

# CV2 Error Logging Improvements

This is a small suite of features designed to make error logging more useful when debugging CV2!

- Error Log Highlighting
- General error message improvements

These features could be shipped separately or as a set, depending on schedule and dev availability.

## Goals:

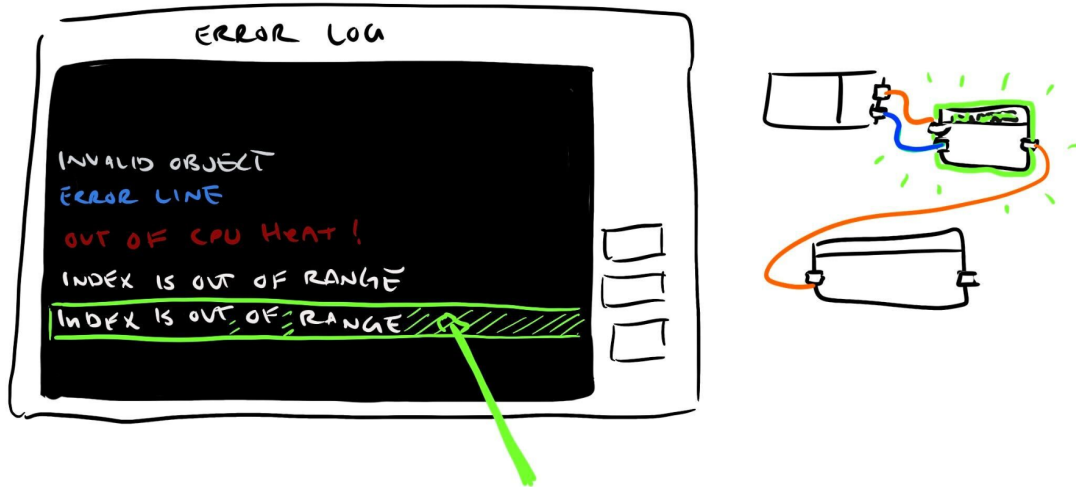
1. Reduce the difficulty of debugging a circuit graph, according to Audrey
2. Prioritize features that also serve novice creators over those that only help advanced creators
3. Increase passive understanding of circuits
4. Don't create a bunch of always-on visual noise
5. Players know where to start debugging
6. Avoid audio spam
  - a. Be judicious about which errors are high enough priority to beep at you
  - b. Errors of different urgency have different beeps and different on/off toggles
  - c. Only creators should ever hear error noises
7. Don't significantly hurt performance for creators, even while debugging
  - a. Debug tools shouldn't be so resource-intensive that they change the behavior of what's being debugged

## Error Log Highlighting

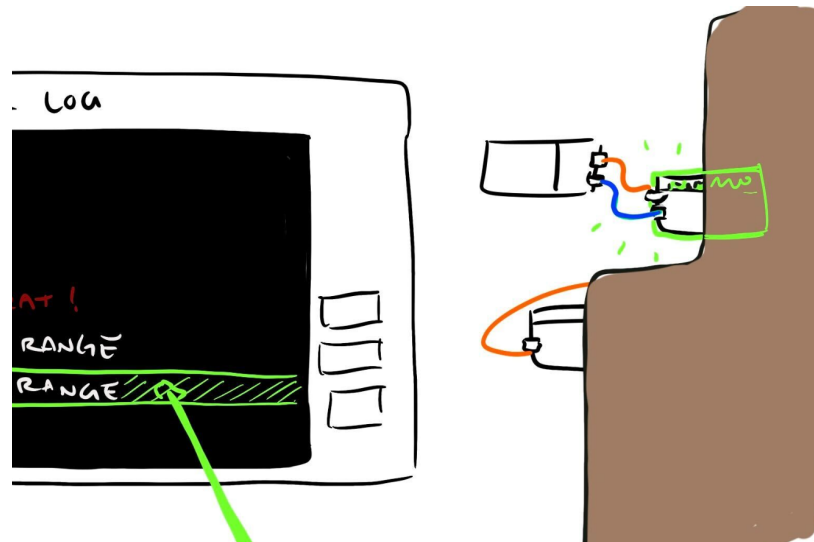
One of the toughest parts of debugging is knowing where an error is coming from! This feature is intended to make that trivial instead.

How it works:

Clicking an error message with the Maker Pen laser or with your finger laser highlights both the log line and the chip that sent it. ("Out of heat" errors highlight the first chip that failed to execute.) I used a green outline here, but red might be better.



This chip highlight x-rays through any occluding geometry:



Both the log line and the chip remain highlighted until you click on another line (which changes what's highlighted,) click on the same line again (which clears the highlight,) or close the log (which clears the highlight.)

**Why not teleport you to the chip in question?** This balloons scope, since you have to check for a valid teleport location and change locomotion modes if the chip is way up in the air, etc. I'd like to do the simple x-ray highlight first as MVP and then see what else is needed.

# General Error Message Improvements

This one is a little bit of a grab bag, but there are a lot of improvements to be made to the existing errors that get sent to the log.

## Descriptive, differentiated, plain English error messages

- Some of the language used in our errors right now is not immediately useful for someone unfamiliar with programming in the context in which it appears.
  - E.g. “Index is out of range” can appear on any chip where our code might internally deal with a list, even if the user has no idea that lists are involved, such as with tags. While it’s not important that every individual chip have a customized error message, it’s much more useful to the players if tag-related chips have tag-related error messages, and list-related chips have list-related error messages, rather than those two categories sharing one.
  - **“List index is out of range”** and **“Tag does not exist”** for example
- Another good example of this is the generic “Are you sure everything is configured correctly?” error. This is too vague to be useful. Any clues we can provide about what’s actually misconfigured will help.
- The first step of this work is identifying these categories, customizing the error messages, and prioritizing which categories to hit first. Changing an error message is easy, but must be done individually per chip, and we have 1000+ chips. Some are clearly more high value than others, and we can triage it.
- Going forward, attention should be paid to descriptive error messages with each individual chip.
- “One or more errors occurred” should just go away completely, replaced by the list of errors.

## Useful data in error message

- Chips that error out based on an incorrect value, or the absence of a match, should include the relevant value
  - Ex: **“Tag ‘#makerpen’ does not exist”** or **“List index ‘22’ is out of range”**

## Error Audio Settings

- Right now we have one error noise and it plays all the time. It's so frequent that creators aren't incentivized to check the log every time, but also get very little information from the beep itself.
- The ask here is that we add a new error sound (requesting this work from [REDACTED]) for a total of at least two, potentially three error noises that evoke different levels of urgency.
- Then we expose different categories of error in the Logic & Debugging settings category.
  - Categories might include:
    - Running out of heat
    - Something is set up wrong
    - Index is out of range/invalid player type errors
  - A dev who knows more about errors under the hood should probably help me pick categories
- Creators can choose between sound 1, sound 2, etc, and none for each category.
  - We pick defaults based on our best guess