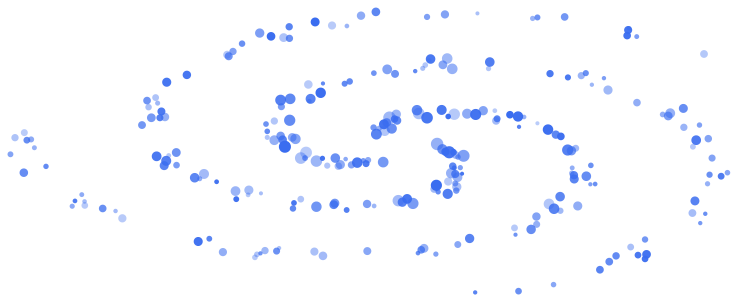
Simple Replicator

Detailed user guide

Version 1.9 · panel in English, French and Spanish



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1 What the script does

Simple Replicator duplicates one or more layers and arranges the copies in a 3D formation: grid, sphere, circle, helix, line, random box, galaxy, or along a path.

The whole formation is driven by a single null layer, **Replicator 1 Control**. Its effects set the shape, spin, noise, reveal, colors… and everything stays editable live, with keyframes.

- Accepted sources: footage, still, video, precomp, text, shape layer, 3D model (GLB/GLTF/OBJ, After Effects 2024 and later).
- Up to 2,000 copies (warning above 400).
- Several replicators can live in the same comp: **Replicator 1**, **Replicator 2**…
- Moving, rotating or scaling the null moves the whole formation. Add a 3D camera to fly through it.

2 Installing and opening

Install as a panel (recommended)

1. Copy `Simple_Replicator.jsx` into `Applications/Adobe After Effects <version>/Scripts/ScriptUI Panels/`
2. Restart After Effects.
3. Open **Window > Simple_Replicator.jsx**. The panel docks like any other After Effects panel.

Run without installing

File > Scripts > Run Script File… and pick `Simple_Replicator.jsx`. The panel opens as a floating window.

Reopening the panel after closing it

- Installed: **Window > Simple_Replicator.jsx**.

- Run by hand: **File > Scripts > Recent Script Files**.

> **NOTHING IS LOST**
> Closing the panel deletes nothing. Everything is stored in the replicator's null: reopen the panel, select the null, and you get full control back, even on a replicator made in an earlier session.

Automatic opening

When the panel is closed, clicking the **Replicator N Control** null (or a copy) reopens it on the Settings tab. This works once the panel has been opened at least once in the session.

To make it work right after After Effects starts, copy `Startup/Simple_Replicator_AutoOpen.jsx` into `Applications/Adobe After Effects <version>/Scripts/Startup/` and restart After Effects.

To turn it off: untick **Open this panel when I select a replicator** (Replicator tab).

Language

The **Language** menu at the top of the panel switches the interface between English, French and Spanish. The choice is remembered. The null's effect names always stay in English, so the expressions work in every language.

3 The panel

The panel is split into three tabs to stay compact. The last open tab is remembered.

TAB	PURPOSE
Create	Build a new replicator: preset, shape, copies, speed options.
Replicator	Act on the selected replicator: number of copies, preset, attractor, path, Freeze / Unfreeze, Turn copies off / on, Precompose, Diagnostic, delete.
Settings	Every null setting, live, in five sub-tabs, with keyframe buttons.

A status line at the bottom says what just happened and what to do next. After **Create**, the panel switches to the Settings tab on its own.

4 Your first replicator in 1 minute

1. Open a comp and select a layer, for example a small text layer or an image.
2. In the **Create** tab, pick the **Particle planet** preset. The shape and the number of copies fill in.
3. Click **Create replicator**.
4. If the script offers to switch to the Classic 3D renderer, accept: it is the fastest with many layers.
5. The panel switches to **Settings**. Move **Radius** (Shape sub-tab) or **Formation Spin** (Animation sub-tab): the sphere changes live.
6. Play it back. If it stutters, go to **Replicator** and click **Freeze (fast playback)**.

RECOMMENDED WORKFLOW

1. Set up the formation with few copies. 2. Raise the count with **Update**. 3. Freeze for playback and rendering. 4. To change something, unfreeze, edit, then freeze again.

5 Create tab

ITEM	WHAT IT DOES
Preset	Fills in the shape and a suggested number of copies, and applies its settings on creation. **(none)** = default settings.
Shape	Grid, Sphere, Circle, Helix, Line, Random box, Galaxy, Path.
Copies	Number of copies (1 to 2,000). Can be changed later with **Update**.
Several sources	When several layers are selected: **Alternate** uses them in order (1, 2, 3, 1, 2, 3…), **Random** mixes them.
Speed up: cache text and shapes	On by default. A text or shape layer is copied into a small cropped precomp, rendered once instead of once per copy.
Speed up: expressions only for active settings	On by default (light mode). Each copy only gets the expressions it needs. See section 11.
Add colorize	Adds a Fill effect to each copy for colors. Off by default: it costs one extra calculation per copy.
Tuck the copies away in the timeline	Copies become shy layers to keep the timeline readable. **They are still computed**: this option tidies, it does not lighten anything. To lighten, see **Turn copies off / on** (section 7).
Motion blur on copies	Turns motion blur on for the copies. Off by default: expensive.
Create replicator	Creates the **Replicator N Control** null and the copies. The sources are hidden (eye off), not deleted.

6 Presets

A preset is a starting point: after that, you can change everything. Use it on creation (Create tab) or on an existing replicator (Replicator tab, **Apply preset**: the number of copies does not change).

Spinning galaxy

Spinning 3-arm galaxy, varied sizes and opacities, color gradient.

400 copies suggested

Image wall

Grid that builds from the center, flying in from the camera.

48 copies

Particle planet

Spinning sphere, small copies facing the camera.

300 copies

Carousel

Tilted spinning ring, copies facing the camera. Best with 8 to 16 images.

12 copies

Tornado

Tall helix spinning fast, with noise.

250 copies

Floating cloud

Random volume drifting slowly, copies spinning on themselves.

150 copies

Explosion

Sphere whose radius goes from 0 to 1,150 px; every copy starts from the same point.

200 copies

Wave

Tilted grid rippled by noise.

400 copies

Path flow

Copies looping along a path. Link a path afterwards (section 10).

60 copies

Swarm + attractor

Restless swarm plus an attractor created automatically: animate the attractor null.

200 copies

Reset settings

Restores the default settings, keeping the shape.

count unchanged

WHAT A PRESET CHANGES

A preset resets the other settings, keyframes included, and sets the null's rotation unless it is animated. It keeps columns and rows, the path, the attractor, the colors and the Seed.

When you select a replicator, the panel shows its preset. If it says **(modified)**, you have changed settings since.

7 Replicator tab

First select the **Replicator N Control** null or one of its copies.

BUTTON	WHAT IT DOES

Copies + Update number of copies	Rebuilds the copies with this number (prefilled with the current count). If you also select other layers, they replace the sources. In light mode, when the number and sources stay the same, it only rewrites the expressions in place (fast). Do it after changing the shape or turning on a setting directly in the null's effects.
Preset + Apply preset	Applies a preset to the selected replicator, without changing the number of copies.
Add an attractor	Creates an **Attractor** null linked to the replicator. Animate it to push or pull the copies.
Use selected path	Select the null + a layer with a mask or a shape path. Sets the shape to Path; the layer becomes a guide layer (visible, not rendered).
Freeze (fast playback)	Replaces the expressions with values or keyframes: smooth playback. See section 12.
Unfreeze (live settings)	Rebuilds the copies with their expressions, without changing their number.
Turn copies off / on	Turns off the eye of every copy of the replicator: they are no longer computed at all. Also works from the main comp: select one or more replicator precomps. Click again to turn them back on. They stay off if the replicator is rebuilt.
Precompose	Moves the replicator into its own composition: null, copies, cache, attractor and path. The precomp is 3D with **Collapse Transformations**: the main comp's camera and lights still apply. Turn off its eye to pause the whole replicator. With Face Camera, a camera linked to yours is added inside.
Diagnostic	Analyzes the replicator, measures its speed, and offers Repair or Switch to Classic 3D. See section 13.
Delete replicator	Deletes the copies, the null, the attractor and the cache, and shows the sources again.
Open this panel when I select a replicator	On by default. Reopens the closed panel on the Settings tab when you click a null or a copy.

8 Settings tab

It mirrors every null setting, in five sub-tabs: **Animation**, **Shape**, **Variations**, **Reveal**, **Color**.

Loading a replicator

- Select the null or a copy: the panel loads it on its own, even after closing the panel or reopening the project.
- If the comp has only one replicator, it loads without selecting anything.
- **Load the selected replicator** forces a fresh read of the values, for example after moving the playhead over an animated setting.

Editing and animating

- Move a slider or type a value: the null changes at once. One undo (Cmd+Z) per change.
- ◆ adds a keyframe at the current time with the value shown. To animate: place the playhead, set the value, click ◆, then repeat further along.
- If a setting already has keyframes (◆ after its name), changing its value creates or edits the key at the current time.
- × removes all the setting's keyframes and keeps the value shown.

Greyed-out settings

A setting with no effect is greyed out: Columns / Rows outside the grid, Arms outside the galaxy, Spin Axis when the formation does not spin, Noise Frequency and Speed without noise, attractor settings without an attractor layer, reveal settings with Reveal off, colors without Colorize. It turns back on as soon as you change the setting that controls it.

> **"FROZEN" IN THE TITLE**
> If the settings title says "frozen", click **Unfreeze** so your changes show. Exception: in fast freeze, Formation Spin and Spin Axis stay live.

9 Every null setting

The same settings appear in the null's effects and in the Settings tab.

Animation

SETTING	EFFECT
Formation Spin (deg/s)	Continuous rotation of the whole formation, in degrees per second. Negative = opposite direction.
Spin Axis	X, Y or Z: the axis of the formation spin.
Clone Spin (deg/s)	Each copy spins on itself.
Noise Amount	Strength of the organic motion, in pixels.
Noise Frequency	Detail: higher values make neighboring copies move more differently.
Noise Speed	How fast the noise evolves.
Attract Strength (%)	0 to 100 % = attraction, negative value = repulsion.
Attract Radius	Attractor's area of influence, in pixels.
Path Offset (%)	Slides the copies along the path (Path shape). 100 % = one full lap.
Orient Along Path	Each copy turns to follow the direction of the path, like a car on a rail. Path shape only.

Shape

SETTING	EFFECT
Shape	Grid, Sphere, Circle, Helix, Line, Random Box, Galaxy, Path.
Columns / Rows	Grid size. With more copies than cells, extra layers stack in depth.
Spacing	Distance between copies in the grid and the line (px).
Radius	Radius of the sphere, circle, helix, galaxy; half-size of the random box.
Height	Height of the helix, thickness of the galaxy.
Turns	Number of helix turns, twist of the galaxy arms.
Arms	Number of galaxy arms.
Arc (deg)	Portion of the circle used (360 = full circle).
Path Layer	Layer holding the path to follow. Set it with **Use selected path**.

Variations

SETTING	EFFECT
Random Position	Random scatter of each copy around its place (px).
Scale (%)	Size of all the copies.
Random Scale (%)	Size variation between copies.
Random Rotation	Random rotation of each copy (°).
Face Camera	Copies always face the active camera.
Random Opacity (%)	Opacity variation between copies.
Seed	Changes all the randomness at once (positions, sizes, order, colors).

Reveal

SETTING	EFFECT
Reveal	Turns on the progressive build-on of the copies.
Reveal Order	Index, Reverse, Random, From Center (in 100 px rings).
Reveal Start (s)	When the reveal starts.
Reveal Stagger (frames)	Time between two copies arriving.
Reveal Duration (frames)	How long each copy takes to arrive.
Reveal Distance	Copies fly in from depth (px). Negative = from the camera, positive = from behind.

Color

Tick **Colorize** in the Color sub-tab, even if the option was not ticked on creation: the script adds the settings to the null and a Fill effect to each copy. The color replaces the source's own (a photo becomes a colored silhouette).

SETTING	EFFECT
Colorize	Turns color on for the copies.
Color Mode	Random (mix of A and B), Gradient (from A to B along the copy order) or Single (every copy in color A).
Color A / Color B	The two colors. The **Pick…** button opens the color picker.

> **GALAXY DIRECTION**
> With a positive Formation Spin, the galaxy turns clockwise and its arms trail behind, like a real galaxy.

10 Recipes

Copies along a path

1. With the Pen tool, draw a mask on a solid (or any layer), or a shape layer with a free path. Parametric shapes (Rectangle, Ellipse) are not read. Only the first mask, or the first path of the first group, is used.
2. Select your source, pick the **Path flow** preset (or the **Path** shape) and click **Create**.
3. Select the null + the path layer (Cmd-click) and click **Use selected path** (Replicator tab). The path layer becomes a guide layer.
4. Animate **Path Offset (%)**: from 0 to 100 %, the copies travel the whole path. The preset already animates it from 0 to 100 % over 5 s, looping. 0 to -100 = reverse direction.

- **Closed path**: copies spread evenly, seamless flow. **Open path**: the first copy at the start, the last copy at the end.
- **Random Position** scatters the copies around the path; **Noise Amount** makes them wiggle.
- Tick **Orient Along Path** (Animation sub-tab) so each copy points along the path. Draw your source pointing right: that is the 0° direction. To offset it, add a Z rotation to the source or use **Random Rotation**.
- You can animate the path itself: the copies follow.
- Freeze works with a path, but bakes keyframes frame by frame: stay around 60 copies.

Image wall

1. Import your images (photos, videos, precomps) and place them in the comp. Their position does not matter.
2. Select them all, pick the **Image wall** preset, then **Several sources**: Alternate or Random.
3. Click **Create**.
4. Adjust **Columns**, **Rows** and **Spacing** to fit your image size, and **Scale** (the preset uses 40 %).

5. Set up the **Reveal**: Order, Stagger, Duration, Distance, Start.

- All images should be the same size: if not, precompose them to the same format first.
- To swap images: select the null + the new images and click **Update**.
- A camera moving in front of the wall gives a nice sense of depth.

Attractor (swarm, repulsion)

1. Select the null and click **Add an attractor** (or use the **Swarm + attractor** preset, which creates it for you).
2. Animate the position of the **Attractor** null in the comp.
3. Set **Attract Strength**: positive to pull, negative to push. **Attract Radius** sets the area of influence.

Image carousel

1. Select 8 to 16 images and pick the **Carousel** preset with **Alternate**.
2. Use as many copies as images so each one appears once.
3. Set the **Radius** so the images do not overlap, and **Formation Spin** for the speed.

Explosion, or a formation that assembles

- The **Explosion** preset animates Radius from 0 to 1,150 px and Random Position from 0 to 250 px: every copy starts from the same point at the center, then bursts out.
- For the reverse (copies coming together), set the Radius keys the other way with ◆.
- Another approach: turn on **Reveal** with a large **Reveal Distance** so the copies fly in from far away.

Replicated text

- A text layer is cached automatically (precomp "… – Replicator cache").
- To edit the text, open that cache precomp: all copies update.

Several formations in one comp

Create a second replicator from another source: it is named **Replicator 2 Control**. The panel follows whichever null you select. With several formations, precompose each one (**Precompose** button) and turn off the eye of those you are not adjusting.

11 Speed and smooth playback

Each copy is a layer driven by expressions. After Effects recalculates those expressions every frame: that is what slows playback down with many copies. The script has several levers.

Light mode

- Option **Speed up: expressions only for active settings**, on by default.
- A copy only gets the expressions it needs. With the default settings, each copy keeps 1 expression (position) instead of 7.

- Since version 1.9, each expression only holds the code it needs: the chosen shape and the active settings (noise, attractor, reveal, rotation…). The code is about 3 times shorter and each frame computes faster. The result is identical to the full calculation.
- When you change a setting from the Settings tab, the copies' expressions adjust on their own. If you change the shape or turn a setting on directly in the null's effects, click **Update**: the expressions are rewritten in place, without rebuilding the layers.
- Face Camera uses After Effects' native auto-orient, with no expression (unless it is animated).
- A replicator made before version 1.9 keeps its long expressions: select it and click **Update** (light mode on) to slim it down.

Shy layers ≠ disabled layers

A **shy** layer (the little figure icon) is only hidden in the timeline. After Effects still computes and renders it every frame, exactly like a visible layer. Only turning off the **eye** (or making it a guide layer) stops it from being computed.

> **REAL EXAMPLE**
> A comp with one replicator of each type kept getting slower. It held 1,045 layers, 1,012 of them shy, which looked "disabled". In fact none had its eye off: all 1,045 layers were computed every frame, with 2,137 expressions (about 7.4 MB of code) and 324,000 frozen keyframes.

To lighten a project with many copies:

1. Click **Update** on each replicator made before 1.9 to slim its expressions.
2. Click **Precompose** to move each replicator into its own composition.
3. Turn off the eye of the precomps you are not working on, or use **Turn copies off / on**.
4. A replicator frozen over a long duration carries hundreds of thousands of keyframes, which weigh down the timeline. Unfreeze it if you do not need it for playback.

3D renderer

The **Classic 3D** renderer is the fastest for many flat layers. The script offers it on creation (with Cinema 4D, or with Advanced 3D from 100 copies), and the Diagnostic has a button to switch.

Other tips

- Keep text and shape caching on.
- Colorize and motion blur cost one calculation per copy: only turn them on when needed.
- Preview at 1/2 or 1/4 resolution.
- Above 300 to 400 live copies, After Effects slows down noticeably: freeze, or precompose and turn off the eye of inactive replicators.
- The composition's motion blur costs too: turn it off while you adjust.
- For animated precomps, a single source precomp stays lighter than several.

> **ROUGH NUMBERS**
> One expression costs about 65 µs. 222 copies with 5 expressions ≈ 72 ms per frame, so 14 fps at best. Freezing brings that cost down to almost nothing.

12 Freeze and Unfreeze

Freeze (fast playback)

- Replaces the copies' expressions with fixed values, or with keyframes over the work area for whatever moves.
- **Set the work area before freezing**: outside it, the copies stop moving.
- Once frozen, the null's settings no longer act (except in fast freeze, below).

Fast freeze with native spin

If the formation only spins, Freeze puts the copies inside a **Replicator N Spin** null that does the turning. During playback, only one expression is left in total. This is by far the smoothest mode.

Conditions:

- a Formation Spin, with no noise, no attractor and no path;
- Face Camera on;
- position settings not animated;
- null at 100 % scale.

Formation Spin and Spin Axis stay live from the panel. The script checks the spin direction by itself. If a condition is missing, Freeze bakes keyframes as usual.

> **GALAXY AND PLANET TIP**
>
> These presets have a little noise. Set **Noise Amount** to 0 before freezing to get the fast freeze.

Unfreeze (live settings)

Rebuilds the copies with their expressions, without changing their number. Then edit what you want and freeze again.

13 Diagnostic and repair

The **Diagnostic** button (Replicator tab) shows a report you can copy:

- script and After Effects versions, the comp's 3D renderer;
- number of copies, sources, cache layers and attractors;
- expressions per copy and a speed measurement (ms per frame);
- any expression errors.

If it finds broken expressions (renamed null, error, expressions disabled), the **Repair** button rebuilds the copies. The **Switch to Classic 3D** button changes the comp's renderer.

If something does not work, copy this report and send it: it holds everything needed to understand the problem.

14 Rules to follow

- **Do not rename** the **Replicator N Control** null: the expressions find it by name. If it happens, restore the name or use **Repair**.
- **Do not delete** the `[SimpleReplicator …]` tags in the layer comments: the script uses them to recognize the null, the copies, the sources and the cache.
- Change the number of copies with **Update**, not by duplicating or deleting copies by hand.
- To remove a replicator, use **Delete replicator**: the sources come back and the cache is cleaned up.

15 Common problems

SYMPTOM	FIX
Playback stutters	Check that "hidden" layers have their eye off: shy layers are still computed (section 11). Precompose the replicators and turn off the eye of those you are not working on. Click **Update** on older replicators, then freeze if needed (section 12). Check the 3D renderer with the Diagnostic.
My changes do not show	The replicator is frozen: click **Unfreeze**. In light mode, after changing the shape or turning on a setting in the null's effects, click **Update**. If the copies have their eye off, click **Turn copies off / on**.
A setting is greyed out	It has no effect with the current shape or settings (section 8).
The panel shows "(none)" or old values	Select the null and click **Load the selected replicator**.
The copies do not follow the path	The path must be drawn with the Pen (not a parametric Rectangle or Ellipse), and the shape must be set to Path. Run **Use selected path** again.
The copies stop moving after a while	They were frozen over the work area: widen it, unfreeze, then freeze again.
Colors do not work	Tick **Colorize** in the Color sub-tab. If the replicator is frozen, click **Unfreeze** first.
Expression errors after renaming the null	Restore the original name, or run the Diagnostic and click **Repair**.
I want to edit a replicated text	Open the "… – Replicator cache" precomp.
I closed the panel	**Window > Simple_Replicator.jsx**, or **File > Scripts > Recent Script Files**. Nothing is lost.