

# Art-World Compatibility Layer

**How to Hang and Sell Your  
Blinky Goodness as Art**

Chris Combs



# About Me

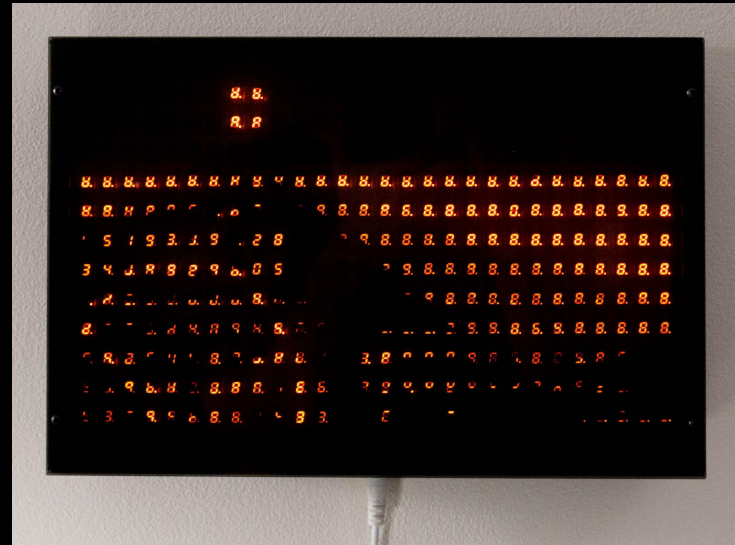
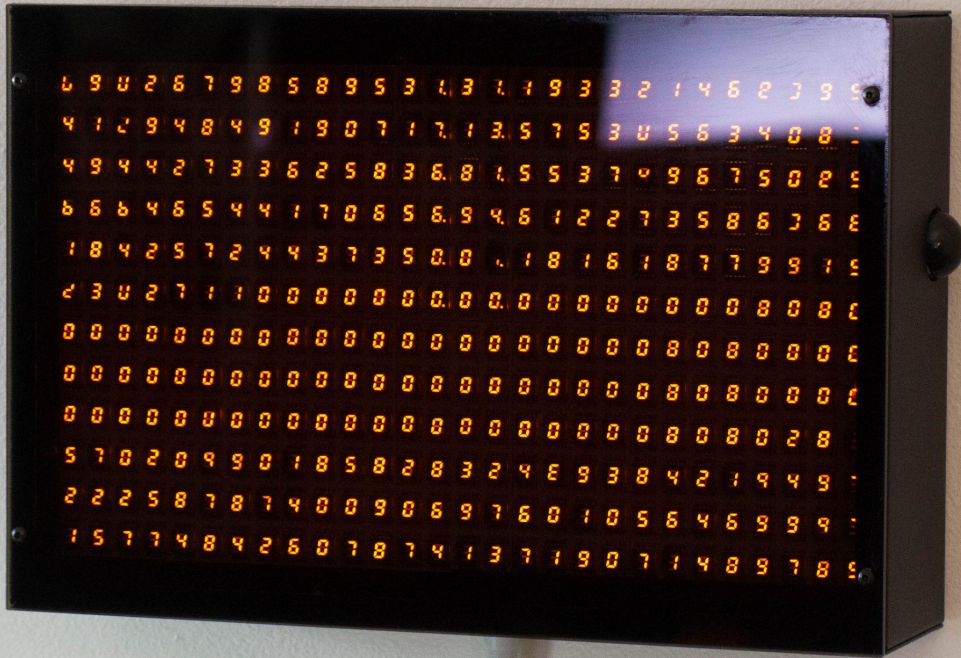
---

Hello! I am Chris Combs, a full-time artist based in DC.


I went to art school for photojournalism and began learning electronics from Adafruit and Hackaday, etc., as a New Year's resolution in 2013.

I spun my first boards in 2014 and immediately became addicted.

Here are some glowing things I've made.



“Road Ahead.” 336 digits, PIR + RCWL-0516, 14xIS31FL3733


 **HACKADAY**

HOME BLOG HACKADAY.IO TINDIE HACKADAY PRIZE SUBMIT ABOUT

**BASK IN THE GLORY OF THIS 336 LED DIGIT DISPLAY**

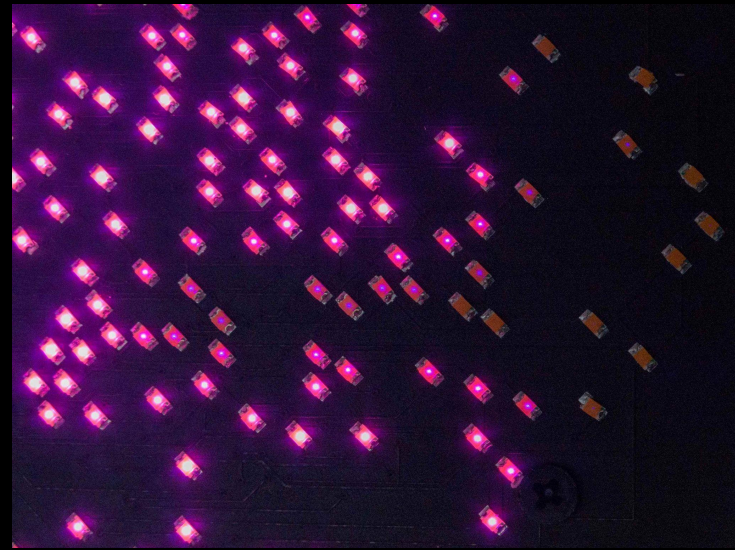
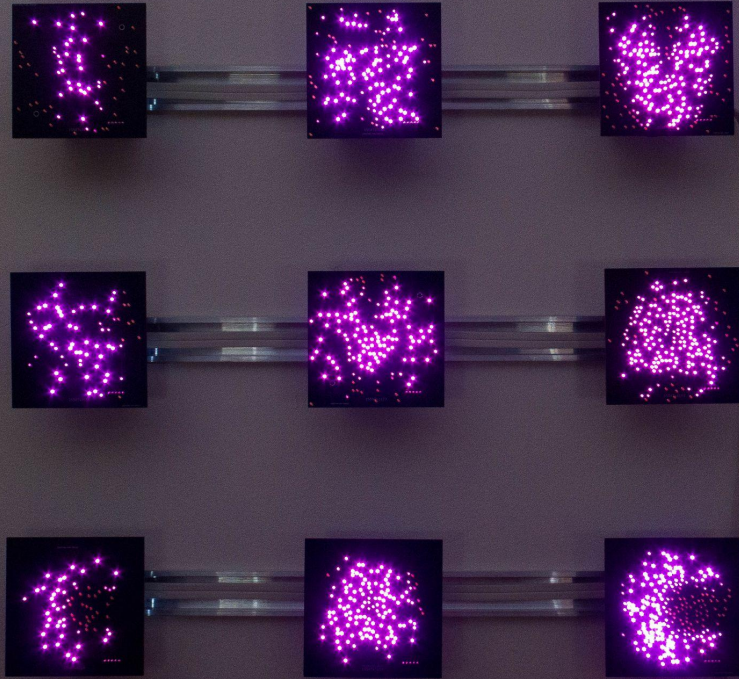
by Tom Nardi 12 Comments

January 16, 2020



[Chris Combs] recently took the wraps off of an incredible art piece that he calls *Road Ahead* which uses 336 seven segment LED digits to create an absolutely gorgeous display. With a piece of smoked acrylic to slightly diffuse the orange glow of the LEDs, the end result has a distinctively retro look that we'd gladly spend all day staring at.

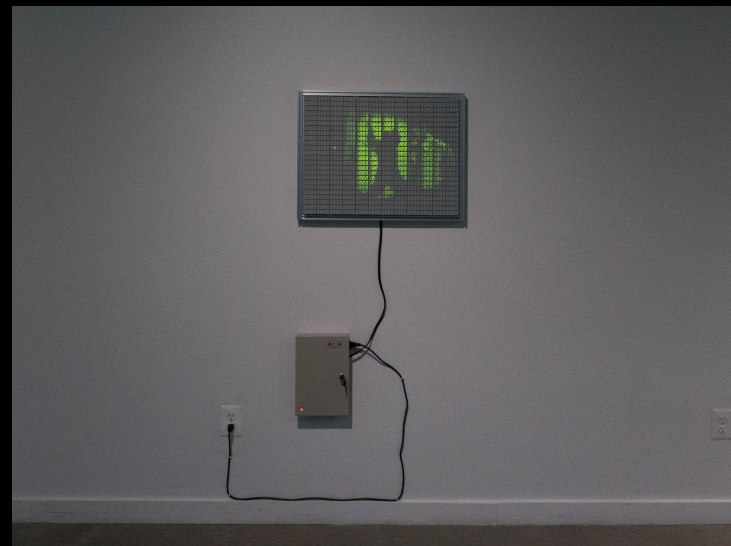
SEARCH



“Rxsqta-Stzne.” 9 hosts, NRF24L01+ radios w/ election protocol



**“Madness Method” (with David Greenfieldboyce). 216 computer-controlled lanterns outside for three months. PCA9685, diff-i2c, Pi 4, three hot controllers w/ arbitration by AVR hardware watchdog**



“One-to-Many.” 7200 segments, 288x “18:88,” 48xIS31FL3733, Pi4



If you look around your desk right now, odds are you'll see a 7-segment display or two showing you some vital information like the time or today's weather. But think of how much information you could see with over 1300 digits, like with [Chris Combs] 7200-segment display.

# Introduction

---

Think of an area of life that has...

- jargon
- an ever-changing landscape of external dependencies
- exclusionary attitudes towards newbies
- lots of technical skills required for success

That's right--It's the world of ~~TECHNOLOGY~~ ART!

# Introduction

---

I think that if you are capable of hacking technology, you can probably hack it in the world of art too.

## **CAVEATS:**

I ain't talking about *The Art World*: blue-chip, investments, megagalleries, MoMAs.

There are much more interesting, smaller pools of art that we can splash in!





**What Makes it Art?**



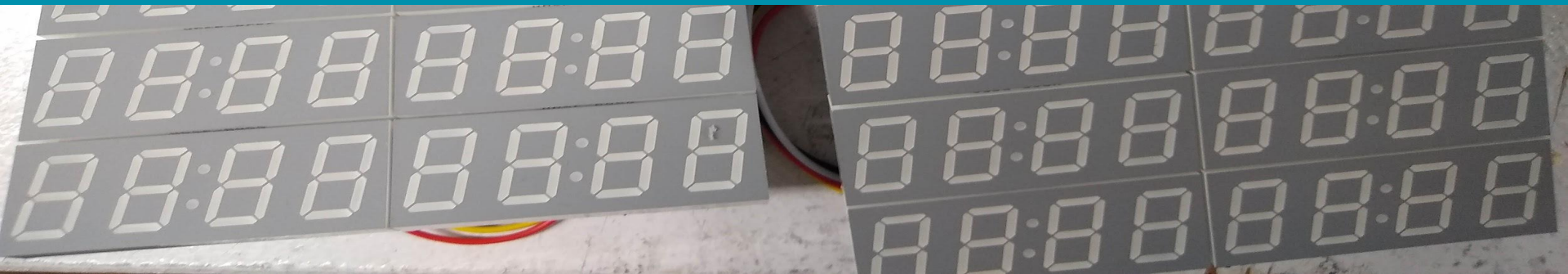
# What Makes it Art?

---

If you say it's art, it's art.



No, like, physically. What will art people expect from my blinky coolthing?



# What People Expect From an Artwork

---

## 1. PLUG AND PLAY

Maaaybe a power button to turn it on.

# What People Expect From an Artwork

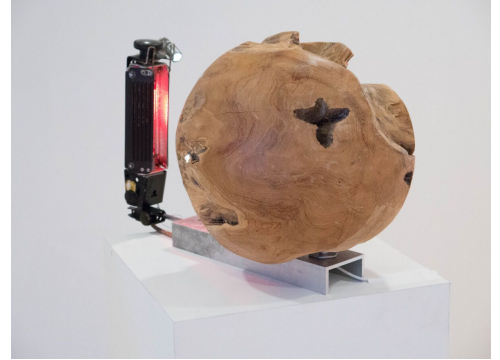
---

## 2. EASY TO HANG

- “Is your art WIRED”?
- They mean: does it have a taut mechanical wire for hanging
- Or, “Tabletop or pedestal” describes non-wall artworks.

Let’s cover the standards for hanging art.

pedestal



## Hanging: “Wiring”

— — —  
A wire connects two points  
for use with a wall hook

Use “D-ring” hangers. They  
have em at \$BIG\_BOX\_HOME

Heavy? Two-screw version

Use “picture hanging wire”  
and look up a tutorial

Don’t use “eye screws.” Over  
a few years they pull out.



# Hanging: “Keyholes”

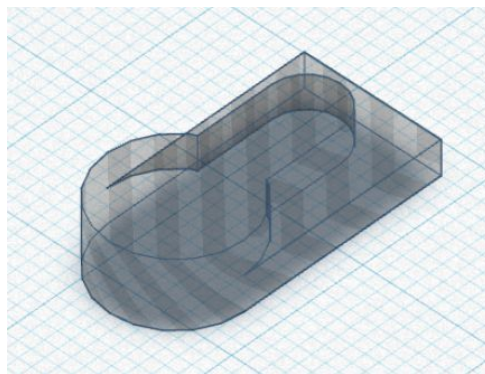
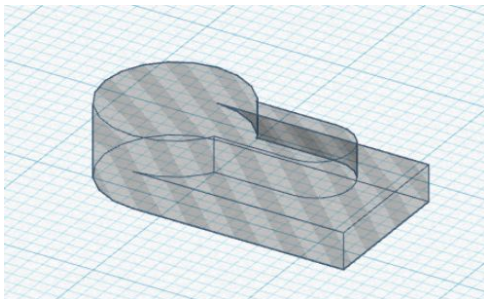
I <3 “keyhole slots.” Two screws in the wall, add art.

You can buy screw-on plates

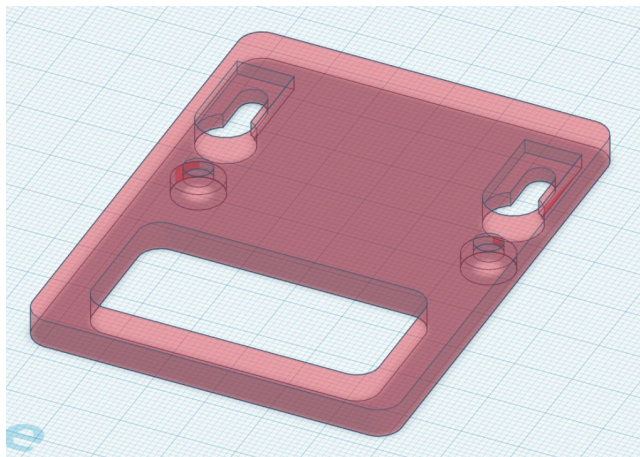
Or! Integrate the cutouts into your design!!

HURDLE: Plaster walls.

HACKY FIX: large-head nails.



UP



# “Hanging Systems”

Some venues: “Your work has to be ready to hang with our \$BRAND Hanging System”

I try to avoid these. “Wired” pieces generally work okay

Ask lots of questions!

Homes never have these.



They have played us for absolute fools



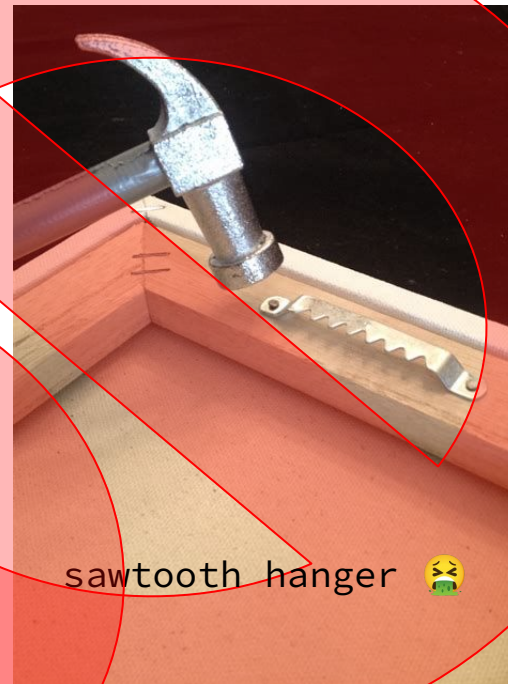
pix ganked from internets ty randos <3



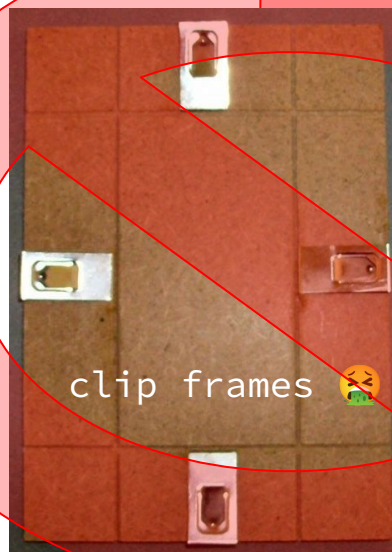
# Hanging: Bad Stuff

---

Don't use any of these.  
Trust me



sawtooth hanger 🤢



clip frames 🤢

# What People Expect From an Artwork

---

3. NO UPDATES ;\_;

- Updating an artwork to fix bugs is weird and bad

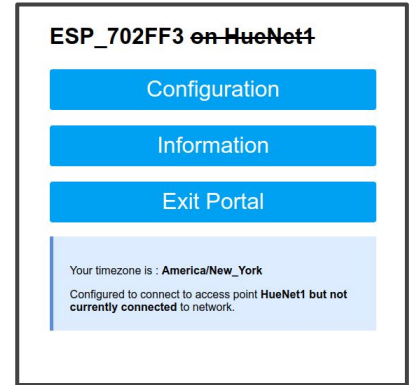
# What People Expect From an Artwork

---

## 4. NO NETWORK CONFIGURATION

Try to avoid network connectivity

Or make it user configurable, eg ESP\_WifiManager



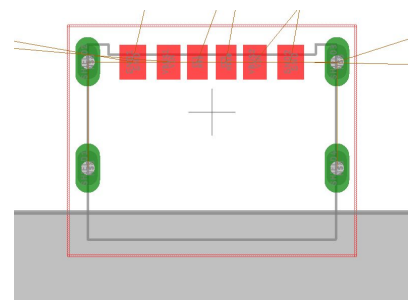
# What People Expect From an Artwork

## 5. CORD COLOR CHOICES

Most walls are light. “Can I get a white cord?”

- Use DC5.5 jacks, provide white 2M/6' extension.
- Or USB, ideally USB-C, w/ white cables.
- Avoid tiny pins w/ the loveable + goofy 6-pin USB-C connector. Or cute adapter pcb

5.5mm X 2.1 mm Female To Male Connector  
inner size is 2.1 mm  
outer size is 5.5mm



# What People Expect From an Artwork

---

## 6. EASILY REPLACED POWER SUPPLY

Common voltage + amperage, shippable quickly

Keep track of the voltage/current/connector in case this happens years later. Spreadsheet?

# What People Expect From an Artwork

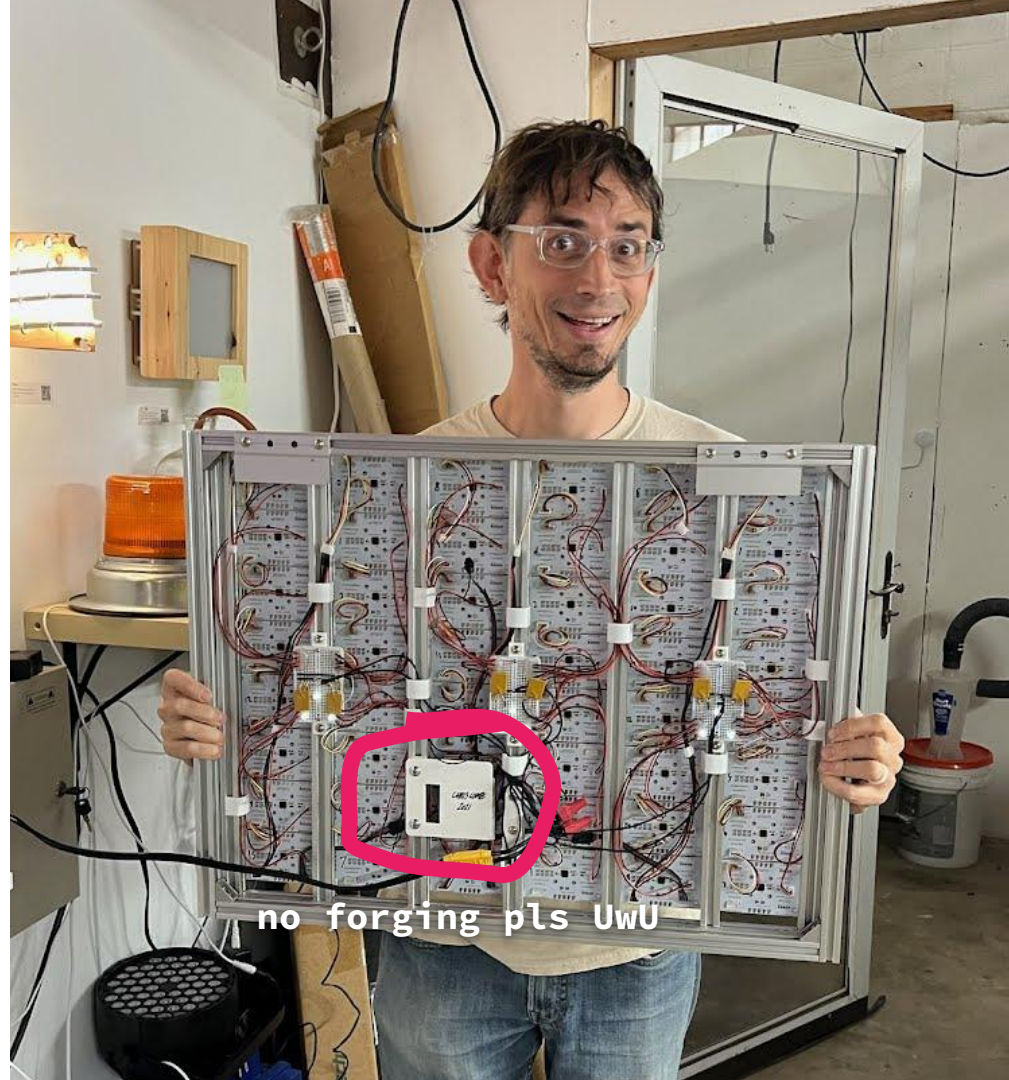
— — —

## 7. ARTIST SIGNATURE

Posca paint pen, marker, ?

Sign and date your creation  
w/ year

Back or front, you pick



no forging pls UwU

# What People Expect From an Artwork

----

## 8. STABLE MATERIALS

I know, technology, but:

- Use materials that are stable over time

Avoid adhesives that degrade: Duct tape, electrical tape

Avoid stuff that oxidizes over time (cheap “Dupont” jumpers)

If it scratches easily, protect the surface



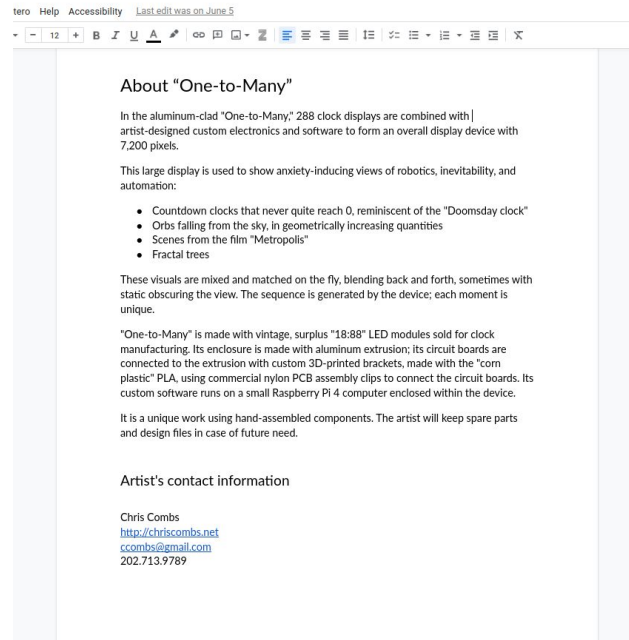
# What People Expect From an Artwork

— — —

## 9. INSTRUCTIONS

Print out:

- How to hang it
- How to plug it in
- What to do if it freezes
- How to remove dust from it
- How to reach you



tero Help Accessibility Last edit was on June 5

12 B I U A

### About "One-to-Many"

In the aluminum-clad "One-to-Many," 288 clock displays are combined with artist-designed custom electronics and software to form an overall display device with 7,200 pixels.

This large display is used to show anxiety-inducing views of robotics, inevitability, and automation:

- Countdown clocks that never quite reach 0, reminiscent of the "Doomsday clock"
- Orbs falling from the sky, in geometrically increasing quantities
- Scenes from the film "Metropolis"
- Fractal trees

These visuals are mixed and matched on the fly, blending back and forth, sometimes with static obscuring the view. The sequence is generated by the device; each moment is unique.

"One-to-Many" is made with vintage, surplus "18:88" LED modules sold for clock manufacturing. Its enclosure is made with aluminum extrusion; its circuit boards are connected to the extrusion with custom 3D-printed brackets, made with the "corn plastic" PLA using commercial nylon PCB assembly clips to connect the circuit boards. Its custom software runs on a small Raspberry Pi 4 computer enclosed within the device.

It is a unique work using hand-assembled components. The artist will keep spare parts and design files in case of future need.

#### Artist's contact information

Chris Combs  
<http://chriscombs.net>  
[ccombs@gmail.com](mailto:ccombs@gmail.com)  
202.713.9789



# What People Expect From an Artwork

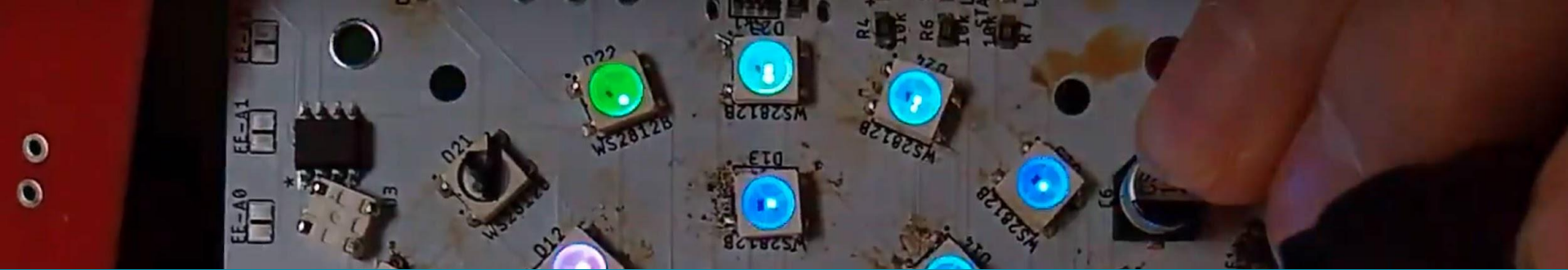
---

## 10. IT JUST DOESN'T QUIT

Artwork should function reliably.

Even if unplugged. Some people put electronic artworks on timers. Some venues turn off the breakers each night

Which segues nicely into...



# Taking Your Gnarly Blinkjawn to the Next Level of Reliability

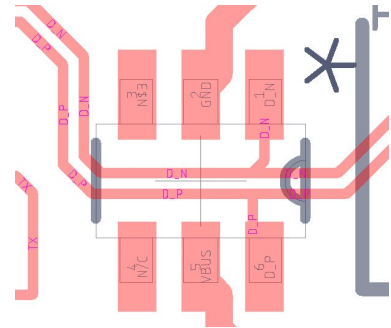
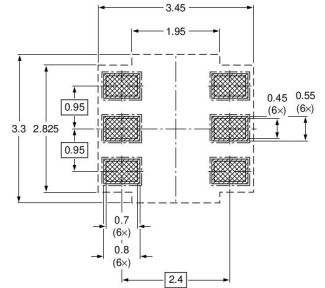


# Making It Reliable - 1. Power Hardening

---

Protect your creation!

- Add MOVs to suppress static zaps.
- For digital signal lines, TVS diodes.
- IP4220CZ6 protects 4 signal lines in a ~3x3mm footprint.



# Making It Reliable - 1. Power Hardening

- 
- Supply PTCs protect against shorts or latch-ups
  - Imagine future tin whiskers

## What are Tin (and Zinc) Whiskers?

- “Hair-Like” Crystalline Structures that May Grow from mostly pure Tin (or Zinc) Finished Surfaces
- LENGTH: Up to 10 mm (Typically < 1mm)
- DIAMETER: from 0.006 to 10  $\mu\text{m}$  (Typical ~ 1  $\mu\text{m}$ )
- Grow from the Base Not the Tip
- Growth Mechanism(s): **UNKNOWN!** Diffusion Processes within Finish or on Surface are likely involved, but what drives diffusion into specific grains and then launches them OUT from surface?

Fundamental Research  
is INCOMPLETE

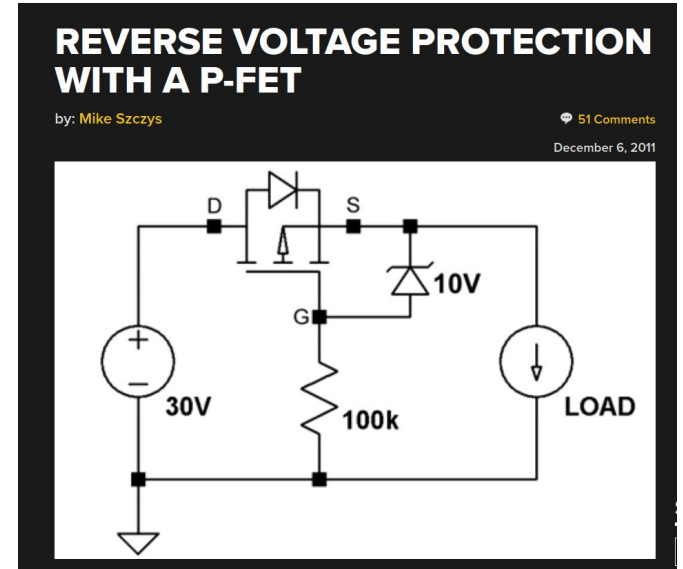
Whiskers are  
NOT Dendrites



# Making It Reliable - 1. Power Hardening

---

- Consider adding reverse polarity protection



# Making It Reliable - 2. Filesystem Hardening

---

- Read-only filesystem
- Raspbian's OverlayFS for the win!!
- Or minimize FS writes.
- Simulate a full filesystem w/ dd. Graceful recovery?
- Set up logrotate and clean temp files w/ cronjob

# Making It Reliable - 3. Software Hardening

---

- Wrapper script to restart the software. Or use supervisord
- Reset buses or devices upon failure?
- For maximum reliability, like outdoor art, consider an off-board hardware watchdog

# Making It Reliable - 3. Burn It In

---

Break its network connection and run it continuously for a few weeks.

- Arduino: Watch out for `millis()` timer overflow bugs every ~50 days
- Pi: w/ no network or RTC the clock will rewind on reboot... Double-check any FS time assumptions in your code





# What Venues Will Want

# Venue Expectations

---

To share your glorious creation with the world, you will need:

- **Title**
- **Medium list, date, dimensions**
- **Photographs**
- **Price** and **edition size**

Perhaps:

- **Bio**
- **Artist's statement**

# Venue Expectations: Title

---

Title your artwork.

“Untitled 1” is a great name for a Notepad document but not for art

You can be as literal as you want. “LED Ball #1” is perfect

I recommend unique-to-you titles

# Venue Expectations: Medium List

---

Comma-delimited list of the main visible materials, like “LEDs, PLA, aluminum.”

- Not, like, part numbers. Summarize as “electronics” or “circuitry” or “hardware” (meaning screws)
- Keep it short. (I’m bad at this)

# Venue Expectations: Artist's Statement

---

We've all seen Bad Art Language. You don't have to do that!  
Just clearly explain why you made this specific thing.

Extra sprinkles:

- How it connects to larger concepts or themes in the world
- How the materials have particular meaning to you
- Inspiration: Historical events, other artists

# Venue Expectations: Artist's Statement

---

Here's a totally synthetic\* example of a bad statement.

\* mostly harvested from a real world example, sob

✗ clearly explain why you made this specific thing

✗ How it connects to larger concepts or themes in the world

✗ How the materials have particular meaning to you

✗ Inspiration: Historical events, other artists

In my work I make connections between the seen and unseen, which is a metaphoric invocation of the fallibility of cognition. I was conceived as an encounter for intersubjective exchanges and merge multiple perspectives into an embodied and shared experience where the primordial and the critical actively unfold in the enjoyment of unorthodox interpretation.

# Venue Expectations: Artist's Statement

---

I don't really know what that other statement was trying to say.

- ✓ clearly explain why you made this specific thing
- ✓ How it connects to larger concepts or themes in the world
- ✓ How the materials have particular meaning to you
- ⚠ Inspiration: Historical events, other artists

In this piece, "Merry-Go-Round," I use vintage LEDs and found objects to recreate my childhood memories of riding a cherished carousel.

I feel that as always-online people we are riding a merry-go-round every day, with all of its glee and whirling chaos.

It's my hope that asking you to touch this interactive piece makes you smile--and perhaps awakens a similar nostalgic memory for you.

# Venue Expectations: Price

---

Pick a price for your artwork. You could say “NFS” (not for sale).

**Many venues take 30-50% of the listed price** for themselves.

Purchasers and venues hate when an artwork's price changes over time.

So from the start, just price your artwork high enough that if 40% is taken off, you'll still be happy. **Stick with that price** until it sells. Don't change prices by venue



# Venue Expectations: Edition Size

---

Is it a one-off?

- “unique object”

Are you making more than one?

- Decide in advance how many: “edition size.”
- Each gets a unique number in that series. Ex: “#3 of 10”

You can say “open edition” if you don’t want to be tied down. Some buyers won’t like that.

# Venue Expectations: Bio

---

Just include these ingredients and keep it short.

- What's your story? In a sentence or two

*Ada Lovelace is a mathematician and writer in Marylebone.*

- What do you like to make?

*She focuses on “poetical science,” engineering that is guided by intuition and imagination.*

# Venue Expectations: Bio

---

- If you like, list a cool achievement or two

*Ada became the world's first programmer when she developed Bernoulli-number algorithms for the Difference Engine.*

- What's a fun fact about yourself?

*She loves betting on horses, and in her spare time she runs a gambling syndicate.*

# Venue Expectations: Photographs

---

Videos are great for the internet but you'll probably need JPEGs for art venues.

- Blank background
- Tidy cords
- Even lighting without harsh shadows
- Angles: Straight on, "3/4 view", and "detail" images

# Venue Expectations: Photographs

— — —

This is a crummy photo.

It has a bunch of unrelated  
stuff visible

The lighting is too dark



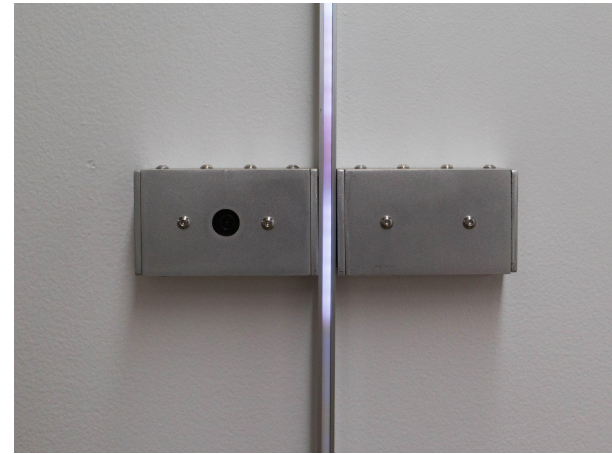
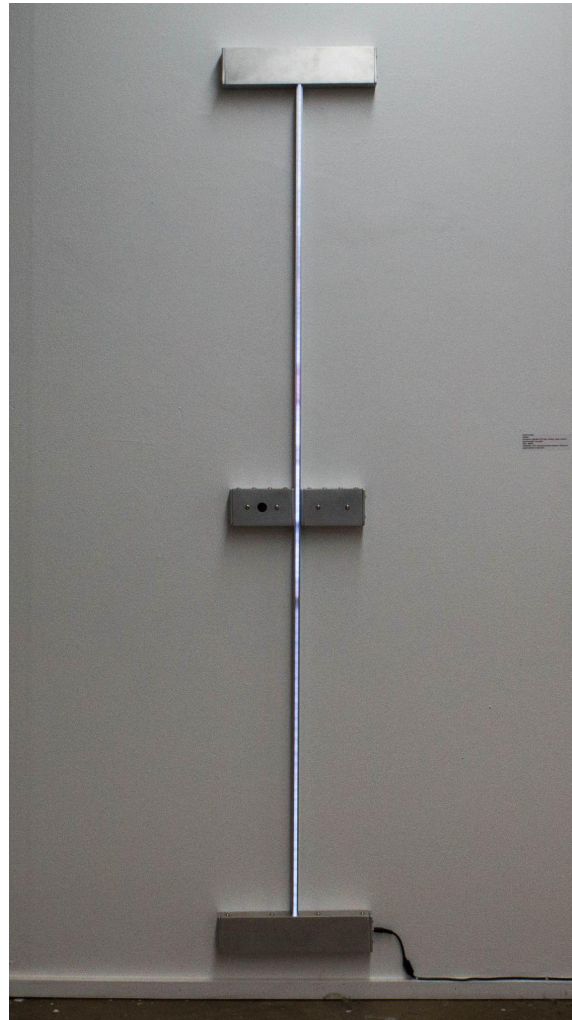
# Venue Expectations: Photographs

— — —

This is an OK version.

The lighting is better, but  
still not great

I'm not happy with it yet



# Venue Expectations: Photographs

— — —

Look at how much other stuff  
is visible!

Lighting/exposure is dark



## Venue Expectations: Photographs

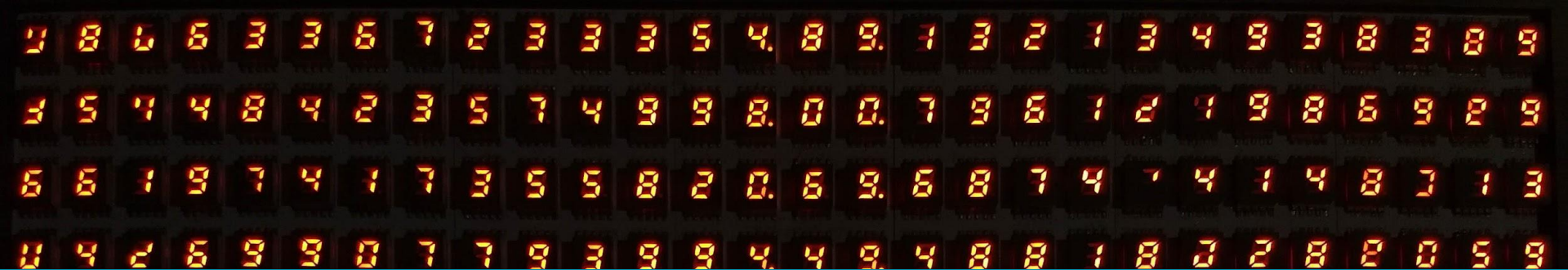
— — —

Still slightly dark, but  
much cleaner frame.

(This is the “3/4” angle I  
mentioned)







# Find Venues



# How to Find Venues: Types of Venue

---

(USA-centric. These definitions are fuzzy)

## **MUSEUM:**

OWNS art. SHOWS it. Never sells it

## **COMMERCIAL GALLERY:**

SELLS expensive art only from “represented” artists. They take a huge cut but employ salespeople

# How to Find Venues: Types of Venue

---

## **NONPROFIT GALLERY:**

This is the sweet spot. They show lots of kinds of art and vaguely try to sell it. Takes a 30-50% cut

## **NON-TRADITIONAL VENUES:**

Coffeeshops, hotels, pop-ups, DIY spaces: Invent your own fun! Direct sales, so you're on your own, but 0% cut. Rare to get promotion or insurance.

# How to Find Venues

---

Thus informed... Build a list of venues:

- DuckDuckGo Places or Google Maps, “gallery”
- Yelp
- Go to the nearest art supply store and ask the clerk

Use this list to...

# Find Shows

- RESPONDING TO OPEN  
**“CALLS FOR ENTRIES”**
- **NETWORKING**
- **ASKING NICELY**



# How to Find Shows - “Calls for Entries”

---

When a venue wants to do a show, they’ll put out a CALL.

“We are looking for SCULPTURES” or “BLUE art” or “works exploring the fluffiness of cats”

w/ deadlines + requirements

All applicants must submit the online submission form.

Please read these guidelines before filling out the form.

Submission Deadline: November 15, 2022

Notification Date 1: February 1, 2023

Notification Date 2: March 15, 2023

See Individual Categories for Notification Date

#### This Year’s Categories Include:

- Installations (Interactive and non-interactive)
- Virtual/Augmented/Mixed Reality Environments
- AI Generated or Assisted 2D and 3D work
- Robotics/Kinetic/Electro-Mechanical Objects and Installations
- Multimedia Performance
- Digitally Generated or Fabricated Objects
- Wearables
- Interactive Installations for Children
- Outdoor Installations and Projections
- Experimental Single Channel Video/Experimental Documentary/Animation

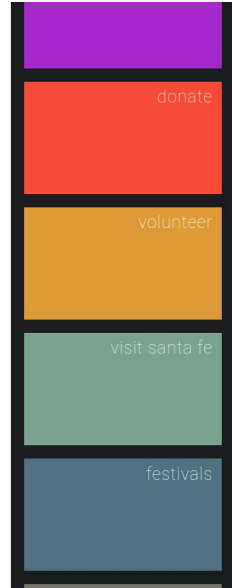
#### Submission Fees

Multiple submissions are welcome in one or more categories. You must submit a new form and pay the fee for each submission.

Experimental Single Channel Video, Documentary and Animation: \$15 per submission.

All other Categories: \$25 for a single and \$20 each for multiple submissions.

Special Category for Axle Contemporary’s Mobile Gallery for New Mexico Artists Only / scroll to bottom of this page. No submission fee.



# How to Find Shows - “Calls for Entries” - Types

---

START HERE



**GROUP SHOWS:** “Group” refers to random artists smashed together because their works all fit a theme. Easiest!

**SOLO SHOWS:** A given artist shows a bunch of pieces.

**OPEN HANGS:** Rarely... First-come, first-serve.

# How to Find Shows - “Calls for Entries”

---

Organizations promote calls via:

- **EMAIL NEWSLETTER** (groan)
- **THEIR OWN WEBSITE** ... who would check this?
- **INSTAGRAM**
- occasionally **ZUCKERNET** or **BIRDSITE**



# How to Find Shows - “Calls for Entry” Tools

---

All of these discovery methods stink.

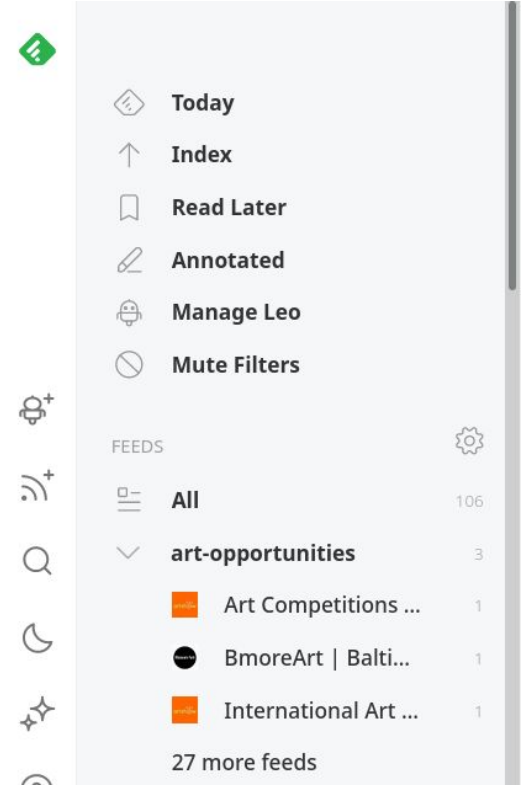
I say, let the computer do the walkin’!

So here are some **automated methods**

# C4E Tools 1. Snooping On Their Websites

“**RSS**” feeds notify you when a site publishes a new page

Add each art venue site to RSS readers like **Feedly** or **NetNewsWire**



# C4E Tools 1. Snooping On Their Websites

No RSS feed? Use [VisualPing](https://visualping.io).

visualping.io; free to a point

It watches for text or visual changes

- Venue's 'Opportunities' page, weekly

Pings you when changes occur

The screenshot shows the VisualPing monitoring interface for the website 'transformer 20'. The page title is 'Artist Resources — Transformer'. The interface includes a preview of the website content, which features a header with 'transformer 20' and 'ARTIST RESOURCES', and a section titled 'GRANTS + FUNDING + MORE'. On the right side, there are settings for 'FREQUENCY' (set to 'Every Week'), 'CHANGE TRIGGER' (set to 'Any change'), and 'MODE' (set to 'TEXT'). Below the preview, there is a 'Changes detected' section with a table of recent changes:

Time Ago	Change Indicators	Percentage
2 days ago	😊 😐 😞	19%
3 weeks ago	😊 😐 😞	26%
4 weeks ago	😊 😐 😞	16%

# C4E Tools 2: Filter and Read Their Dumb Newsletters

---

(I love you, art venues)

Sign up for email newsletters from each venue.

**Set up a filter** for “**CALL**” or “**ENTRIES**” or “**OPPORTUNITIES**”

drink a bunch of \$HOT\_BEVERAGE and skim through them weekly.

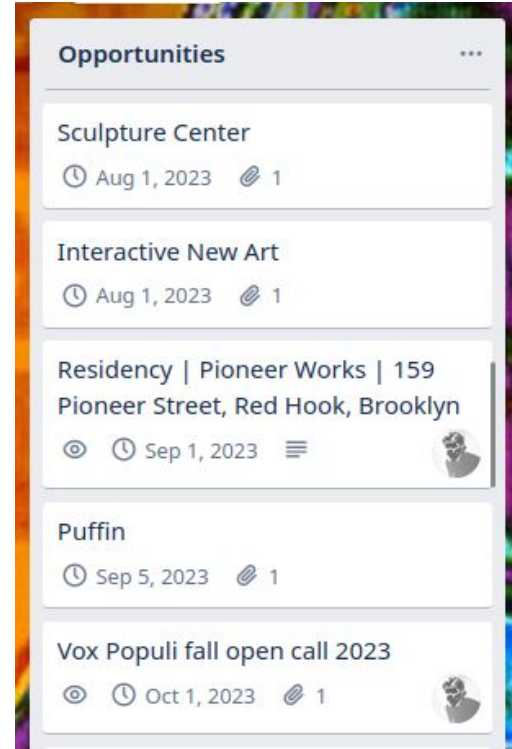
- Subject lines often conceal opportunities

# C4E Tools 3. Keeping On Track

---  
You don't have to apply right away.

Use a task tracker like **Trello**, **Remember the Milk** or \$YOUR\_OS\_TASK\_LIST. Save 'em up

Set early due dates so you can ask questions (“Do you have electrical outlets?”)



# C4E Tools 3. Keeping On Track

---

Copy the important parts of the call into your task management tool:

- **Topic**
- **Key dates**, including when the show will occur
- **Contact info**

Sometimes this all vanishes after the deadline, especially Google Forms

# How to Find Shows - “Calls for Entries”

---

Some entry platforms are browseable:

- CaFÉ
- Submittable
- EntryThingy

These are not a great use of time IMHO

But search for local version! e.g. Virginia’s “Art League” has awesome lists of regional opportunities weekly.



The screenshot shows the CaFÉ website interface. At the top right, it says 'Welcome back, CHRIS' and 'LOG OUT'. The main navigation bar includes 'MY CAFÉ ENTRIES', 'MY PROFILE', 'MY PORTFOLIO', 'APPLY TO CALLS', 'CALENDAR', 'CHECKOUT', 'CAFÉ HELP', and 'LOG OUT'. The 'Call Listings' section is active, displaying a search bar with the text 'Jacksonville Jaguars Miller Electric Center Artistic Bike Racks-Project 1 of 7' and '220 Results'. Below the search bar are filter options: 'Filter By: Reset', 'Favorites Only' (checkbox), 'Invitational Calls (code req)' (checkbox), 'CALL TYPE' (+), 'ELIGIBILITY' (+), 'ENTRY FEE' (+), 'PROJECT BUDGET' (+), 'DEADLINE MONTH' (+), and 'LOCATION' (+). A 'Sort by' dropdown is set to 'Choose...'. On the right side of the listing, there are buttons for 'MORE INFO' and 'APPLY NOW'. Below these buttons, the call details are listed: 'Call Type: Public Art', 'Eligibility: Regional', 'State: Florida', 'Entry Deadline: 10/28/22', 'Deadline is Today!', 'Budget: \$5,000', and a description: '(2) Two, three-dimensional (3D), free-standing, sculptural bicycle rack(s) to be installed adjacent to main entrances of the Jacksonville Jaguars' new sports performance center with a focus on specified medium; steel (Reference Full Call to Artist HERE, pages 4-5. View size, page 13)'. At the bottom of the page, there is a navigation menu with 'Classes', 'Gallery', 'Events', 'Support', 'About', and 'Blog'. The footer shows 'Home / Blog / Artist Opportunities #615' and a 'SHARE' button.

## Artist Opportunities #615

October 26, 2022 | Art League, Artist Opportunities



# How to Find Shows - Networking

---

Check out a venue at an “opening” or “artist’s talk.”

They’ll promote upcoming opportunities sometimes

Also check out their vibe

If a show seems annual, add it to your calendar + 10 months



# How to Find Shows - Asking Nicely

---

Is their site vague or uninformative?

Literally just email them a few sentences asking how you could apply to show your art at their venue

> **attach a JPEG of your cool creation!**

# How to Find Shows

---

I'm at about a 15% acceptance rate right now

So it may take a few tries to locate a show

Awesomeness stands atop a mountain of rejection letters

Keep going!

**chriscombs.net**

**ccombs@gmail.com**

**IG: @ccombsdc**

**@combs@mastodon.art**

**bird: @ccombs**

**zuck: /ccombsdc**

November 7: Featured on “WETA  
Arts” (DC PBS)

Through Dec 4: Westconn PAC  
Gallery, Danbury, CT

April-June: McLean Project  
for the Arts, McLean, VA

May-July: PG Publick  
Playhouse, Hyattsville, MD

June-July: Arlington  
Art Truck, Arlington, VA