and rules. The board keeps working on its own after you close the app.



2 HARDWARE OVERVIEW

THE CONTROLLER BOARD

All connections are made to the red Pinlights Pro controller board, which normally sits in the bottom of the cabinet or behind the backboard. The illustration below shows the connectors you will use. It is a functional diagram; the exact position of each connector on your board may differ.



❶ **5V Power.** Connect the included 5 V power supply here. Plug the supply into your game's service outlet so that it switches with the machine, or into a wall outlet. Pinlights Pro follows your game's GI on INPUT 1, so the bars still switch on and off with the game even when the board is powered all the time.

❷ **INPUT 1–4.** Four optically isolated inputs that accept 5–48 V, AC or DC. Polarity doesn't matter. **INPUT 1** must be connected to a GI lamp; it tells Pinlights Pro when the game is on and how bright the GI is. On SPIKE games, Sync GI to Game on p. 34 can take its place. **INPUTS 2–4** are free for triggering effects. See Hardware Inputs 1–4 on p. 29.

❸ **Light Bars Left / Right.** 3-pin outputs for the left and right light bars. Each bar can be addressed on its own in the effect editor ("Side"), so be sure the left bar is plugged into LEFT and the right bar into RIGHT.

❹ **SPIKE (RJ45).** Connects to the node bus of a Stern SPIKE 1, 2 or 3 game through the SPIKE splitter. See Stern SPIKE Integration on p. 32. Leave it empty on other games.

❺ **AUX.** An auxiliary header reserved for expansion accessories. AUX states appear in the Input Monitor, but AUX inputs cannot currently be used to trigger rules. Leave AUX 1 and AUX 2 set to ANY in your rules.

❻ **Status LED.** Shows what the board is doing; see the table below.

❼ **Reset button.** Press and hold for at least four seconds to restore factory defaults. See Factory Reset on p. 41.

STATUS LED

The status LED gently pulses ("breathes") to show that the board is running. Its color tells you what the board can see. When more than one state applies, the LED shows the one highest in this table.

COLOR	PATTERN	MEANING
Cyan	Fast on/off blink	An expansion accessory board is connected.
Blue	Pulsing	The Pinlights app is connected over Bluetooth.
Pink	Pulsing	Stern SPIKE node bus data is being received (SPIKE games only).
Green	Pulsing	Normal operation.
(frozen)	Steady	A firmware update is in progress. Don't remove power.

NOTE

The light bars, not the status LED, flash **orange** when the app asks the board to identify itself during setup. The bars turn **solid orange** while a firmware update installs.

THE LIGHT BARS

Each light bar is a strip of individually addressable RGBW LEDs. The extra white (W) channel makes whites and pastel colors much cleaner than red, green and blue alone, which is why every color picker in the app includes a **White Intensity** slider.

The bars mount to the inside walls of the cabinet, just beneath the glass channel, so that they shine across the playfield. They can be mounted with the flexible adhesive strips that come attached to the bars, or with the optional metal cabinet brackets. See Installation on p. 5.

The two bars normally show the same thing. Any effect can be limited to the left or right bar, and direction options can be set separately for each bar, to make chases that run toward each other or follow the ball around the playfield.

FAQ: **WHY IS THERE A BRIGHTNESS LIMIT?** To keep power consumption and heat safe for an always-on accessory, the firmware caps the bars at a fixed maximum drive level. The GI Brightness and FX Brightness controls in the app scale within that limit, so 100% in the app is the brightest the bars are designed to run.

3 INSTALLATION

BEFORE YOU BEGIN

Installation takes about 30–60 minutes and needs no soldering. You will need access to the inside of the cabinet and the underside of the playfield.

- Switch off and unplug the game before you start.
- Install the **Pinlights app** on your phone. It is available for Android and iOS (iOS may require TestFlight). If you already have the app, make sure it is up to date; app and firmware updates often add new effects and fixes.
- Read Important Safety Instructions on p. 1.

QUICK TIP

If you have a SPIKE game and the SPIKE splitter kit, you can skip connecting the FX trigger inputs in Step 3. The node bus gives Pinlights Pro access to every switch and coil in the game. Connect INPUT 1 to the GI as well. With firmware 0.3.9 or later you can switch on Sync GI to Game on p. 34 instead, and the INPUT 1 cable becomes optional.

STEP 1. APPLY POWER

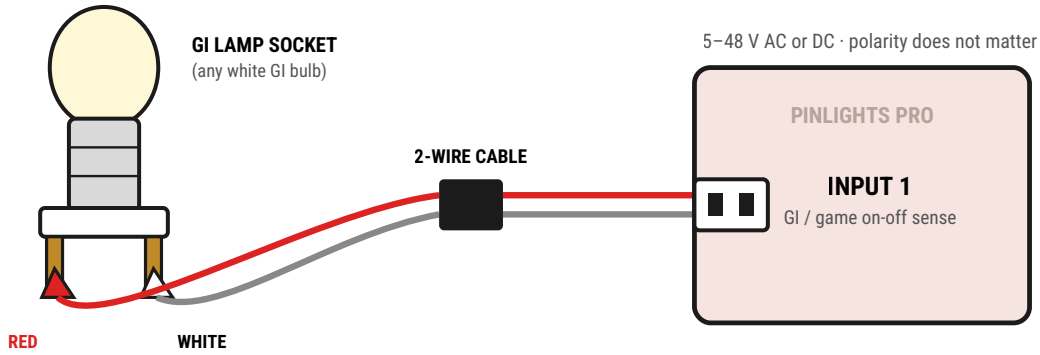
Plug the included 5 V power supply into your game's service outlet, and the other end into the red Pinlights Pro controller board.

If your game doesn't have a service outlet, you can run the plug outside the cabinet to a wall outlet. The unit still switches on and off with your game's GI even though it is always powered.

STEP 2. CONNECT A GI (GENERAL ILLUMINATION) BULB

Pinlights Pro syncs to your game's on/off state by sensing 5–48 V on **INPUT 1**. This lets the bars dim with your game's general illumination and switch off when the game switches off.

1. Locate any white GI bulb in your game.
2. Clip the red and white alligator clips to the two lugs of the lamp socket. Polarity doesn't matter.
3. Use one of the four included 2-wire cables to connect the alligator clips to **INPUT 1** on the controller board.



Connecting INPUT 1 to a GI lamp socket.

If your game has no accessible bayonet (twist-and-turn) sockets, use the included wire taps on the wires to the coin door's interface bulbs instead. Connection instructions for your game's manufacturer are at pinlights.net/support.

IMPORTANT INPUT 1 must see your game's **GI**, not a flasher or a lamp that the game switches on and off. Pinlights Pro uses INPUT 1 to decide whether the game is on, and the GI light bars follow its brightness.

STEP 3. CONNECT YOUR FX TRIGGERS

INPUTS 2, 3 and 4 can trigger RGB light effects from any 5–48 V signal in the game. They are ideal for flashers, motors, alternate GI strings, and even coils. Use the remaining alligator clips, wire taps and 2-wire cables to make your connections.

Use the included zip ties to secure your connections. Make sure that no clip can touch another terminal and that no wire can be pulled by a moving mechanism. Manufacturer-specific connection kits are available at pinlights.net; refer to the documentation included with those products where applicable.

See Hardware Inputs 1–4 on p. 29 for advice on choosing good trigger signals.

STEP 4. INSTALL THE WIRE ROUTING CLIPS

1. Lower the playfield and install the two included wire routing clips behind the machine's backboard, one on each side.
2. Connect the left and right 3-pin cables to the controller board's **LIGHT BARS** connectors (LEFT and RIGHT).
3. Run the black JST connector end of each cable to the wire clip on the matching side of the backboard.

STEP 5. SURFACE PREPARATION

Use the included alcohol wipes to clean the left and right cabinet walls just beneath the glass channel. Allow them to dry completely. This ensures good adhesion for the flexible mounting strips.

If you purchased the metal cabinet mounting brackets, you can skip this step.

STEP 6. INSTALL THE LIGHT BAR MOUNTS

With the metal cabinet mounting brackets: install a bracket on each side between the glass channel and the cabinet wood. The short side of the bend slips just under the plastic glass channel. You can use the adhesive strip on the back for extra tack, but double-check alignment before you press it down; the adhesive is very strong.



WARNING The metal bracket must **never** touch the playfield glass directly.

With the factory flexible mounting strips:

1. Leave the strip attached to the light bar and peel the white liner paper off the back.
2. Align the bar so that its top sits just beneath the glass channel, and press it firmly against the cabinet wall.
3. Remove the light bar. The flexible adhesive strip should now stay stuck to the wall.
4. Firmly press the adhesive strip down along its whole length, then press the light bar back onto it.

Repeat for the other side, then plug each bar into the JST connector at its wire clip.

STEP 7. POWER UP THE RIG

With everything installed, power on your game. The status LED on the board starts pulsing green and the light bars light up in the GI color.

Now add the board to the app. Follow Add Your Game to the App on p. 8 in the Quick Start Guide. During setup, the bars of the unit you selected flash **orange** so you can be sure you are configuring the right one.

STEP 8. MAKE IT YOUR OWN

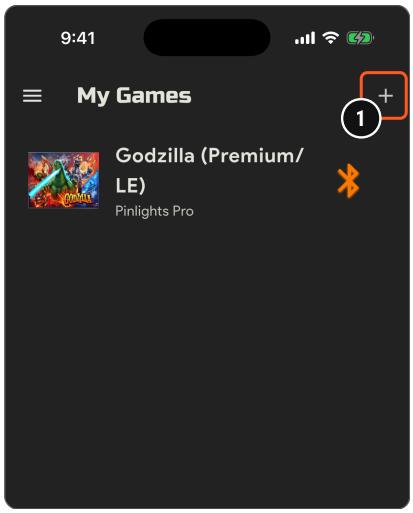
You're ready to start building your own light show. Browse the community presets for your game, or create your own rules and effects. The Quick Start Guide on p. 8 walks you through your first rule.

4 QUICK START GUIDE

This guide takes you from a freshly installed Pinlights Pro to your first custom light effect in about ten minutes. It assumes that you have completed Installation on p. 5, that the game is switched on, and that your phone's Bluetooth is turned on.

ADD YOUR GAME TO THE APP

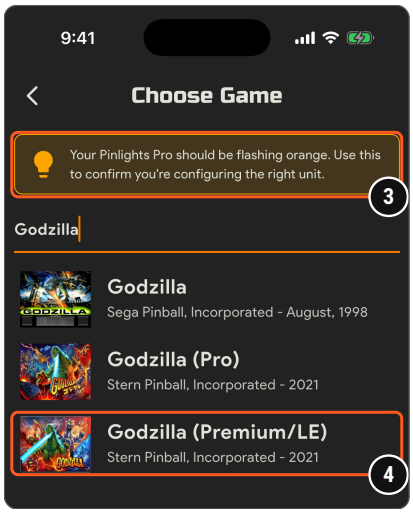
Each Pinlights Pro board is added to the app as a **game**. You only need to do this once per machine.



My Games. *Tap [+].*



Add Game. *Tap your PLPRO unit.*



Choose Game. *Search for and pick your title.*

1. Open the Pinlights app. On the **My Games** screen, tap the **[+]** icon in the upper-right corner ❶. (If your library is empty, you can also tap **Add a Game**.)
2. The **Add Game** screen scans for nearby units. Your board appears as **PLPRO** followed by its address, for example "PLPRO 3C:61:05:9A:7E:12". Tap it ❷. If nothing appears, pull down on the list to scan again.
3. The light bars of the unit you selected now **flash orange**, and a banner reminds you to check ❸. If the wrong game's lights are flashing, go back and pick another unit.
4. Type part of your game's name in the **Game Name** field and tap the correct title in the results ❹. Be sure to pick the exact model (for example *Pro* or *Premium/LE*); for SPIKE games this loads the list of switch and coil names used by the rules editor.

The app saves the game and returns to **My Games**. Tap the game at any time to connect to it and open its settings.

QUICK TIP

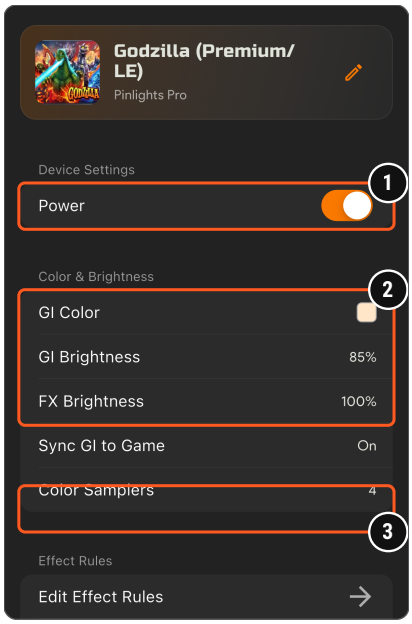
Choosing the right title also determines which community presets are offered for your game, and whether the **Spike Triggers** section appears in the rule editor.

SET YOUR GI COLOR AND BRIGHTNESS

When no effect is playing, the light bars show your **GI color**, dimmed along with the game's own GI. Set it first; it is what you will see most of the time.

1. Tap your game on the **My Games** screen. The app shows "Connecting to game…" while it downloads the board's settings.
2. Make sure **Power** is switched on ❶.
3. Under **Color & Brightness** ❷, tap **GI Color**. Drag the color wheel to choose a hue and use the **White Intensity** slider to add the dedicated white LEDs. The light bars change as you drag. Swipe the sheet down to close it.
4. Tap **GI Brightness** and **FX Brightness** to set the overall brightness of the GI and of the effects.

Edit Effect Rules ❸ takes you to the rules engine, which you will use next.



RULES IN ONE MINUTE

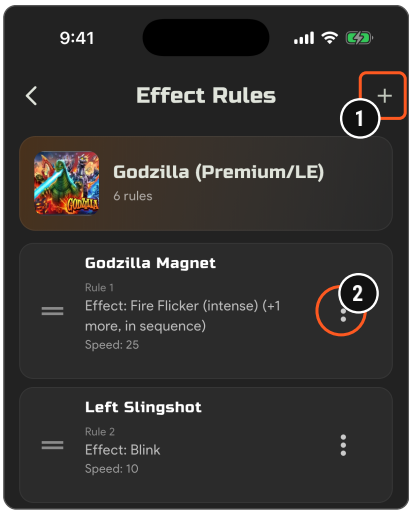
Before creating your first rule, here is everything you need to know:

- A **rule** says "**when** these conditions are true, **play** one of these effects."
- Conditions are the states of INPUT 1–4 (**ON**, **OFF** or **ANY** = don't care) and, on SPIKE games, specific switches or coils. All of a rule's conditions must be true at the same time.
- Rules are listed in **priority order**. Rule 1, at the top of the list, is the most important. A rule can interrupt any rule *below* it, but never one *above* it.
- Adding several effects to one rule makes Pinlights Pro **pick one at random** each time the rule fires, or, with **Play in Sequence** on, **play them all in order**.

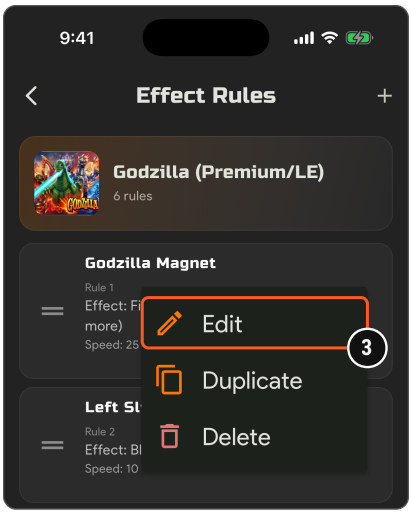
The full details are in The Rules Engine on p. 16 and Rule Priority on p. 21.

CREATE YOUR FIRST RULE

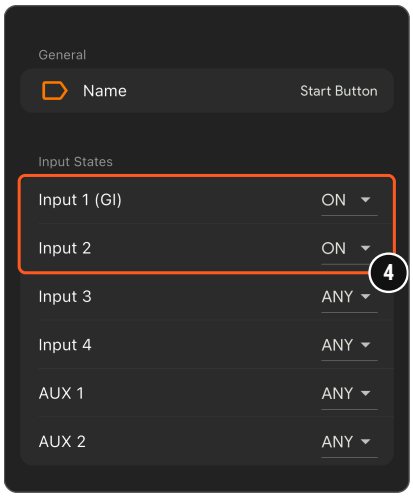
In this example you will flash the light bars white whenever a flasher wired to **INPUT 2** fires, but only while the game is on.



Tap [+] to add a rule, then ⋮ on the rule.



*Choose **Edit**.*

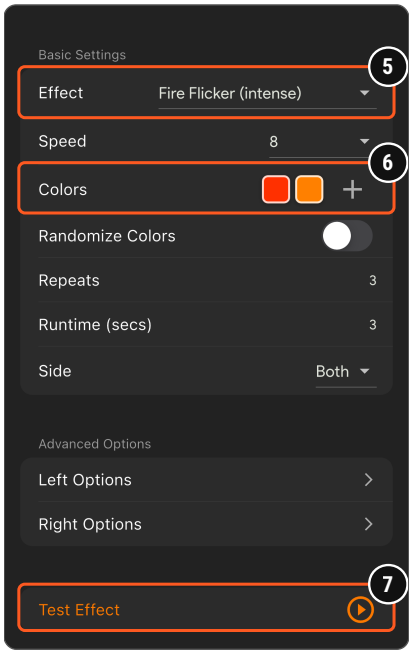


Set the Input States.

1. On your game's screen, tap **Edit Effect Rules**. The **Effect Rules** screen lists the rules already on the board.
2. Tap **[+]** 1 . A new rule is added at the bottom of the list and sent to the board immediately.
3. Tap the ⋮ button on the new rule 2 and choose **Edit** 3 .
4. Tap **Name** and enter a name, for example "Flasher".
5. Under **Input States** 4 , set **Input 1 (GI)** to **ON** and **Input 2** to **ON**. Leave the other inputs at **ANY**.

IMPORTANT New rules start with **Input 1 (GI) = OFF**, which means "only when the game is off". That is ideal for an attract-mode light show, but for an in-game effect you must change it to **ON** (or **ANY**).

6. Scroll down to **Effects** and tap **Effect 1** to open the effect editor.
7. Tap the **Effect** drop-down 5 and choose **Blink**.
8. Under **Colors** 6 , long-press each color swatch to remove it, then tap **[+]** and pick white (move the **White Intensity** slider all the way to the right). Switch **Randomize Colors** off.
9. Set **Speed** to 5 and **Repeats** to 2 (three flashes in total).
10. Tap **Test Effect** 7 . The light bars play the effect immediately, so you can fine-tune it.
11. Tap **Back** to save the effect, then **Back** again to return to the rule list.



That's it. Fire the flasher (or start a game) and the bars flash white.

NOTE

Changes in the effect editor are sent to the board when you leave the screen with **Back**. Changes in the rule editor are saved as you make them.

PUT THE RULE IN THE RIGHT PLACE

Your new rule was added at the bottom of the list, which makes it the **lowest** priority. To move it, **press and hold** the rule card, then drag it up or down. When you drop it, every rule is renumbered from the top, and the new order is written to the board.

Put short, important effects such as flashers, magnets and jackpots near the top, and long, ambient effects such as an attract-mode show at the bottom. Rule Priority on p. 21 explains why.

TRY A COMMUNITY PRESET

If other owners of your game have shared their light shows, an orange "***N* community presets available**" line appears on your game's screen. Tap it, pick a preset, read its description and **Connections** (which inputs it expects to be wired to what), and tap **Install Preset**. See Community Presets on p. 39.

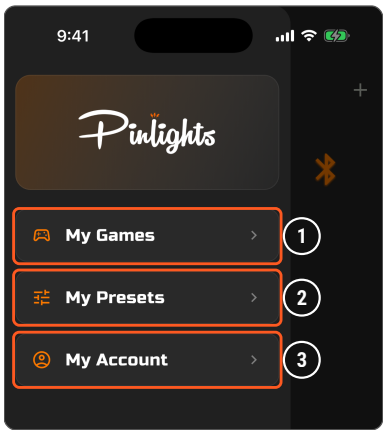


CAUTION Installing a preset **replaces all of your rules** and your GI color and brightness settings.

5 THE PINLIGHTS APP

The Pinlights app is where you set up and customize everything. This chapter is a tour of its screens. The rules engine and effects have their own chapters.

NAVIGATING THE APP



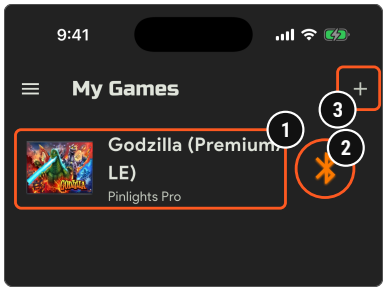
The app opens on **My Games**. Tap the ☰ menu icon in the upper-left corner to open the navigation drawer:

1. **My Games.** Your library of Pinlights-equipped machines.
2. **My Presets.** Browse light-show presets shared by the community and your own published presets.
3. **My Account.** Sign in, sign up, or manage your cloud account.

The app version is shown at the bottom of the drawer. Include it when you contact support.

Within a game, settings are grouped into labeled sections. Tap a row to open it. Rows with an arrow (→ or ›) lead to another screen, and the ‹ button in the upper-left corner goes back.

MY GAMES



Every Pinlights Pro you add appears here with its game title, box art and model.

1. **Tap a game** to connect to it and open its settings. The app connects over Bluetooth only while a game screen is open, and disconnects when you go back.
2. **The Bluetooth icon** shows whether the lights are on (orange glow) or off (grey). Tap it to switch the lights on or off without opening the game.
3. **[+]** adds another game. See Add Your Game to the App on p. 8.

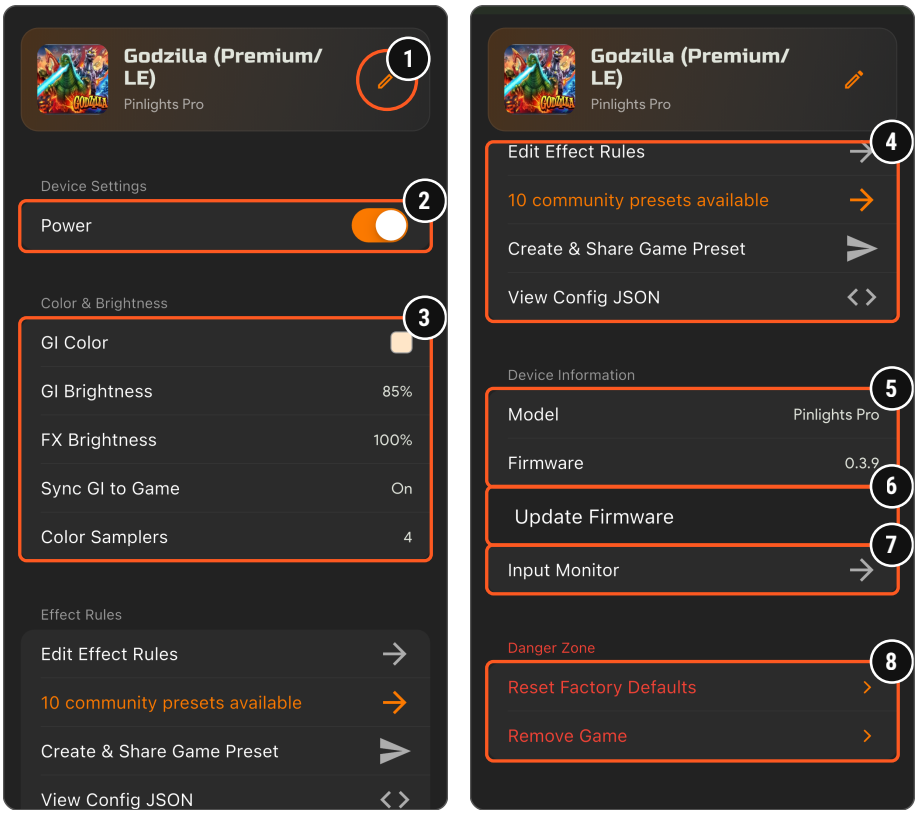
Pull down on the list to rescan for nearby units.

QUICK TIP

Your phone must be within Bluetooth range of the machine, usually a few meters, to connect. If a game won't connect, move closer, make sure the game is powered, and pull down to refresh.

THE GAME SCREEN

Tapping a game opens its main settings screen. The top half controls the lights. The bottom half shows device information and maintenance functions.



1 Game title. Tap the pencil to change which pinball title this unit is assigned to. You choose from the same title search used during setup. Titles always come from the Pinlights title database; you can't type a free-form name.

2 Device Settings – Power. Switches the light bars on or off. When you switch them on or off, the bars play a quick wipe from the center. While the power is off, the bars stay dark and rule effects are suppressed.

3 Color & Brightness.

- **GI Color** opens a color wheel with a **White Intensity** slider. The bars update live as you drag; swipe the sheet down to close it.
- **GI Brightness** sets how bright the GI color is when your game's GI is fully on. The bars still dim with the game's own GI.
- **FX Brightness** sets the brightness of rule effects. Effect brightness doesn't follow the game's GI.
- **Sync GI to Game** (SPIKE titles) makes the GI follow the game's own GI lamp instead of INPUT 1. The row shows **On** or **Off**. See Sync GI to Game on p. 34.
- **Color Samplers** (SPIKE titles) lets effects take their colors from the game's RGB inserts. The row shows how many are set up. See Color Samplers on p. 35.

4 Effect Rules.

- **Edit Effect Rules** opens the rule list. See The Rules Engine on p. 16.
- ***N* community presets available** appears in orange when other owners have shared presets for this title. See Community Presets on p. 39.
- **Create & Share Game Preset** publishes your current setup to the community (account required).
- **View Config JSON** shows the board's complete raw configuration, with a copy button. Support may ask you for it when troubleshooting.

5 Device Information. Model and **Firmware** version reported by the board.

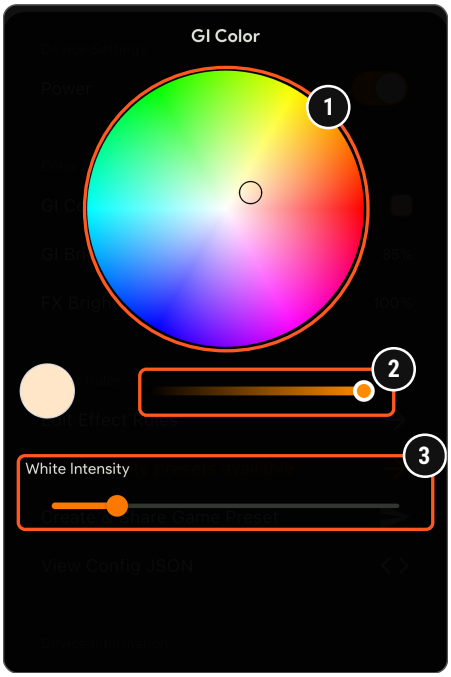
6 Update Firmware. Checks for, downloads and installs the newest firmware over Bluetooth. See Firmware Updates on p. 41.

❼ **Input Monitor.** A live view of the hardware inputs and, on SPIKE games, of switch, coil and rule activity. See The Input Monitor on p. 31.

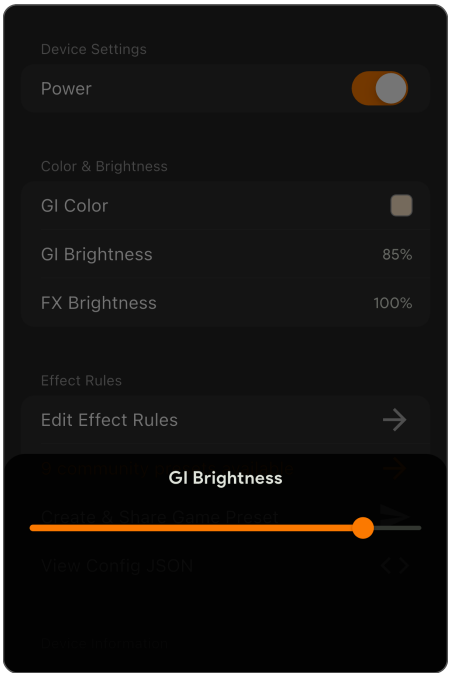
❽ **Danger Zone.**

- **Reset Factory Defaults** erases all rules and settings on the board. See Factory Reset on p. 41.
- **Remove Game** removes the game from your library (after a confirmation). This does **not** erase the board's configuration. If you add the board again, its rules are still there.

COLOR AND BRIGHTNESS CONTROLS



GI Color: hue wheel ❶, color/brightness ❷, White Intensity ❸.



GI Brightness slider.

The same color picker is used for the GI color and for effect colors. Choose the hue on the wheel ❶ and adjust its brightness with the slider beside the preview swatch ❷. The **White Intensity** slider ❸ mixes in the dedicated white LEDs; use it for clean whites, warm "incandescent" GI, and pastel tints.

QUICK TIP

For a classic incandescent GI look, pick a pale orange hue and add about 25% White Intensity. For a cool, modern LED look, use white with a slight blue tint.

MY PRESETS

The **My Presets** screen (from the drawer) lists presets published by the Pinlights community, with their game title, author, download count, likes and age. When you are signed in, the chips at the top switch between **My Presets** (the presets you published) and **All Presets**.

This screen is for browsing. Presets are installed from the screen of the game they belong to; see Community Presets on p. 39.

MY ACCOUNT

A Pinlights account is **optional**. You only need one if you want to:

- sync your game library to the cloud and across several phones, or

- create and share presets with the community.

Tap **My Account** in the drawer to **Sign in**, **Sign up** or **Reset password**. When you are signed in, the Account screen shows your email address and has **Sign Out** and **Delete Account** buttons.



NOTE

Cloud sync covers your list of games. Rules and settings are stored **on the Pinlights Pro board itself**, so they keep working without the app and are the same no matter which phone connects.

6 THE RULES ENGINE

The rules engine is the heart of Pinlights Pro. It runs on the controller board, not on your phone, and continuously compares what is happening in your game with your list of rules. When a rule's conditions are met, it plays the rule's effects on the light bars: one picked at random, or all of them in order. When no effect is playing, the bars show the GI color.

ANATOMY OF A RULE

Every rule has four parts:

PART	WHAT IT DOES
Name	A label for the rule, such as "Left Ramp" or "Attract Mode" (up to 32 characters).
Conditions	**When** the rule fires: the required state of INPUT 1–4 and, on SPIKE games, of specific switches and coils.
Effects	**What** plays. One or more effects. If there are several, one is picked at random each time, or they all play in order if **Play in Sequence** is on.
Advanced settings	**How** it behaves: Debounce Time, Kill on Input Release, and Latch.

A rule's **position in the list** is its priority. See Rule Priority on p. 21.

THE EFFECT RULES LIST

Open it from your game's screen with **Edit Effect Rules**. The header shows the game and how many rules are stored on the board.



❶ **[+] Add rule.** Adds a new rule to the bottom of the list and sends it to the board immediately.

❷ **Drag handle.** Press and hold anywhere on a rule card, then drag it to change its position (priority).

❸ **Rule summary.** The rule's name and number ("Rule 1" is the highest priority), its first effect ("+1 more" if it has several, "+1 more, in sequence" if they play in order), and the effect's raw speed value.

❹ ⋮ **Rule options. Edit**, **Duplicate** (adds a copy named "… (Copy)" directly below), or **Delete**.

❺ **Conditions.** A summary of the rule's input conditions, for example "Input 1 (GI)=On AND Input 2=On". SPIKE triggers are not shown in the summary.

CAUTION **Delete** removes the rule immediately; there is no confirmation and no undo. If you're experimenting, **Duplicate** the rule first.

DEFAULT SETTINGS FOR A NEW RULE

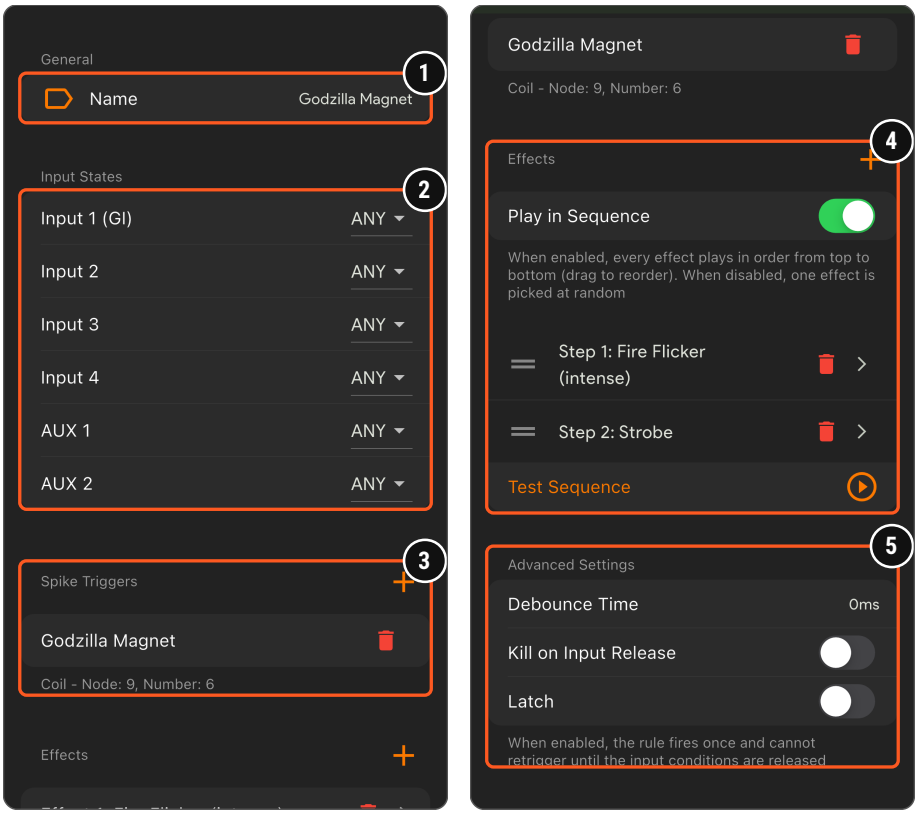
A rule created with [+] starts with:

- **Input 1 (GI) = OFF** and all other inputs ANY. In other words, it fires when the game is **off**.
- One **Static** effect in five colors (red, yellow, green, cyan and blue) with **Randomize Colors** on, played on both bars.
- Debounce Time 0 ms, Kill on Input Release off, and Latch off.

Change the Input States before you do anything else if the rule is meant to fire during play.

EDITING A RULE

Choose ⋮ › **Edit** to open the **Edit Rule** screen. Changes on this screen are saved to the board as you make them.



❶ **General – Name.** Tap to rename the rule. A good name makes the Input Monitor's log and your rule list much easier to read.

❷ **Input States.** One drop-down per input: **ANY**, **ON** or **OFF**. See Conditions on p. 17 below.

❸ **Spike Triggers.** Shown only for Stern SPIKE titles. Tap **[+]** to add a switch or coil as a condition, tap a trigger to edit it, or tap the trash can to remove it. See Stern SPIKE Integration on p. 32.

❹ **Effects.** The list of effects this rule can play. Tap **[+]** to add an effect, tap an effect to edit it (see Effects and Options on p. 24), or tap the trash can to remove it. A rule always keeps at least one effect, so the last one can't be deleted. Once a rule has two or more effects, a **Play in Sequence** switch appears at the top of the list. See Several Effects on One Rule on p. 19.

❺ **Advanced Settings. Debounce Time**, **Kill on Input Release** and **Latch**. See below.

CONDITIONS

A rule's conditions say **when** it may fire. Each input can be set to:

SETTING	MEANING
ANY	Don't care. This input is ignored by the rule.
ON	The input must be active (voltage present).
OFF	The input must be inactive (no voltage).

All of the conditions you set must be true at the same time for the rule to fire; they are combined with AND. Spike triggers count as conditions too, so a rule can combine, for example, *Input 1 (GI) = ON* with *Switch "Left Ramp Made" = ON*.

A rule needs **at least one** condition that isn't ANY. A rule with every input at ANY and no Spike triggers never fires.

Conditions are **states**, not momentary events. A rule whose conditions remain true (for example, *Input 1 (GI) = OFF* while the game sits switched off) stays "true" the whole time. What happens then is controlled by Latch; see below.

QUICK TIP

Use **Input 1 (GI)** to separate in-game effects from attract-mode effects. *Input 1 = ON* rules only fire while the game is on; *Input 1 = OFF* rules only fire while it is off. Leave it at ANY for rules that should work in both cases.

NOTE

AUX 1 and **AUX 2** are reserved for expansion accessories and can't currently trigger rules. Always leave them at **ANY**.

ADVANCED SETTINGS

DEBOUNCE TIME

Debounce Time (0–1000 ms) filters out noise and rapid re-triggering. It does two things:

1. The rule's conditions must stay true **continuously** for at least this long before the rule fires.
2. After firing, the rule can't fire again until at least this much time has passed.

Use 0 ms for clean signals and for all **SPIKE coil** triggers. Use 20–100 ms for a switch or button wired to an input that "bounces", or for a signal you want to ignore if it's very brief.

IMPORTANT Rules triggered by a **SPIKE coil** must use a Debounce Time of **0 ms**. A coil firing is a brief event, and a non-zero debounce will cause the rule to miss it most of the time.

KILL ON INPUT RELEASE

Normally an effect, once started, plays to its natural end even if the rule's conditions go away. With **Kill on Input Release** switched on, the effect stops as soon as the conditions are no longer true, after the Debounce Time.

Use it to make the light bars follow a signal exactly: for example, an effect that should last only as long as a flasher is lit or a motor runs.

LATCH

Latch controls what happens when a rule's conditions stay true after its effect finishes:

	CONDITIONS HELD TRUE	CONDITIONS TRUE ONLY BRIEFLY
Latch off	The effect plays, ends, and plays again, repeating for as long as the conditions hold.	The effect plays once.
Latch on	The effect plays **once**. The conditions must go false before the rule can fire again.	The effect plays once.

Use **Latch off** for continuous, looping light shows such as attract mode or a "mode running" background. Use **Latch on** for one-shot reactions to a state change, such as "play a celebration once when the ball-save lamp lights".

HOW LONG AN EFFECT PLAYS

Each effect plays for either:

- **Repeats + 1 cycles** when **Runtime** is 0. (Repeats = 0 plays a single cycle, Repeats = 2 plays three.) What counts as a "cycle" depends on the effect: one flash for Blink, one full wipe on and off for Color Wipe, one pass for Comet, and so on.
- **Runtime** seconds when Runtime is greater than 0. Repeats is then ignored.

When the effect ends, the bars return to the GI color, unless the rule plays its effects in sequence and has another step, or a rule fires again straight away.

QUICK TIP

Some effects (for example Rainbow Cycle, Fire Flicker or Ocean Waves) look best as continuous backgrounds. Give them a Runtime, or use Latch off, rather than relying on Repeats.

SEVERAL EFFECTS ON ONE RULE

A rule can have any number of effects. When it has two or more, the **Play in Sequence** switch at the top of the rule's **Effects** list decides what happens each time the rule fires:

PLAY IN SEQUENCE	EACH TIME THE RULE FIRES
Off (the default)	Pinlights Pro **picks one** of the effects at random and plays it.
On	Pinlights Pro plays **every** effect, one after another, from the top of the list to the bottom.

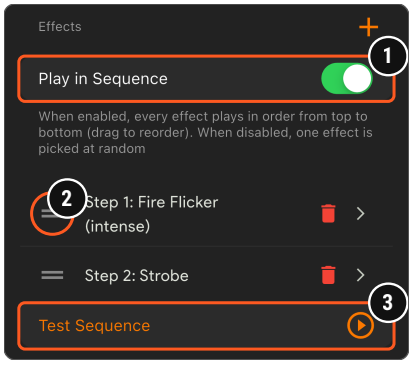
Each effect in the list has its own settings: type, speed, colors, repeats, runtime, side and options.

PICKING ONE AT RANDOM

This is the easiest way to keep a light show from becoming predictable: give your "jackpot" rule three different celebration effects and you'll never know which one you'll get.

PLAYING IN SEQUENCE

Use a sequence to build one longer show out of simple steps, for example a white **Blink** followed by a **Color Wipe 3** in your game's colors. Switch on **Play in Sequence** ❶ at the top of the rule's **Effects** list.



- Each step plays for its own Repeats or Runtime (see How Long an Effect Plays on p. 19), and the next step starts as soon as it ends. After the last step, the bars return to the GI color.
- With Play in Sequence on, the effects are listed as **Step 1**, **Step 2** and so on. To change the order, press and hold a step's **drag handle** ❷ and drag it to a new position. The new order is saved to the board right away.
- Tap **Test Sequence** ❸ below the steps to play the whole sequence on the light bars, even if the lights are switched off.
- The whole sequence counts as the rule's effect. A higher-priority rule can interrupt it at any step, and the remaining steps are then skipped. **Kill on Input Release** stops the whole sequence, and with **Latch off** the sequence starts again from Step 1 while the conditions hold. See Rule Priority on p. 21.

IMPORTANT **Chase Flash**, **Chase Flash Random**, **Filler Up**, **Flipbook** and **Auxiliary WS2812** never end on their own, so the steps after them would never play. In a sequence these effects need a **Runtime** of at least 1 second. When you switch on Play in Sequence, the app gives any of them that has no Runtime **5 seconds** and tells you; it does the same when you change a step to one of these effects. A step that still has no Runtime, for example one installed from an older preset, is marked in amber.

NOTE

Play in Sequence and Test Sequence need firmware **0.3.9** or later. If a rule has two or more effects and you don't see the switch, update the board's firmware; see Firmware Updates on p. 41.

RULE RECIPES

The following examples show common ways to combine conditions and settings. Adjust effects and colors to taste.

GOAL	CONDITIONS	SETTINGS
Attract mode light show while the game is off	Input 1 (GI) = OFF	Latch off. Effects: Ocean Waves, Rainbow Cycle, Running Lights (picked at random). Put it at the **bottom** of the list.
Jackpot: a flash, then a sweep	Spike switch or input for the jackpot = ON	**Play in Sequence** on, Latch on. Step 1: Blink in white, Repeats 2. Step 2: Color Wipe 3 in your game's colors. Put it near the **top**.
Flash with a flasher during play	Input 1 (GI) = ON, Input 2 = ON	Blink in white, Repeats 1–3. Kill on Input Release optional.
Start-button sparkle	Input 1 = ON, Input 3 = ON	Comet or Larson Scanner, Debounce 50 ms, Latch on.
Shaker motor rumble	Input 1 = ON, Input 4 = ON	Fire Flicker (intense), Kill on Input Release on, Runtime 5 s.
SPIKE magnet grab	Spike coil "Magnet" = ON	Debounce **0 ms**. Strobe or Fire Flicker. Put it near the **top**.
Left/right slingshot kick	Spike coil "Left Slingshot" = ON (another rule for Right)	Debounce 0 ms. Blink with Side = Left (or Right), Repeats 1.

7 RULE PRIORITY

A busy pinball game can trigger several rules at once: a slingshot fires while a magnet grabs the ball while a flasher strobes. Pinlights Pro plays **one effect at a time**, so it needs to know which matters most. That's what rule priority is for.

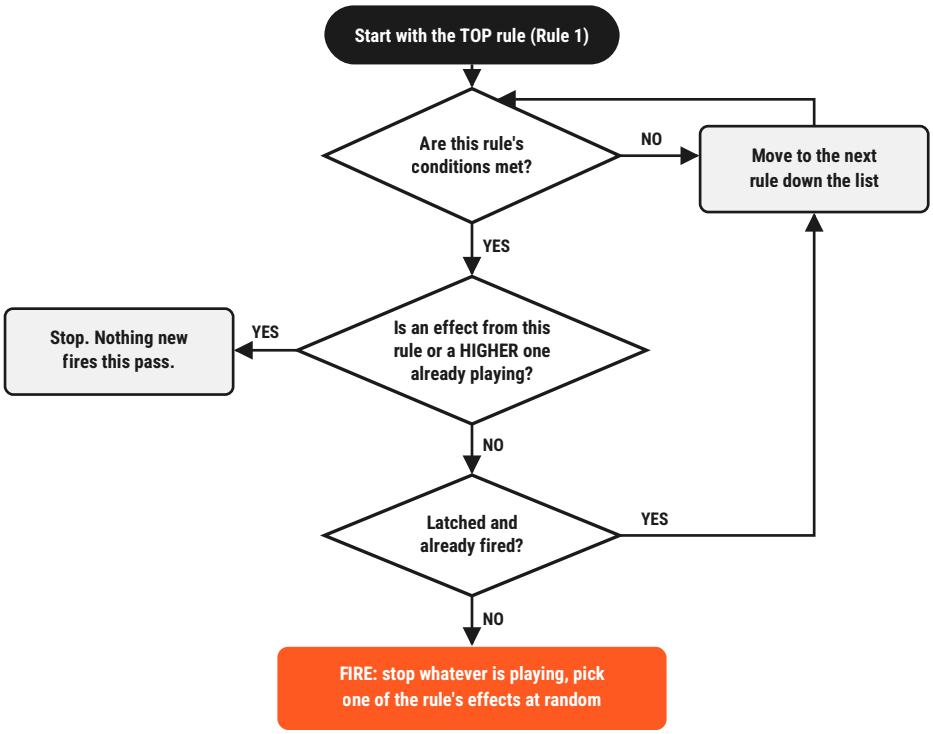
THE GOLDEN RULE

> **The higher a rule is in the Effect Rules list, the higher its priority.**

Rule 1 at the top of the list is the most important. A rule can **interrupt** any rule below it, and is **never** interrupted by a rule below it. To change a rule's priority, press and hold it in the list and drag it to a new position. The rules are renumbered from the top when you drop it.

HOW RULES ARE EVALUATED

Many times per second, and immediately whenever a SPIKE switch or coil changes, the board walks down your rule list from the top:



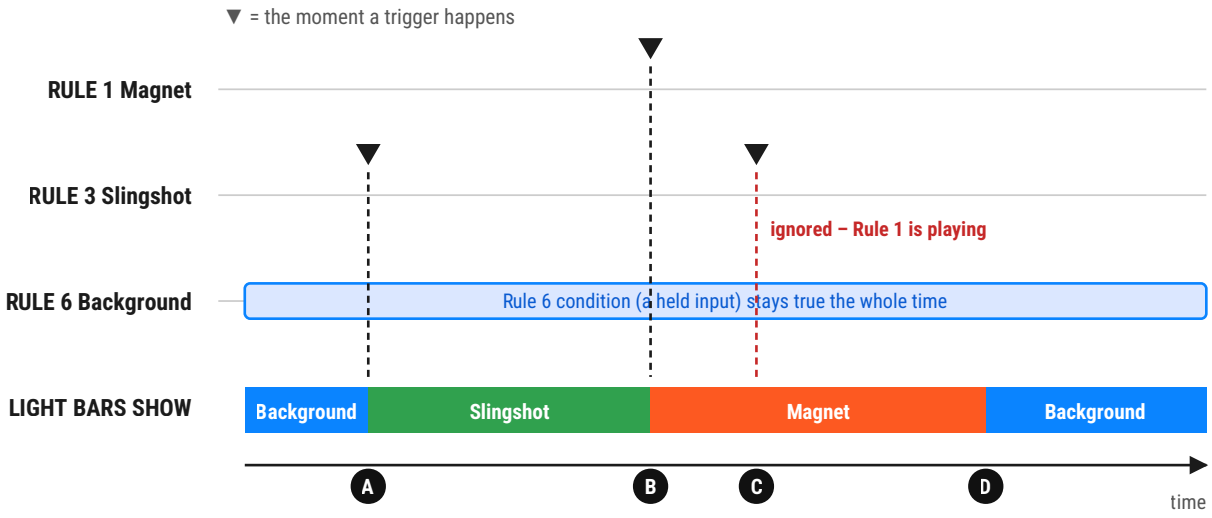
1. Rules whose conditions are not met are skipped.
2. The first rule whose conditions **are** met is checked against what's currently playing.
   - If an effect from **that rule or a higher one** is already playing, nothing happens, and the board stops checking for this pass. Rules lower in the list don't get a turn.
   - Otherwise the rule **fires**. Whatever was playing is stopped at once, and the rule's effect starts (or the first step of its sequence).
3. At most **one** rule fires per pass.

WHAT THAT MEANS IN PRACTICE

- **Higher-priority rules interrupt lower ones instantly.** The interrupted effect is discarded, not paused. It doesn't resume afterwards.
- **Lower-priority rules are ignored while a higher-priority effect plays.** Nothing is queued. If a lower rule's trigger is a brief event, such as a coil firing or a short pulse on an input, it is simply missed.
- **Held conditions get another chance.** If a lower rule's conditions are *still* true when the higher effect ends, it fires then.
- **Equal priority can't interrupt.** A rule never interrupts itself while its own effect is playing.
- **A sequence counts as one effect.** While any step of a rule's sequence plays, the rule holds its place: rules below it wait until the last step ends, and a higher rule that interrupts it discards the remaining steps.
- **One effect for both bars.** An effect set to Side = Left still occupies the engine. While it plays, the right bar shows GI, and a lower-priority right-side effect won't start until it finishes.

AN EXAMPLE

The timeline below shows three rules: a background rule at the bottom of the list (Rule 6) whose input stays on, a slingshot coil rule (Rule 3), and a magnet coil rule at the top (Rule 1).



A. The slingshot fires. Rule 3 outranks Rule 6, so the background effect stops and the slingshot effect starts.

B. The magnet fires. Rule 1 outranks Rule 3, so the slingshot effect is cut off and the magnet effect starts.

C. The slingshot fires again, but Rule 1's effect is still playing. Rule 3 is lower, so this event is **ignored**.

D. The magnet effect ends. Rule 6's input is still on, so the background effect fires again.

CHOOSING A GOOD ORDER

QUICK TIP

Short and important at the top, long and ambient at the bottom.

1. **Top:** brief, high-value moments, such as jackpots, magnets, ball saves, kickbacks and big flashers. These should be short (low Repeats or a few seconds of Runtime, and short sequences) so they don't block everything else for long.

2. **Middle:** frequent playfield action, such as slingshots, pop bumpers, ramps, spinners and the start button.
3. **Bottom:** long-running or background effects, such as "mode active" shows and **attract mode** (*Input 1 = OFF*, Latch off).

Some more advice:

- A high-priority rule whose conditions stay true with **Latch off** loops forever and blocks every rule below it. Give such rules **Latch on** or **Kill on Input Release**, or move them lower.
- Avoid long **Runtime** values on rules near the top.
- If two rules respond to the same event, only the higher one plays. If you want variety, put several effects on **one** rule instead, either picked at random or played in sequence.

WATCHING PRIORITY IN ACTION

The **Input Monitor**'s debug console logs every rule as it fires, with its priority:

`RULE Godzilla Magnet (p=1) [preempt]`

p= is the rule's priority (its position in the list) and **[preempt]** means it interrupted another effect. **[latch]** and **[kill]** show the rule's advanced settings. See The Input Monitor on p. 31.

FAQ:

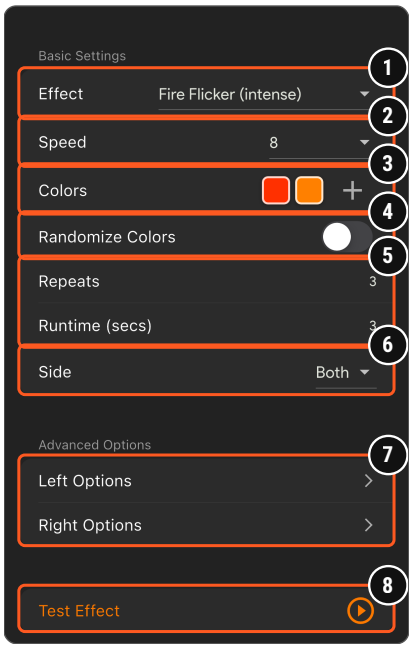
WHY DOESN'T MY ATTRACT SHOW EVER PLAY? Check for a rule higher in the list whose conditions are also true when the game is off, for example a rule with *Input 2 = OFF* and Input 1 left at ANY. If that rule has Latch off it loops endlessly and the attract rule below it never gets a turn. Set its Input 1 to ON, switch on Latch, or move the attract rule above it.

8 EFFECTS AND OPTIONS

An **effect** is the animation a rule plays on the light bars. Every effect in a rule has its own type, speed, colors and options, which you set in the effect editor.

THE EFFECT EDITOR

Open a rule (⋮ › **Edit**) and tap one of the entries under **Effects**. The screen title shows the effect's number in the rule and its type.



1. **Effect.** The animation type. See the Effect Catalog on p. 26.
2. **Speed.** From **1 (Slowest)** to **10 (Fastest)**.
3. **Colors.** The colors the effect uses. Tap a swatch to change it, **long-press** a swatch to remove it, or tap **[+]** to add one. On SPIKE games, a swatch can follow an RGB insert's live color; see Color Samplers on p. 35.
4. **Randomize Colors.** Shuffles the color list each time the effect starts.
5. **Repeats** and **Runtime (secs).** How long the effect plays. See How Long an Effect Plays on p. 19.
6. **Side. Both**, **Left** or **Right** light bar.
7. **Left Options / Right Options.** Direction, fade and size, set separately for each bar.
8. **Test Effect.** Plays this effect on the light bars right now, even if the lights are switched off, so you can see your changes.

The effect editor saves your changes to the board when you leave it with **Back**.

SPEED

The Speed setting maps to the effect's internal frame time. The rule list shows this raw value ("Speed: 50").

APP SETTING	1 (SLOWEST)	2	3	4	5	6	7	8	9	10 (FASTEST)
Raw value	600	500	400	300	200	100	50	25	10	5

For most effects, the raw value is roughly the number of milliseconds between animation steps, so the difference between 9 and 10 is subtle while the difference between 1 and 2 is large. Fast effects (8–10) with few repeats can be over in a fraction of a second. Use **Test Effect** to check.

NOTE

The rolling-wave effects **Ocean Waves**, **Candlelight**, **Lantern**, **Boiling Red** and **Boiling Pink** run their speed the other way around: a *lower* setting gives a *faster* wave. **Breath** runs at its maximum rate at settings 7–10.

COLORS

Most effects use up to **three** color slots. Slot 1 is the main color, slot 2 is usually the background or "fade-to" color, and slot 3 is used by three-color effects such as Tricolor Chase, Trifade and Color Wipe 3. Slots with no color are black (off). The catalog below lists which colors each effect uses; some effects, such as Rainbow or Ocean Waves, ignore your colors entirely.

- To build a **palette** for an effect, add your colors in order. If you add more than three, switch on **Randomize Colors**. Each time the effect starts, the list is shuffled and the first three colors are used.
- With **Randomize Colors** on, the main color changes from one firing to the next. This is an easy way to make a single effect look different every time.
- Every color picker has a **White Intensity** slider. Use it to make whites and pastels with the dedicated white LEDs.
- On SPIKE games with color samplers on p. 35 set up, the color picker also has a **Color Source**. Choose a sampler to make that color slot follow an RGB insert in the game. A swatch that follows a sampler shows the insert's live color with an eyedropper badge.



IMPORTANT Always leave at least one color on an effect. The Fireworks effect in particular needs at least one color that isn't black.

REPEATS AND RUNTIME

- **Repeats** (0–1000): the effect plays *Repeats + 1* cycles. A cycle is one natural pass of the animation (one blink, one wipe, one comet).
- **Runtime (secs)** (0–255): when set above 0, the effect plays for this many seconds instead, and Repeats is ignored.

Chase Flash, **Chase Flash Random**, **Filler Up**, **Flipbook** and **Auxiliary WS2812** never complete a cycle, so Repeats can't end them. Give them a Runtime or use Kill on Input Release; otherwise they play until another rule interrupts them. In a rule that plays its effects in sequence, the app requires a Runtime of at least 1 second for these effects, and the **Runtime** setting says so. See Playing in Sequence on p. 19.

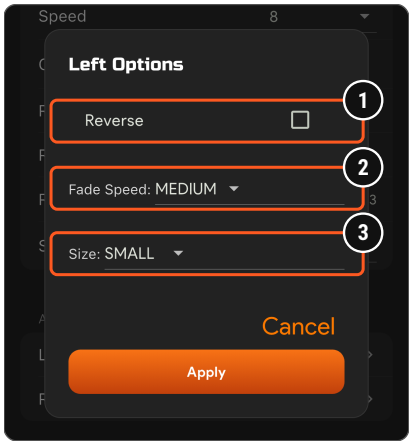
SIDE

SIDE	RESULT
Both	The effect plays on both light bars.
Left	The effect plays on the left bar only; the right bar shows GI.
Right	The effect plays on the right bar only; the left bar shows GI.

Side is perfect for ball-following effects: a left slingshot flashes the left bar, a right orbit sweeps the right bar.

LEFT AND RIGHT OPTIONS

Tap **Left Options** or **Right Options** to fine-tune the effect separately for each bar, then tap **Apply**.



1 **Reverse.** Runs the animation in the opposite direction. Reversing one bar only makes the two bars move in opposite directions, for example toward each other, or both "up" the playfield when the bars are mounted facing each other.

2 **Fade Speed.** For effects with trails or fades (Comet, Larson Scanner, Twinkle Fade, Fireworks and others): **XFAST**, **FAST**, **MEDIUM**, **SLOW**, **XSLOW**, **XXSLOW** or **GLACIAL**. Slower fades leave longer tails.

3 **Size.** For effects that light blocks, bands or pulses (Scan, Running Color, Heartbeat, Sparkle and others): **SMALL**, **MEDIUM**, **LARGE** or **XLARGE**.

QUICK TIP

For a "Left Orbit" sweep that chases around the playfield, use **Color Wipe** with **Reverse** checked on one side only.

EFFECT CATALOG

The effect list in the app comes from your board's firmware, so new effects appear automatically after a firmware update. The table below describes the effects in firmware 0.3.9. **c1**, **c2** and **c3** refer to the first, second and third colors.

EFFECT	DESCRIPTION	COLORS
Auxiliary WS2812	Mirrors an external addressable-LED data stream wired to the AUX header onto the bars. For advanced users; set a Runtime.	From source
Bicolor Chase	Bands of two colors chasing along the bar.	c1, c2
Bits	A fixed rainbow bit pattern (demo effect).	—
Blink	The whole bar flashes on and off. Great for flashers and coils.	c1
Blink Rainbow	Blink, stepping through the rainbow on each flash.	—
Block Dissolve	Pixels dissolve at random to c1, then c2, then c3.	c1–c3
Boiling Pink	Rolling magenta waves (or waves built from c1, if set).	c1 optional
Boiling Red	Rolling red "lava" waves (or waves built from c1, if set).	c1 optional
Breath	Slow "breathing" fade between two colors.	c1, c2
Candlelight	Gentle rolling waves in a warm off-white palette.	—
Chase Blackout	Bands of color with dark gaps moving along the bar.	c1
Chase Blackout Rainbow	Rainbow bands with dark gaps.	—
Chase Color	Alternating bands of c1 and white moving.	c1
Chase Flash	A flashing white pair races along, leaving c1 behind. Doesn't end on its own; set a Runtime.	c1
Chase Flash Random	As Chase Flash, with a new random color each pass. Doesn't end on its own; set a Runtime.	—
Chase Rainbow	Rainbow and white bands moving.	—
Chase Rainbow White	White and rainbow bands moving.	—
Chase Random	Random-color and white bands; new color each pass.	—
Chase White	Alternating bands of white and c1 moving.	c1
Circus Combustus	Red, white and black bands chasing.	—

EFFECT	DESCRIPTION	COLORS
Color Sweep Random	A random-color wipe on, then off from the far end.	—
Color Wipe	LEDs light one after another in c1, then wipe off to c2.	c1, c2
Color Wipe 3	Wipes in c1, then c2, then c3.	c1–c3
Color Wipe Inverse	Color Wipe with the two colors swapped.	c1, c2
Color Wipe Random	Wipes in a new random color each pass.	—
Color Wipe Reverse	Wipes on in c1, then off in c2 from the opposite end.	c1, c2
Color Wipe Reverse Inverse	Color Wipe Reverse with the colors swapped.	c1, c2
Comet	A comet runs from one end to the other with a fading tail.	c1
Comet Middle	Comets burst from the middle of the bar outward.	c1
Dual Larson	Two scanner dots start at opposite ends, cross and bounce.	c1, c3
Dual Scan	Two mirrored blocks sliding back and forth.	c1, c2
Fade	Smooth fade from c2 to c1 and back.	c1, c2
Fade Single	One fade from c1 to c2.	c1, c2
Filler Up	Drops fall and stack until the bar is full, then colors swap. Doesn't end on its own; set a Runtime.	c1, c2
Fire Flicker	Flickering flame in c1.	c1
Fire Flicker (intense)	Strong, violent flicker.	c1
Fire Flicker (soft)	Subtle, gentle flicker.	c1
Fireworks	Bursts of color that blur and fade. Needs a non-black color.	c1–c3
Fireworks Random	Fireworks in random colors.	—
Flash Sparkle	Bar in c1 with single white flashes.	c1
Flipbook	Reserved; shows nothing. Not for normal use.	—
Halloween	Purple and orange running bands.	—
Heartbeat	A double pulse expanding from the middle, like a heartbeat.	c1
Hyper Sparkle	Bar in c1 with intense white sparkles.	c1
ICU	Two "eyes" glide to random spots, blink and pause.	c1
Lantern	Gentle rolling waves in a warm off-white palette.	—
Larson Scanner	The classic "KITT" scanner dot sweeping end to end.	c1 (tail fades to c2)
Merry Christmas	Red and green running bands.	—
Multi Comet	Several comets launching at random.	c1, c3
Multi Dynamic	Every LED changes to a new random color at once.	—
Multi Strobe	Bursts of rapid flashes followed by a pause.	c1, c2
Ocean Waves	Layered rolling waves in deep blue, teal and aqua with white caps.	—
Oscillator	Two blocks bounce at varying speeds, blending where they overlap.	c1, c2
Popcorn	"Kernels" pop up from one end and fall back under gravity.	c1, c2
Rain	Drops falling along the bar.	c1–c3
Rainbow	The whole bar cycles through the color wheel.	—
Rainbow Cycle	A rainbow scrolling along the bar.	—
Rainbow Fireworks	Sparks that ripple out into rainbow rings.	—
Rainbow Larson	A Larson scanner in changing rainbow colors.	—
Random Color	The whole bar changes to a new random color.	—
Running Color	Alternating bands of c1 and c2 scrolling.	c1, c2
Running Lights	Smooth sine-wave blend of two colors scrolling.	c1, c2

EFFECT	DESCRIPTION	COLORS
Running Random	Random-color bands scrolling.	—
Running Random2	Random RGB bands scrolling.	—
Running Red Blue	Red and blue bands scrolling (police lights).	—
Scan	A block of c1 slides back and forth over c2.	c1, c2
Single Dynamic	Random colors, one block changing at a time.	—
Sparkle	A single block jumps to random positions.	c1, c2
Static	The whole bar in one solid color.	c1
Strobe	Rapid on/off flashing (same as Blink in this firmware).	c1
Strobe Rainbow	Rainbow strobe (same as Blink Rainbow in this firmware).	—
Theater Chase	Theater-marquee bands crawling along.	c1, c2
Theater Chase Rainbow	Theater Chase in rainbow colors.	c2
Tricolor Chase	Bands of three colors chasing.	c1–c3
Trifade	Fades c1 → c2 → c3 → c1. Reverse adds a fade to black between colors.	c1–c3
Twinkle	Random LEDs light up over the background, then reset.	c1, c2
Twinkle Fade	Random sparkles that fade out.	c1
Twinkle Fade Random	Twinkle Fade in random colors.	—
Twinkle Random	Twinkle in random colors.	c2
TwinkleFOX	Each LED slowly twinkles between colors.	c1–c3
VU Meter	A bouncing bar-graph "level meter".	c1–c3



Good starting points for pinball: **Blink** or **Strobe** for flashers and coils, **Comet** and **Larson Scanner** for ramps and orbits, **Running Color** for chases, **Heartbeat** for tension moments, **Fire Flicker** for shakers and magnets, and **Ocean Waves**, **Rainbow Cycle** or **TwinkleFOX** for attract mode.

9 HARDWARE INPUTS 1–4

Pinlights Pro has four hardware inputs that let it "see" what your game is doing. Each input is **optically isolated** from the controller board and accepts **5–48 V, AC or DC**. Connect an input across any lamp, flasher, motor or coil, and the input turns **ON** whenever that device is powered. Polarity doesn't matter, and the inputs don't affect how the device behaves.

INPUT	ROLE	TYPICAL CONNECTION
INPUT 1	**GI sense (required).** Game on/off and GI brightness. Can also be used in rules. Optional on SPIKE games using Sync GI to Game.	Any white GI lamp socket.
INPUT 2	Effect trigger	Flasher, motor, lamp, GI string, coil
INPUT 3	Effect trigger	Flasher, motor, lamp, GI string, coil
INPUT 4	Effect trigger	Flasher, motor, lamp, GI string, coil



WARNING Never connect an input to a source above **48 V**, to line voltage, or to a display's high-voltage supply. If you're not sure what voltage a circuit carries, measure it or consult your game's manual first.

INPUT 1: GENERAL ILLUMINATION

INPUT 1 has a special job. It tells Pinlights Pro whether the game is on, and how bright the game's GI is.

- **Brightness follows the game.** The GI light bars track the brightness on INPUT 1, scaled by your **GI Brightness** setting. When your game dims its GI, for example during a mode or a ball drain, the bars dim with it. Changes are smoothed over about 0.2 seconds.
- **Game off = bars off.** When the game is switched off, INPUT 1 goes inactive and the GI fades to dark. This is why the bars switch on and off with the game even though the board is always powered.
- **Use it in rules.** *Input 1 (GI) = ON* means "during play" and *Input 1 (GI) = OFF* means "while the game is off" (attract mode).



NOTE

On SPIKE games with **Sync GI to Game** switched on, the GI level and the *Input 1 (GI)* rule condition come from the game's GI lamp on the node bus instead of the INPUT 1 cable. See Sync GI to Game on p. 34.

Effects keep working while the game is off. If a rule has Input 1 at ANY, its effects can play on otherwise dark bars. Set Input 1 to ON for rules that should only work during play.



NOTE

Some games dim LED GI with a rapidly pulsed DC signal. On these games the bars may look slightly brighter than the game's GI at low dimming levels. Adjust **GI Brightness** to taste.

INPUTS 2–4: EFFECT TRIGGERS

INPUTS 2, 3 and 4 trigger effects through rules. On their own they do nothing; create a rule with *Input 2 = ON* (for example) to make something happen.

Good trigger sources:

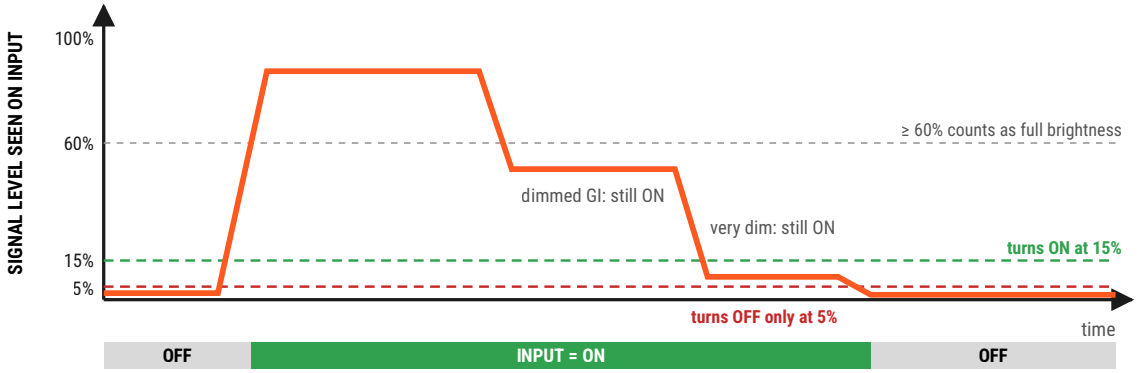
- **Flashers.** Connect across the flasher lamp's socket.

- **Motors**, such as shaker motors, spinning toys and ball-lock mechanisms. Connect across the motor's terminals.
- **Switched lamps and inserts**, such as the start button lamp, a "jackpot lit" insert, or a ball-save lamp.
- **Alternate GI strings** that the game switches separately.
- **Coils**, such as kickbacks, magnets and VUKs. Connect across the coil's lugs. See the timing note below.

Each input is ON while voltage is present and OFF when it isn't, so you can trigger rules from either edge: *Input 3 = ON* fires when the lamp lights; *Input 3 = OFF* (with Input 1 = ON) fires when it goes out.

HOW INPUTS ARE READ

Pinball circuits are rarely a clean on/off. GI is often AC or dimmed, and lamps are frequently strobed. Pinlights Pro measures how much of the time each input is active and applies thresholds with **hysteresis**:



- An input turns **ON** when it is active at least **15%** of the time.
- It only turns **OFF** again when it falls to **5%** or less. A dimmed or flickering signal therefore stays ON instead of chattering.
- For INPUT 1's brightness, **60%** or more counts as full brightness.

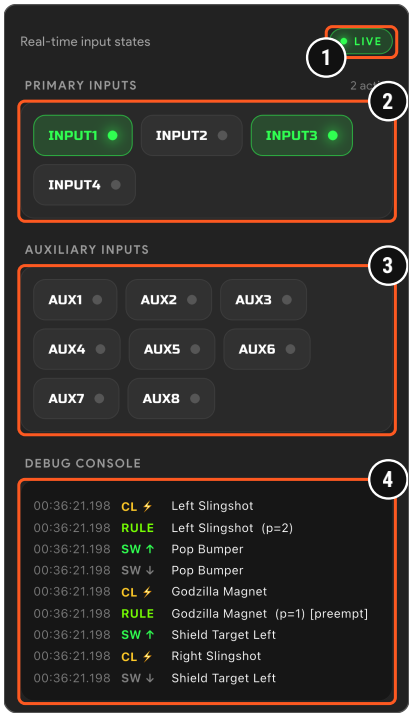
TIMING

Inputs are sampled in short windows and filtered to reject glitches, so an input takes roughly 50–150 ms to register a change. In practice:

- Signals that stay on for **100 ms or longer** are detected reliably.
- **Very short pulses** (under about 50 ms), such as the kick of a slingshot or pop bumper coil, **may be missed**. Use a longer-lasting signal related to the same event (a flasher, a lamp, or a coil that's held on), or on SPIKE games use a **Spike coil trigger** instead.
- A rule's **Debounce Time** adds to this delay. Leave it at 0 ms unless you need it.

THE INPUT MONITOR

The **Input Monitor** is the best tool for checking your wiring. Open it from your game's screen (**Device Information › Input Monitor**).



1. **LIVE** shows that the monitor is receiving updates from the board.
2. **Primary Inputs.** INPUT1 to INPUT4. An input glows **green** while it is ON. The count at the top right shows how many are active.
3. **Auxiliary Inputs.** AUX1–AUX8 states, for expansion accessories.
4. **Debug Console** (firmware 0.3.2 or later). A running log of SPIKE switch (**SW**) and coil (**CL**) activity and of every **RULE** that fires, with its priority. See Finding Switches and Coils on p. 34.

TESTING YOUR CONNECTIONS

1. Switch the game on and open the Input Monitor. **INPUT1** should be green. If it isn't, check the GI connection.
2. Make each trigger happen. Fire the flasher in the game's test menu, press the start button, or start a game. Watch for its input to turn green.
3. If an input never lights, check the alligator clips and connectors and make sure the device is actually being powered. If it lights only for an instant, the signal may be too short to trigger a rule reliably; see Timing on p. 30.

QUICK TIP

Most games have a **coil/flasher test** in their service menu. It's the easiest way to fire one device at a time while you watch the Input Monitor.

AUXILIARY (AUX) INPUTS

The AUX header is reserved for expansion accessories. AUX states are shown in the Input Monitor, but in the current firmware **AUX inputs can't trigger rules**. Leave **AUX 1** and **AUX 2** set to **ANY** in the rule editor.

10 STERN SPIKE INTEGRATION

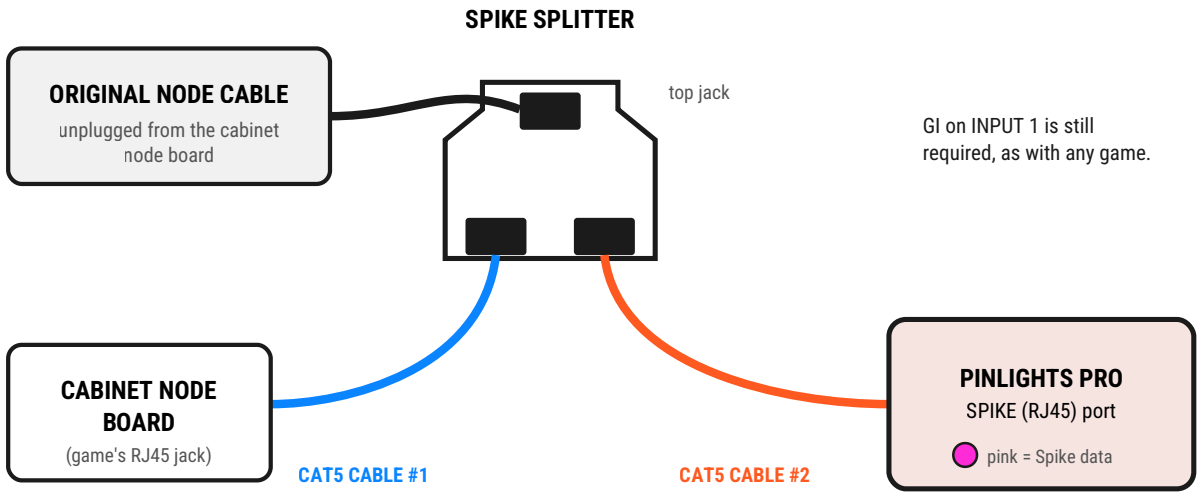
On Stern games built on the **SPIKE 1**, **SPIKE 2** and **SPIKE 3** platforms, Pinlights Pro can listen to the machine's **node bus**, the network that connects the game's CPU to its node boards. That gives your rules direct access to **every switch and coil in the game** by name, with no extra wiring beyond the GI connection on INPUT 1. With firmware 0.3.9 or later, Pinlights Pro can also read the game's **lamps**: the GI bars can follow the game's own GI lamp (Sync GI to Game on p. 34), and effects can take their colors from the game's RGB inserts (Color Samplers on p. 35).

WARNING Native SPIKE integration is **highly experimental** and could be changed or removed in the future if Stern changes the system. You can get the same level of integration by connecting switches and coils to INPUTS 2–4 with the hardware included in your kit. When using native SPIKE integration, we **highly** recommend disabling your game's automatic code updates, as a game update could change node bus behavior.

WHAT YOU NEED

- A Stern SPIKE 1, 2 or 3 game.
- The **Pinlights SPIKE splitter kit**: the splitter and two CAT5 cables.
- INPUT 1 connected to the game's GI, as for any installation. This is optional if you use Sync GI to Game on p. 34.
- Your game added to the app with the **exact SPIKE title** (for example *Godzilla (Premium/LE)*), so the app can load the game's switch and coil names.

CONNECT THE SPIKE SPLITTER



1. With the game **powered off**, unplug the RJ45 (Ethernet-style) cable from your game's **cabinet node board**.
2. Plug the cable you just removed into the **top** jack of the splitter (the side with one jack).
3. Plug one of the included CAT5 cables into one of the two bottom jacks of the splitter. Plug its other end into the cabinet node board, where the original cable was.
4. Plug the other CAT5 cable into the remaining bottom jack, and its other end into the **SPIKE (RJ45)** port on the Pinlights Pro board.

5. Power on the game. Once the SPIKE system is sending commands, the status LED on the Pinlights Pro board changes from pulsing **green** to pulsing **pink**.

NOTE

You don't have to use the cabinet node board. The Pinlights board can be connected anywhere in the node chain, for example to the spare RJ45 jack on the CPU board of later SPIKE games.

Nothing needs to be switched on in the app. The board starts decoding as soon as it sees node bus traffic.

HOW SPIKE TRIGGERS WORK

A **Spike trigger** is a rule condition based on a specific switch or coil:

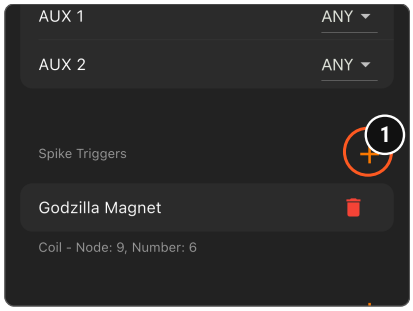
TRIGGER	ON MEANS…	OFF MEANS…
Switch	The switch is closed (ball on a rollover, target hit, button pressed…).	The switch is open.
Coil	The coil has just fired.	The coil has not fired recently.

Spike triggers are combined with the rule's Input States using AND, just like the hardware inputs. A typical in-game rule uses *Input 1 (GI) = ON* plus one Spike trigger. Lamps can't be used as triggers.

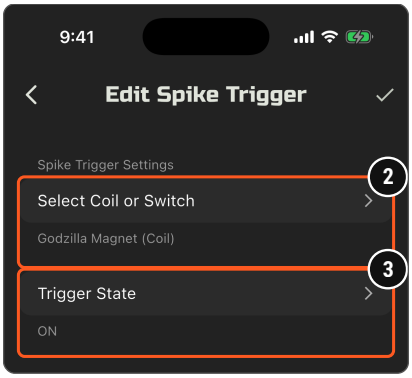
Rules are checked **immediately** each time a switch changes or a coil fires, so SPIKE effects respond with no perceptible delay.

IMPORTANT Rules triggered by a **coil** must use a **Debounce Time of 0 ms**.

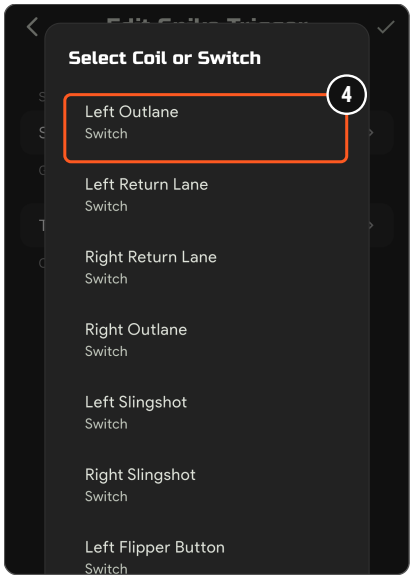
ADDING A SPIKE TRIGGER TO A RULE



Spike Triggers section



Edit Spike Trigger



Select Coil or Switch

1. Open the rule (⋮ › **Edit**). The **Spike Triggers** section appears for SPIKE titles. Tap **[+]** ❶ .
2. Tap **Select Coil or Switch** ❷ . A list of every named switch and coil in your game appears ❹ , each marked *Switch* or *Coil*. Tap the one you want.
3. Tap **Trigger State** ❸ and choose **ON** or **OFF** (normally ON).
4. Tap the ✓ in the upper-right corner to save the trigger.

5. Set the rule's Input States (usually *Input 1 (GI) = ON*), set **Debounce Time** to 0 ms for coil triggers, and add your effects.

Existing triggers are listed under **Spike Triggers** with their name and address, for example "Godzilla Magnet – Coil – Node: 9, Number: 6". Tap a trigger to change it, or tap its trash can to remove it.

ENTERING SWITCHES AND COILS BY NUMBER

If the app has no switch and coil names for your game, the Add Spike Trigger screen asks for the details instead:

- **Type:** Coil or Switch.
- **Node Board Number:** the node the device is connected to (0–255).
- **Switch/Coil Number:** the device's number on that node (0–255).

Stern's manuals and service menus identify devices in the form **node-type-number**: **9-SW-17** is switch 17 on node 9, and **8-DR-2** is driver (coil) 2 on node 8. Enter the first number as the node and the last number as the switch or coil number.

QUICK TIP

Switch and coil names are downloaded when you add the game to the app. If they're missing, for example because you changed the game's title afterwards or set up a new phone, remove the game from the app (**Danger Zone › Remove Game**) and add it again with the correct title. Removing a game doesn't erase the rules on the board.

FINDING SWITCHES AND COILS

Not sure which switch is which? Open the **Input Monitor** and watch the **Debug Console** while you play or trigger devices by hand:

- **SW** ↑ (green): a switch closed. **SW** ↓ (grey): it opened.
- **CL** ⚡ (amber) ❶ : a coil fired.
- **RULE** ❷ : one of your rules fired, with its priority (p=) and flags.



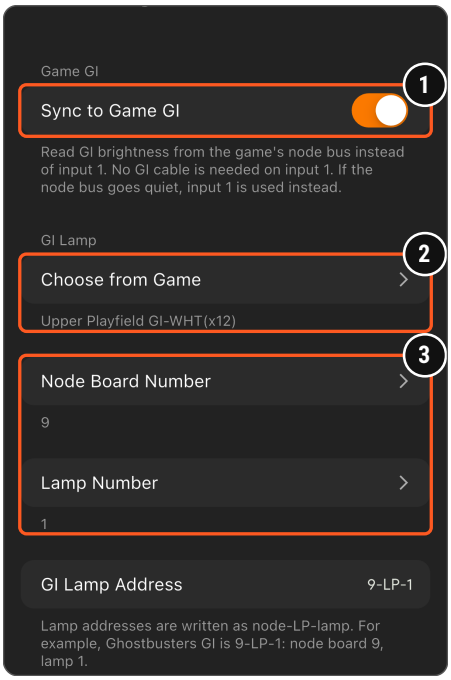
Devices are shown by name when the app knows the game's names, otherwise by address (for example **1-SW-23** or **2-DR-5**). The console keeps the most recent 200 events.

SYNC GI TO GAME

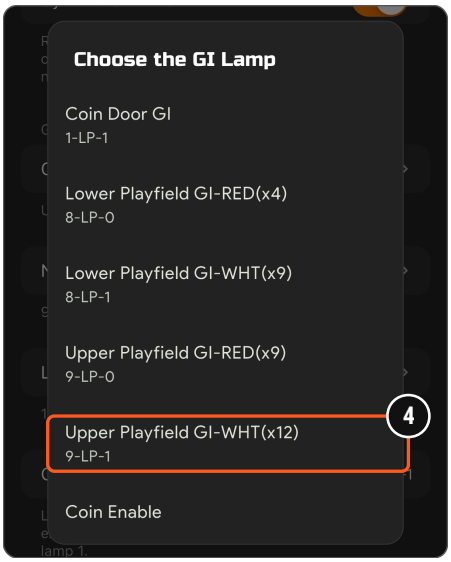
On SPIKE games the GI is just another lamp on the node bus. With **Sync GI to Game** switched on, Pinlights Pro reads the brightness of a GI lamp you choose straight from the node bus, instead of measuring INPUT 1:

- The GI bars follow the GI level the game sets, including its dims and fades.
- **No GI cable is needed** on INPUT 1.
- Rule conditions on **Input 1 (GI)** follow the game's GI lamp too, so in-game (*Input 1 = ON*) and attract-mode (*Input 1 = OFF*) rules keep working without the cable.
- If the node bus goes quiet, for example because the splitter is unplugged, Pinlights Pro goes back to INPUT 1.

Sync GI to Game needs firmware **0.3.9** or later. On older firmware its row on the game screen says **Update firmware**.



Sync GI to Game



Choose the GI Lamp

1. On your game's screen, under **Color & Brightness**, tap **Sync GI to Game**. The row shows **On** or **Off** and appears for SPIKE titles.
2. Switch on **Sync to Game GI** ❶ .
3. Tap **Choose from Game** ❷ and pick the GI lamp from the game's lamp list ❹ . GI lamps are listed first. For playfield GI, choose a white GI string that is lit during play, such as *Upper Playfield GI-WHT*. **Choose from Game** appears when the app has your game's lamp list; see the tip in Adding a SPIKE Trigger to a Rule on p. 33.
4. Alternatively, enter the **Node Board Number** (1–15) and **Lamp Number** (0–479) ❸ yourself. **GI Lamp Address** shows the result in Stern's *node*-LP-*lamp* form, for example **9-LP-1** for lamp 1 on node 9.
5. Tap the ✓ in the upper-right corner to save. While sync is on, ✓ works only once a lamp is set.

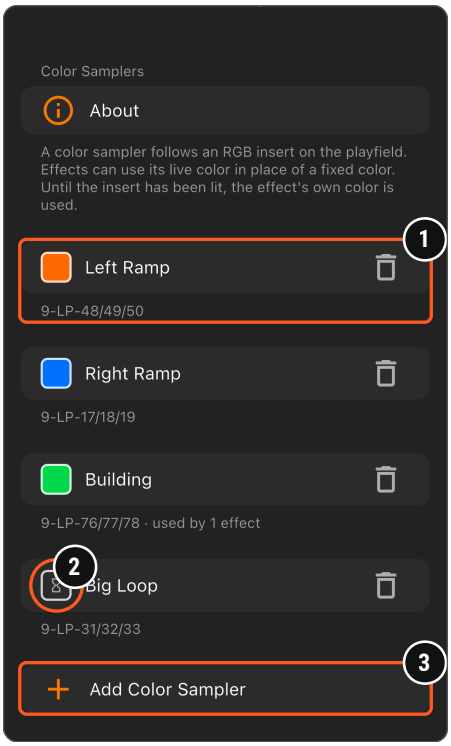
To go back to INPUT 1, switch **Sync to Game GI** off and tap ✓ . The lamp is remembered, so switching sync back on later is one tap.

COLOR SAMPLERS

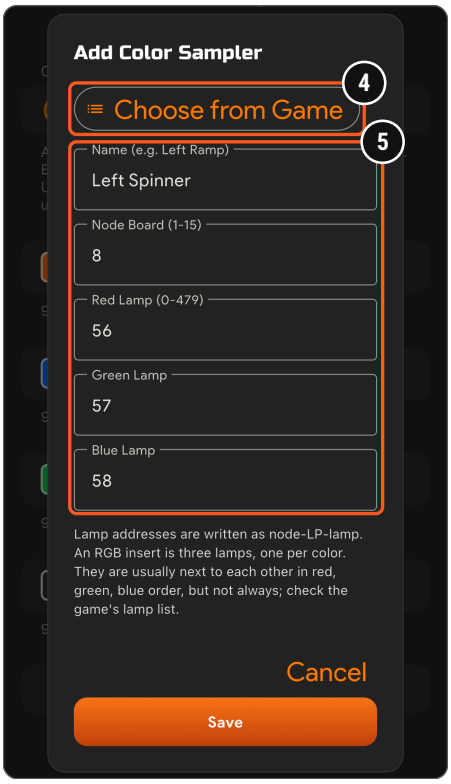
A **color sampler** follows an RGB insert on the playfield, such as a ramp or shot arrow that the game lights in different colors for different modes. In the effect editor, any of an effect's colors can follow a sampler instead of using a fixed color, so the light bars match whatever color the game is showing on that insert.

- Pinlights Pro measures the insert's red, green and blue lamps while it is lit and scales the result so the brightest channel is fully on. The effect gets the insert's hue, at your FX Brightness.
- When the insert goes dark, the sampler keeps its last color.
- Until the insert has been lit since the board started, the effect uses its own fixed color for that slot.
- A running effect picks up color changes as they happen.
- You can set up to **8** color samplers.

Color samplers need firmware **0.3.9** or later. On older firmware the **Color Samplers** row says **Update firmware**.



Color Samplers



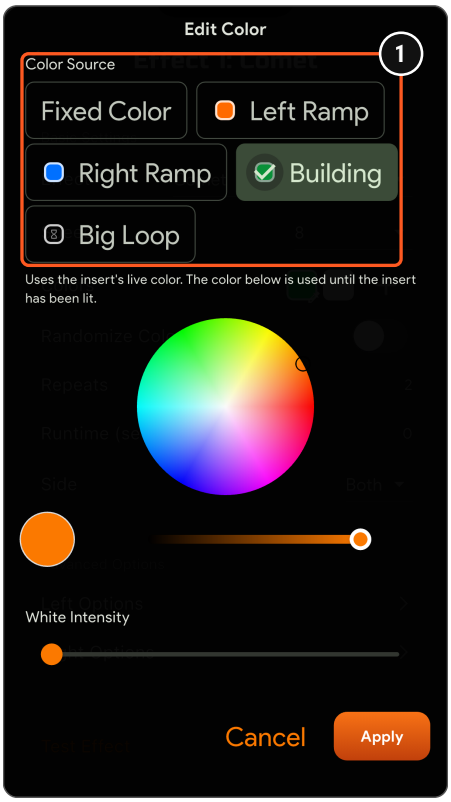
Add Color Sampler

ADDING A COLOR SAMPLER

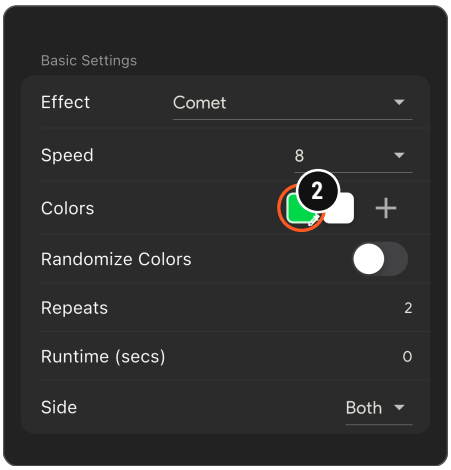
1. On your game's screen, under **Color & Brightness**, tap **Color Samplers**. The row shows how many samplers are set up, or **None**.
2. Tap **Add Color Sampler** 3 .
3. Tap **Choose from Game** 4 and pick an RGB insert from the game's lamp list. The app fills in the name, node board and lamp numbers 5 .
4. Or enter them yourself: a **Name**, the **Node Board** (1–15), and the **Red**, **Green** and **Blue Lamp** numbers (0–479). When you type the red lamp, the app fills in the next two numbers for green and blue. Most inserts are wired that way, but not all, so check the game's lamp list.
5. Tap **Save**. The sampler is sent to the board right away.

Each sampler in the list 1 shows its live color, name, address (for example **9-LP-48/49/50**) and how many effects use it. An hourglass 2 means the insert hasn't been lit since the board started. Tap a sampler to edit it, or tap its trash can to delete it. Effects that used a deleted sampler go back to their own colors.

USING A SAMPLER IN AN EFFECT



Color Source in the color picker



A swatch that follows a sampler

1. In the effect editor, tap one of the color swatches under **Colors**, or tap **[+]** to add a color.
2. Under **Color Source** 1 , choose the sampler instead of **Fixed Color**.
3. Pick a color on the wheel as usual. It is the **fallback**, used until the insert has been lit.
4. Tap **Apply**.

A swatch that follows a sampler shows the insert's live color with an eyedropper badge 2 . **Test Effect** plays it with the sampler's current color.

QUICK TIP

Use a ramp's sampler in that ramp's rule, for example a *Left Ramp Made* switch trigger with a Comet whose color follows the *Left Ramp* sampler. The bars then flash in whatever color the game gives that shot in the current mode.

SPIKE 3 NOTES

SPIKE 3 games encrypt most node bus traffic with a key that is unique to each node board.

- **Switches** are decoded without any key.
- **Coils** and **lamps** need each node's key, so coil triggers, Sync GI to Game and color samplers depend on it. Pinlights Pro captures the keys automatically **while the game boots**, so the board must be powered and connected to the node bus when the game is switched on. In a normal installation, powered from the game's service outlet, this happens automatically.
- Keys are remembered across power cycles and factory resets. If a node board is replaced, the old key is discarded automatically and the new one is captured the next time the game boots.

If coil triggers, Sync GI to Game or color samplers don't work on a SPIKE 3 game, switch the game off and on again with the Pinlights Pro board connected and powered.

LIMITATIONS

- SPIKE integration is experimental; see the warning at the start of this chapter.
- A switch that's **already closed when the board starts**, such as a trough switch with a ball resting on it, reads OFF until it opens and closes again.
- Coil triggers must use a Debounce Time of 0 ms, and a coil event that happens while a higher-priority effect is playing is ignored. See Rule Priority on p. 21.
- Lamps and LEDs can't be used as rule triggers. They can only drive the GI (Sync GI to Game on p. 34) and effect colors (Color Samplers on p. 35).
- A color sampler reads one node board, so an insert whose red, green and blue lamps are on different nodes can't be sampled.

EXAMPLE: GODZILLA (PREMIUM/LE)

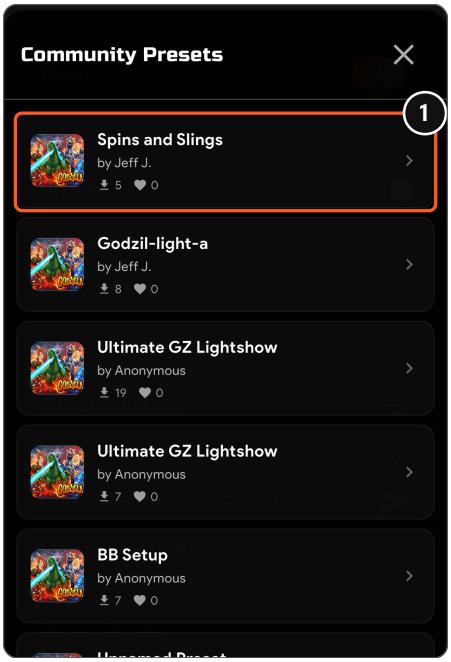
PRIORITY	RULE	CONDITIONS	EFFECTS
1	Godzilla Magnet	Coil "Godzilla Magnet" (9-DR-6) = ON, Debounce 0	Play in Sequence: Fire Flicker (intense) for 3 s, then Strobe in white
2	Left Slingshot	Coil "Left Slingshot" = ON, Debounce 0	Blink, white, Side = Left
3	Right Slingshot	Coil "Right Slingshot" = ON, Debounce 0	Blink, white, Side = Right
4	Start Button	Input 1 = ON, Input 2 = ON, Debounce 50 ms	Comet in the *Building* sampler's color (orange until it's lit) and white
5	Flasher	Input 1 = ON, Input 3 = ON, Kill on Input Release	Fade, white
6	Attract Mode	Input 1 = OFF	Ocean Waves or Rainbow Cycle

This setup also has **Sync GI to Game** on, following *Upper Playfield GI-WHT* (9-LP-1), so the *Input 1* conditions above follow the game's GI and no INPUT 1 cable is needed.

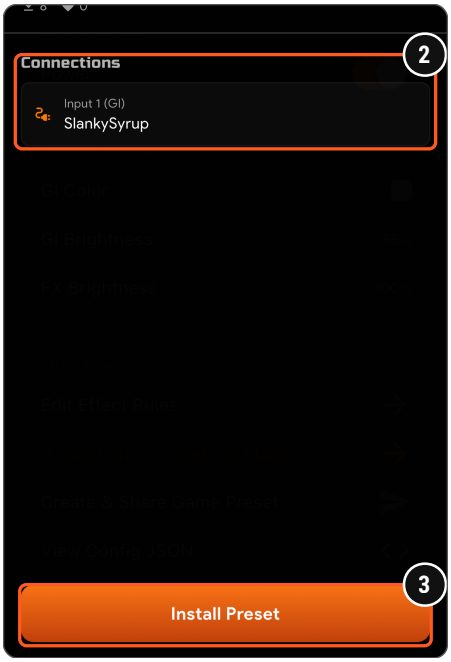
11 COMMUNITY PRESETS

A **preset** is a complete Pinlights Pro light show for a particular game title: all of its rules and effects, plus the GI color and brightness settings. On SPIKE games it also includes the Sync GI to Game on p. 34 lamp and any color samplers on p. 35, since those are wired the same on every machine of a title. Owners can publish their presets so that anyone with the same game can install them in a few taps.

INSTALLING A PRESET



Community Presets for this title



Preset details

1. Open your game in the app. If presets exist for its title, an orange "***N* community presets available**" line appears under **Effect Rules**. Tap it.
2. The **Community Presets** list shows each preset's name, author, downloads and likes. Tap a preset ❶ to see its details.
3. Read the description and check the **Connections** section ❷. It shows which inputs the author used and what they connected them to, for example *Input 2 → Start Button*, often with photos. Wire your inputs the same way to get the full effect. SPIKE presets often need nothing beyond INPUT 1.
4. Tap **Install Preset** ❸ and confirm with **Install**. The preset is written to your board.

CAUTION Installing a preset **replaces all of your existing rules**, your GI color, and your GI and FX brightness. If you have rules you want to keep, publish them as a preset (or a draft) first.

After installing, open **Edit Effect Rules** to see how the author built the show. Presets are a great way to learn the rules engine, and you can tweak anything you like.

CREATING AND SHARING A PRESET

You need a Pinlights account to share presets. See My Account on p. 14.

1. Build and test your light show on your game.

2. On the game's screen, tap **Create & Share Game Preset**. The **Share a Preset** sheet lists **New draft**, any **Local drafts**, and **Your published presets** for this title.
3. Tap **New draft** (or a draft to continue it).
4. Enter a **Name** and an optional **Description**.
5. Under **Inputs in use**, the app lists every input your rules use. INPUT 1 (GI) is always included. Give each one a **human-readable name**, such as "Start Button" or "Left Ramp Flasher", and optionally add photos of your connection. Clear connection notes are the most helpful thing you can give other owners.
6. Tap **Save Draft** to keep working later (drafts are stored on your phone), or **Publish** to share it.

The published preset contains your board's current rules and GI settings. To update a preset you published earlier, open **Create & Share Game Preset** and tap it under **Your published presets**. When publishing, you can choose to publish as new or to update an existing preset.

BROWSING ALL PRESETS

The **My Presets** screen (from the drawer) lists presets for all games. When you're signed in, the **My Presets** chip shows only the presets you've published. Presets are installed from the screen of the matching game, not from this list.

12 ADDITIONAL TOPICS

FIRMWARE UPDATES

New firmware adds effects, improves SPIKE support and fixes bugs. Check for updates whenever you update the app.

1. Stand near the game with the game switched on, and open your game in the app.
2. Under **Device Information**, note the **Firmware** version, then tap **Update Firmware**.
3. The app checks for a newer version, downloads it and sends it to the board over Bluetooth. A progress percentage is shown. During the update both light bars turn **solid orange**.
4. When the app reports **"Firmware update successful"**, the board restarts on the new firmware. The app returns to **My Games**.

If no update is available, the app tells you so.

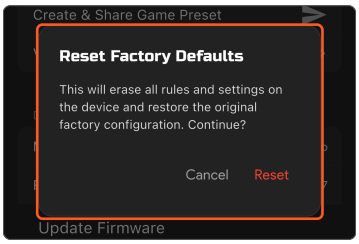
IMPORTANT Keep the app open and the phone near the game, and don't switch the game off, during an update. If an update is interrupted, the board automatically keeps its previous firmware; just start the update again.

FACTORY RESET

A factory reset erases all rules and settings on the board and restores the factory configuration. You can do it from the app or with the button on the board.

From the app: open your game, scroll to **Danger Zone** and tap **Reset Factory Defaults**, then confirm with **Reset**.

With the reset button: with the board powered, press and hold the **RESET** button on the controller board for **at least four seconds**, then release it. The board restarts with factory settings.



After a reset the board has:

- GI color: cool white; GI brightness 50%; FX brightness 75%.
- Three starter rules: *Input 2 Red*, *Input 3 Green* and *Input 4 Blue*, which flash or wipe the bars in red, green or blue when INPUT 2, 3 or 4 turns on.

A factory reset doesn't remove the game from your app library, and it doesn't erase stored SPIKE 3 keys.

QUICK TIP Settings changed in the app are stored on the board about three seconds after the change. Wait a few seconds after making changes before switching the game off.

TROUBLESHOOTING

PROBLEM	WHAT TO CHECK
The app doesn't find the board (no PLPRO in Add Game)	The board is powered (status LED pulsing). Bluetooth is on and the app has Bluetooth permission. You are within a few meters. Pull down to rescan. Only one phone can be connected at a time; close the app on other phones.
"Failed to connect to device"	Move closer and try again. Power-cycle the game.
The light bars never light	Power is switched on in the app. INPUT 1 is connected to a GI lamp that is lit (check INPUT1 in the Input Monitor). GI Brightness isn't 0%. The bar cables are connected to LIGHT BARS on the board.

PROBLEM	WHAT TO CHECK
Bars stay on when the game is off	INPUT 1 is connected to something that stays powered. Move it to a GI lamp.
Left and right are swapped	Swap the cables at the board's LEFT and RIGHT connectors.
A rule never fires	Check its conditions in the Input Monitor. Make sure Input 1 isn't left at OFF (the default for new rules) if the rule is for gameplay. Make sure the rule has at least one condition that isn't ANY. Check that a higher-priority rule isn't playing; see Rule Priority on p. 21.
A rule fires only sometimes	The trigger signal may be too short; see Timing on p. 30. SPIKE coil rules need Debounce 0 ms. A higher-priority effect may be blocking it.
An effect plays forever	The rule's conditions stay true and Latch is off. Switch Latch on, or use Kill on Input Release. Chase Flash, Chase Flash Random, Filler Up, Flipbook and Auxiliary WS2812 never end on their own; give them a Runtime.
A sequence gets stuck on one step	The step is one of the effects that never end on its own and has no Runtime (it is marked in amber). Give it a Runtime.
No Play in Sequence switch	The switch appears only when a rule has two or more effects. If it still doesn't appear, update the board's firmware to 0.3.9 or later.
Sync GI to Game or Color Samplers says "Update firmware"	Update the board's firmware to 0.3.9 or later.
Bars don't follow the GI with Sync GI to Game on	Check the GI lamp in **Sync GI to Game**; choose a GI string that is lit during play. On SPIKE 3, switch the game off and on so the board can capture the node keys.
A color sampler's swatch shows an hourglass	The insert hasn't been lit since the board started. Play the game until it lights. If it never changes, check the node and lamp numbers. On SPIKE 3, switch the game off and on so the board can capture the node keys.
An attract-mode rule never plays	A higher rule is also true while the game is off; see the FAQ in Rule Priority on p. 21.
Status LED doesn't turn pink on a SPIKE game	Check the splitter cables and that the game is fully booted. The splitter's top jack must receive the game's original node cable.
SPIKE switch names are missing	Remove the game from the app and add it again with the exact SPIKE title.
SPIKE 3 coil triggers don't work	Switch the game off and on with Pinlights Pro connected and powered, so it can capture the node keys.

GETTING HELP

Video guides, connection instructions for many games, and the latest version of this manual are at pinlights.net/support.

When contacting support, include your app version (bottom of the navigation drawer), the board's firmware version (game screen › Device Information), your game title, and, if relevant, the configuration from **View Config JSON**.

SPECIFICATIONS

CONTROLLER

Processor	Espressif ESP32-S3

Wireless	Bluetooth Low Energy (app connection and firmware updates)
Power	5 V DC, included power supply
Status indicator	One RGB status LED
Controls	Reset button (hold 4 s for factory defaults)

INPUTS

Hardware inputs	4, optically isolated (INPUT 1 = GI sense)
Input voltage	5–48 V AC or DC, polarity independent
Input thresholds	ON at ≥ 15% active, OFF at ≤ 5% active
Auxiliary	AUX header (reserved for expansion)
Stern SPIKE	RJ45 node bus port (RS-485). SPIKE 1, 2 and 3 (experimental), via the SPIKE splitter

LIGHT BARS

Outputs	2 (left and right), 3-pin
LED type	Addressable RGBW (red, green, blue + dedicated white)
LEDs per bar	138
Mounting	Flexible adhesive strips (included) or metal cabinet brackets (optional)

SOFTWARE

App	Pinlights for iOS and Android (version 1.1.1 at the time of writing)
Firmware	0.3.9 at the time of writing; updatable over Bluetooth
Effects	81 built-in effects

Specifications subject to change without notice.