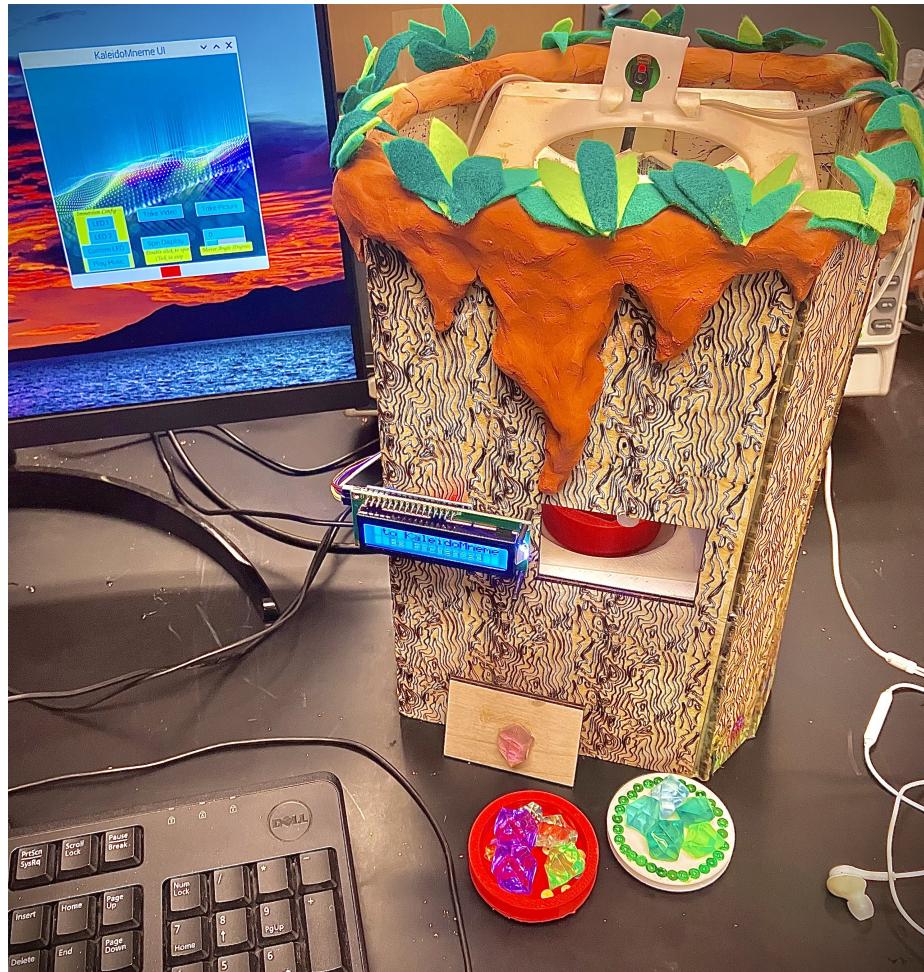


# Never-Land Kaleidoscope

1st Edition User Manual

Be Enchanted!



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# 1 Safety & Support

## 1.1 Warnings / Advertencias

*Caution, this product produces light displays which may trigger epileptic seizures.*  
*Precaución, este producto puede desencadenar ataques epilépticos.*



Protect the environment by not disposing of this product in your household waste (2002/96/EC). Check with your local authority for recycling advice and facilities.

Proteja el medio ambiente no deshaciendose de este producto junto con sus residuos domesticos (2002/96/EC). Solicite a su autoridad local consejos e informacion sobre instalaciones de reciclado.



**Warning!** small parts. Not for children under 3 years of age

**¡Advertencia!** Piezas pequeñas. No apto para niños menores de 3 años.

## 1.2 Customer Support

-Damaged wooden/3D-printed parts may be replicated using the files found on our product GitHub (Link in Appendix). Contact your local Makerspace to create the parts and we'll cover the cost.

-General inquiries, feedback, and returns regarding this product may be processed through the toll-free university hotline **757-221-4000**.

-Raiderin CEO *Russell Burns* may be contacted directly at **raburns@wm.edu**. Reach out for ideas/collaborations! Emails are returned within 5 business days.

-**Siempre se habla español.**

## 1.3 Specs

Dimension: 8" \* 6" \* 12" (LWH)

Controlling Unit: Raspberry Pi 4

Motions: High Torque Stepper (16 Ncm); High Torque Servo Motor (G35kg)

Maximal Operating Voltage and Current: 5V 4A (RPi 4); 5V 700mA (Supply)

Materials: Wood, ABS plastic, Clay, Superglue

IP address:

Username: candy

Password: raspberry

Remote Control: Compatible with SSH

## **2 Your Scope's Story**



In a quiet corner of a dusty old antique shop, nestled among forgotten trinkets and weathered books, there appeared a small, mysterious kaleidoscope. Its faded, wooden exterior, peppered with burned designs, belied the enchanting secrets it held within. As unsuspecting customers passed by, drawn to more conventional curiosities, you, being the curious soul you are, catch a glint of the Never-Land Scope. Channeling the power of electromagnetic radiation, the scope roars to life and invites you to peer through its cloudy lens. To your astonishment, the world around you transforms into a fractal panorama of fantastical landscapes, vibrant colors, and ethereal patterns. The air buzzes with an otherworldly energy. In the center of the swirling colors, a shimmering portal beckoned, revealing glimpses of a dimension unknown to Earth.

Word of the kaleidoscope's magical abilities spreads like wildfire, attracting adventurers and seekers from all corners of the globe. The world's top scholars ponder its origin, but none turn up even a modicum of certainty toward any one conclusion. It is clear that this scope was misplaced across the fabric of reality, having emerged through a cosmic crack that you and you alone opened with your curiosity. You are the one who holds the power to not only to reveal hidden dimensions, but also to bridge the gap between worlds. Forge connections that transcend the boundaries of imagination and build a better globe from it!

*Every scope has a unique story. Post yours online and tag us! @raiderintech*

### **3 Our Product**

The first product in Raiderin Technologies' "Kaleidommeme" robotic kaleidoscope line, the Never-Land Scope combines masterful presentation and unparalleled customization with a bevy of unique features.

The exterior is hand sculpted, painted, and burned by our in-house designer, *Erin*, and is unique to every scope. Also unique to every one is its story, which is AI generated, human vetted, and can be found on the preceding page.

Powered by a Raspberry Pi 4 microprocessor, this kaleidoscope can perform 8 available features, most simultaneously. The UI puts these at your fingertips. By default, pick a preset LED show or a custom one of your design. Choose from a couple gem plates, or make your own, and pop it in the chamber and watch it spin to life. Slip in a pair of headphones and immerse yourself in the fractals; you may pause the gem plate rotation or LED loop as you please, which comes in handy if you want to capture the visuals. No need for your phone, though, as the Never-Land Scope comes equipped with a slide-on camera that you can activate for any pattern you enjoy. If you want to keep things moving, you can also take a 20 second video. If you get bored, you can also change the mirror angle!

The extensive documentation within this manual, combined with the straightforward open-source function modules, allow virtually every aspect of this product to be modified in some form. We encourage everyone, from the first-time coders and novice hobbyists, to the industry experts to try their hand at bringing their Never-Land to life!

## **4 Instructions / Instrucciones**

- Plug in the Raspberry Pi 4 and wall outlet cords to a power source, turn on the wall outlet with the screw on the back.
- Plug in a monitor to the HDMI cord.
- Download the UI and function modules library from this QR code and load them onto your Raspberry Pi 4.



- Run each function module before running the UI to make sure all necessary extensions are installed.
  - Run the UI script.
  - Note that Picture and Video have a 5-second start and end preview.
- 

- Conecte la Raspberry Pi 4 y los cables de la toma de corriente a una fuente de alimentación, encienda la toma de corriente con el tornillo en la parte posterior.
- Conecte un monitor al cable HDMI.
- Descargue la biblioteca de módulos de interfaz de usuario y funciones del código QR anterior y cárguelos en su Raspberry Pi 4.
- Ejecute cada módulo de funciones antes de ejecutar la interfaz de usuario para asegurarse de que todas las extensiones necesarias estén instaladas.
- Ejecute el script de la interfaz de usuario.
- Tenga en cuenta que Imagen y vídeo tienen una vista previa de inicio y fin de 5 segundos.

## **5   FAQs & Troubleshooting**

### **5.0.1   Out of Resources Error**

May occur when attempting to take another picture or video in UI. Simply reboot Pi.

### **5.0.2   Incongruous Default Mirror State**

Pi isn't good with PWM signals, so it may mess up upon its return to a DC of 0. Simply return the mirror back to its place by hand.

### **5.0.3   Camera Angle Adjustment**

On the very top of the mirror assembly, the camera is held in place by a sliding plate. Adjust the position of this plate to move the camera to the desired location, or snap it off and set it to the side.

### **5.0.4   Scope Replacement**

We provide extensive documentation for every physical and digital element of the scope. If you're having issues, give us a call! Contacts are in Chapter 1.2. If we can't resolve the issue over the phone, we recommend repairing the device to factory spec with the help of these files. We are always here to help, so don't be afraid to reach out!

### **5.0.5   Scope Won't Power On**

We recommend shutting down the device, then taking out and reinserting the microSD card.

### **5.0.6   Scope Intact, Won't Function**

Reinstall all the listed modules on by one, as this is the most likely source of any software issues. If the device still does not function after a re-installation and hard reset, attempt to update the Raspberry Pi's operating system using the built-in UI, then reinstall the modules and re-download the requisite project files from our GitHub page, linked in Section 5.2.

### **5.0.7   Unique Patterns**

The scope is designed with customization in mind! If you want to create more pattern plates, simply 3D print the appropriate plate design from our GitHub page. You can then create a custom design to use in the scope. The door on the front of the exterior shell opens to reveal the rotation mechanism, which supports and spins the pattern plate. Simply remove the old pattern plate, match the hexagonal base pattern to that of the new pattern plate, close the door, and enjoy!

## **6 Assembly & Vector Art Index**

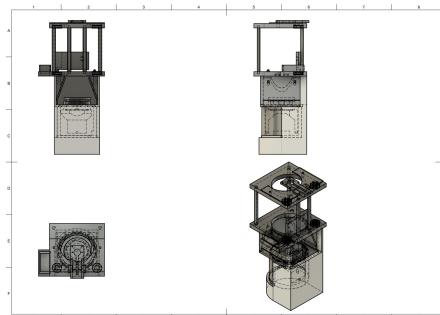


Figure 1: Full Assembly Model with Interior Views

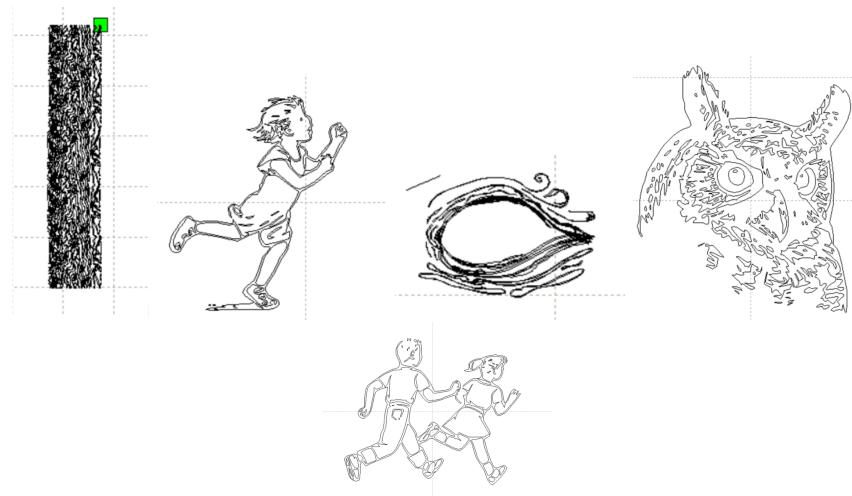


Figure 2: Vector Art (Wood Grain, Boy Run, Wood Hole, Owl, Group Run)

## **7 Materials & Replacements**

Item Number	Item	CPI, Count, Total Cost
1	LEDs	8.99 x1
2	Breadboard (3)	7.99 x1
3	Camera Extension Ribbon	4.69 x1
4	Wall converter	9.99 x1
5	Dual 3.3V and 5V Power Module	9.09 x1
6	Adhesive Acrylic Mirror Tiles	9.99 x1
7	LCD Interaction Screen	13.22 x1
8	LCD Text Module	10.99 x1
9	Spring	3.71
10	Bearings (packed)	8.99
11	Bearings (loose, 3mm)	6.49

Table 1: Total Cost: 94.19

Links to products and reasons for inclusion:

1. LEDs: Needed for kaleidoscope effects
2. Breadboard: Needed for providing power rails and compartmentalizing circuitry
3. Camera Ribbon: Needed to enable camera relocation and adjustment
4. Wall Converter: Needed for power to motors, LEDs
5. 3.3V/5V Power Supply: Supplies both 3.3V and 5V from the wall converter
6. Mirror tiles: Essential to kaleidoscope
7. LCD Interaction Screen: Essential for reduced form factor and UI interaction
8. LCD Text Module: Adds to presentation
9. Springs: Part of the mirror mechanism that ensures smooth rotation
10. Packed Bearings: Bearings to ensure smooth rotation in the kaleidoscope
11. Loose Bearings: Ball bearings to reduce friction in plate revolution mechanism

## 8 Appendix

### 8.1 Credits & Attributions

-**Russell Burns:** Team Lead, Manual Co-Author, UI Architect, Lead Electronics Handler, Lead Internal Assembly Assembler

-**Erin McDonald:** Lead External Assembly Designer, Lead External Assembly Assembler, Assistant Internal Assembly CAD Designer, LED and Stepper Code Architect

-**Aidan Smith:** Lead Internal Assembly CAD Designer, Manual Co-Author, Assistant Internal Assembly Assembler, Servo Code Architect

All vector art used for exterior follows fair use act. All other imagery is AI generated and distributed under fair use from zoo.replicate.dev.

### 8.2 Source Code

Github Link: <https://github.com/rustyburna/KaleidoMnene>

Modules Used: time, guizero, tkinter, math, picamera, PIL, itertools, Rpi.GPIO, random, threading, pygame

### 8.3 Schematic

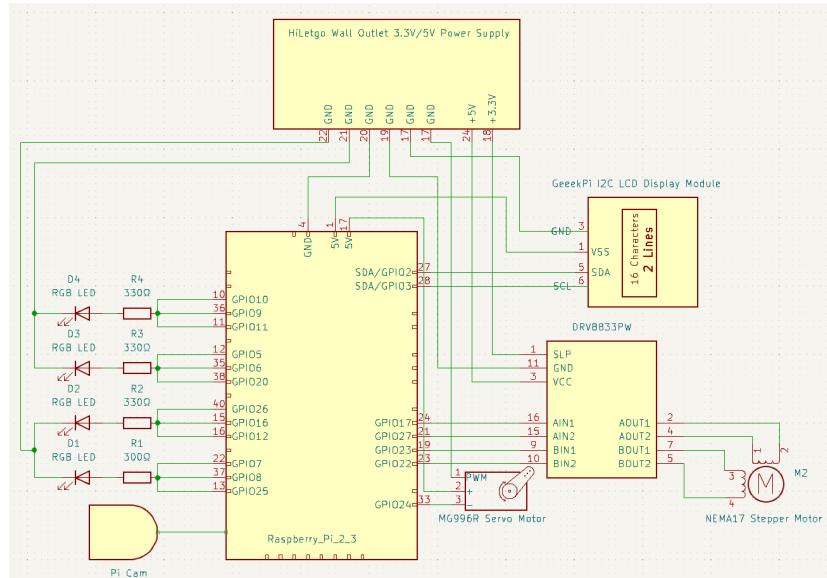


Figure 3: KiCad Circuit Diagram of the Neverland Scope