Nathan Villicaña-Shaw
November 15, 2015

Wave Cave Proposal: *Cathode Ray Tubes*

1. Synopsis of the Piece (50 to 100 words) – What exactly will we see and hear as we enter the gallery and explore the work.

   Four CRT TV's are set up each on its own small TV stand in a semicircle. In front of each TV is a Nintendo hardware emulator (Retron) with its circuitry exposed. The TV's and the Retrons are all connected in one large 8bit-glitch feedback loop. As the interactee approaches one of the TV's they are able to lay their hands on the bare circuit board; inserting their body into the installations circuitry, effecting the video on all four of the displays. The Video from each of the Retrons is sonified in real time using custom video decoding circuitry.

2. Detailed Description of the Piece (500 words or less) – Tell us more about your approach both aesthetically and technically.

   Four Retron NES hardware emulation consoles are removed from their original casings and repackaged in clear acrylic boxes. In the repackaging all the critical circuit boards are exposed to the outside of the case while the control ports and cartridge slot are removed (effectively turning the device inside out).

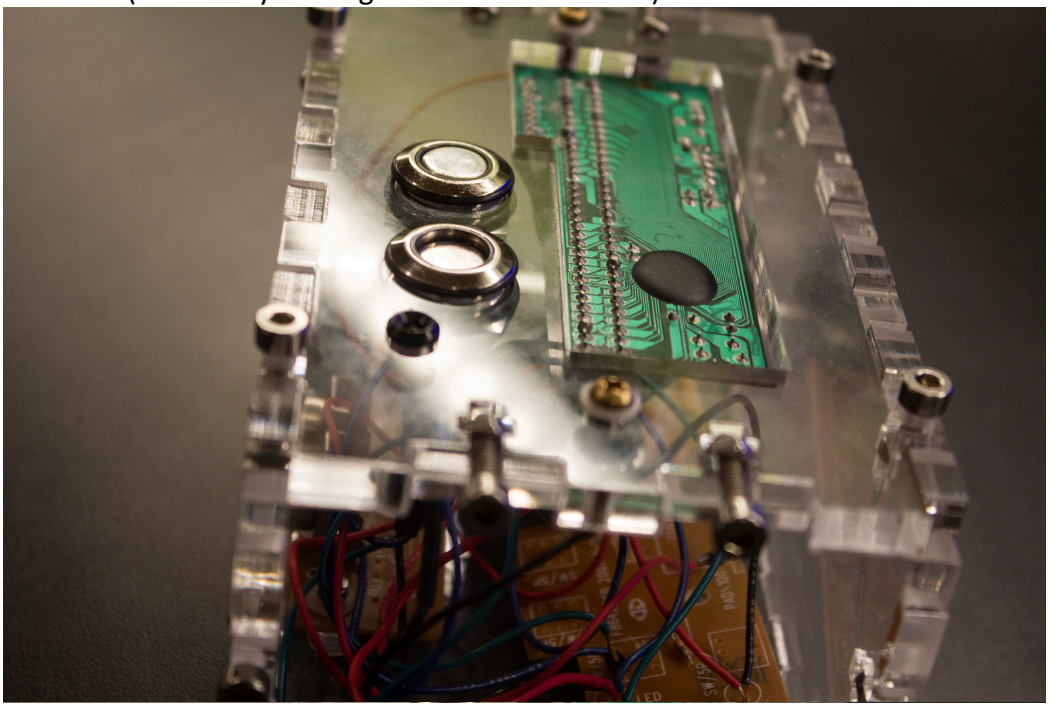


Image 1: first-run Retrono (installation versions will not have buttons only the circuit board)

When the Retron consoles are turned on with no game cartridge inserted the circuitry ‘floats’ creating interesting simple geometric glitch displays (see image 2). The pins are floating without any proper pull-up or pull-down mechanisms and the circuit becomes “live” and extremely susceptible to outside interference.

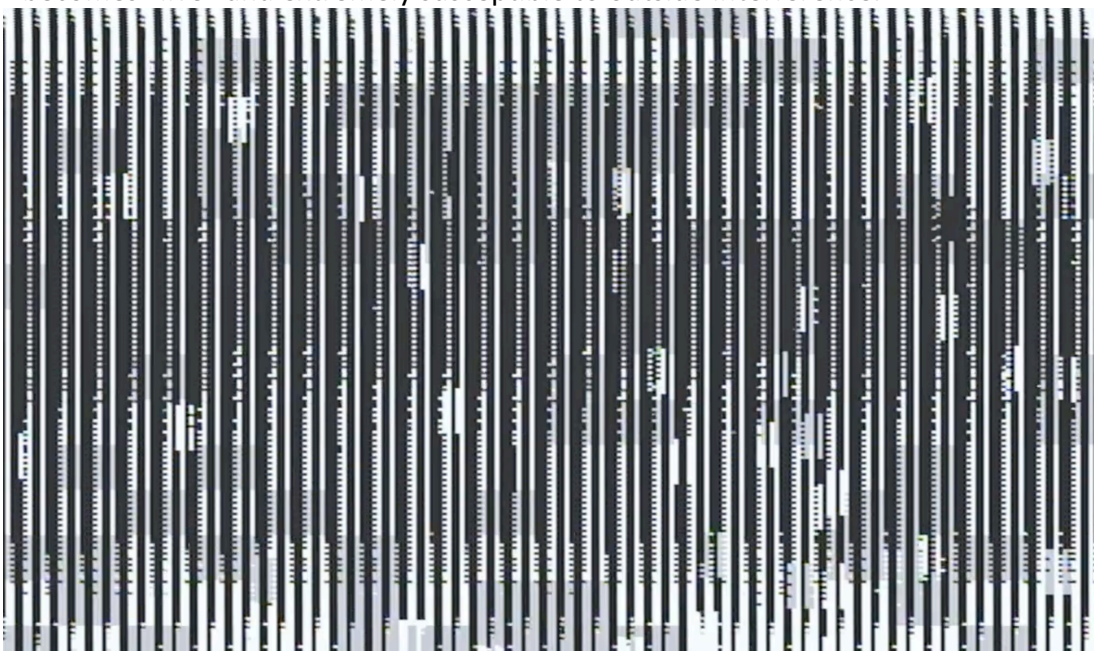


Image 2: Example output from “live” Retron

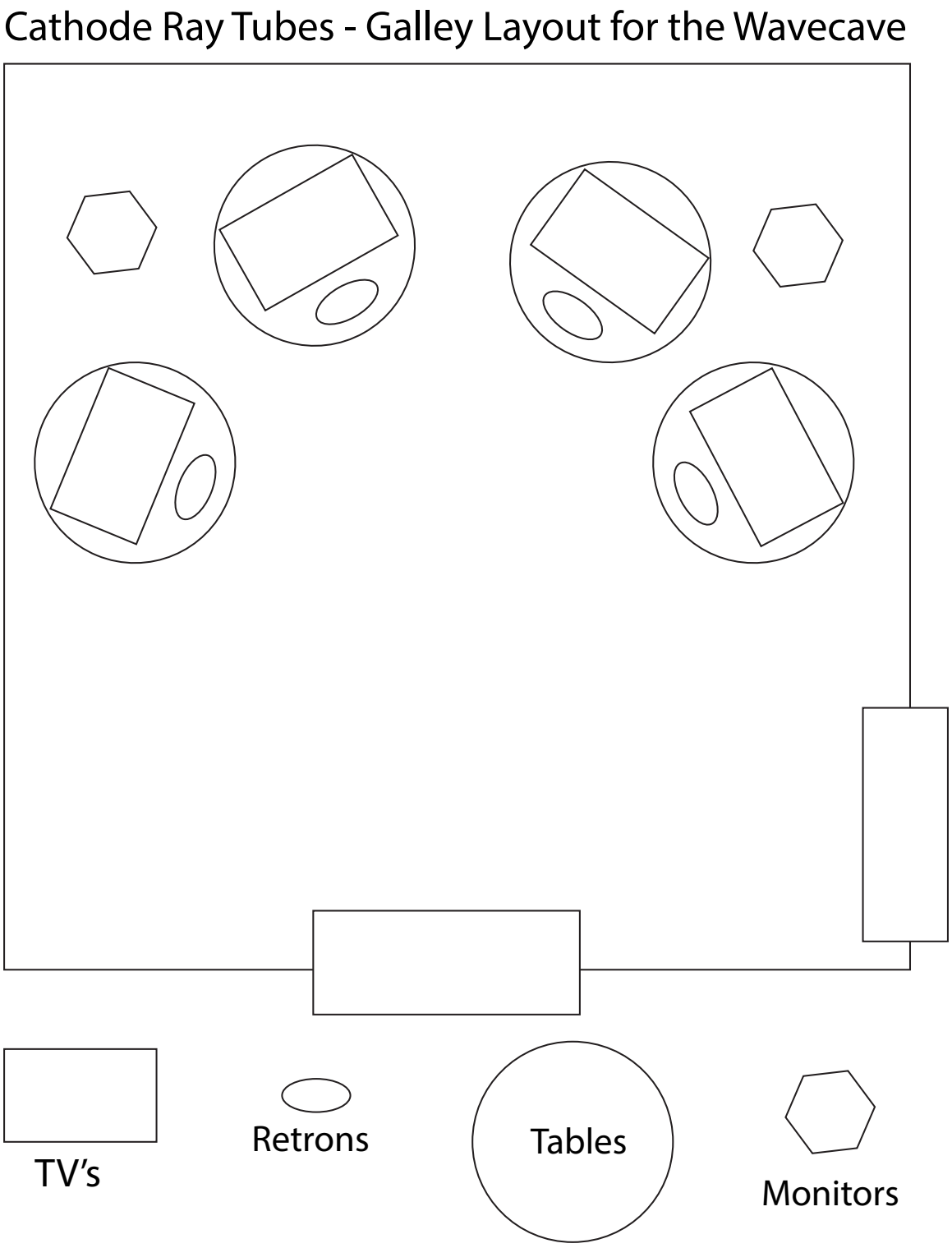
Each of the Retrons are placed in front of a CRT TV (close enough for the CRT’s electrical field to start to interfere with the Retron circuitry). Whatever is displayed on the TV starts to directly effect the output of the Retron. While the audio outputted from each Retron does go to the TV it sits in front of, the Video output is sent to the next TV in the installation as well as being sent to custom video to audio circuitry. (see electrical diagram below) This wiring schema effectively connects all four TV’s and all four Retons in one large feedback loop.

While the system will generate interesting visuals and sounds on its own, *Cathode Ray Tubes* is an interactive space and interactees are encouraged to “play” the feedback loop. Interactees are able to inject data into the loop by touching one of the exposed circuit boards, if they touch multiple circuit boards at once they are able to create sub-loops as the electricity flows through their bodies (its safe). If they touch the TV screens they will temporarily add resistance to the feedback loop by removing the static electricity from the TV which acts as the transfer mechanism between the TV’s and the Retrons. If the interactee is uncomfortable with touching circuit boards or crackling TV screens they can effect the system by simply changing the position of the Retron in relation to the TV as even small adjustments can drastically effect the images produced.

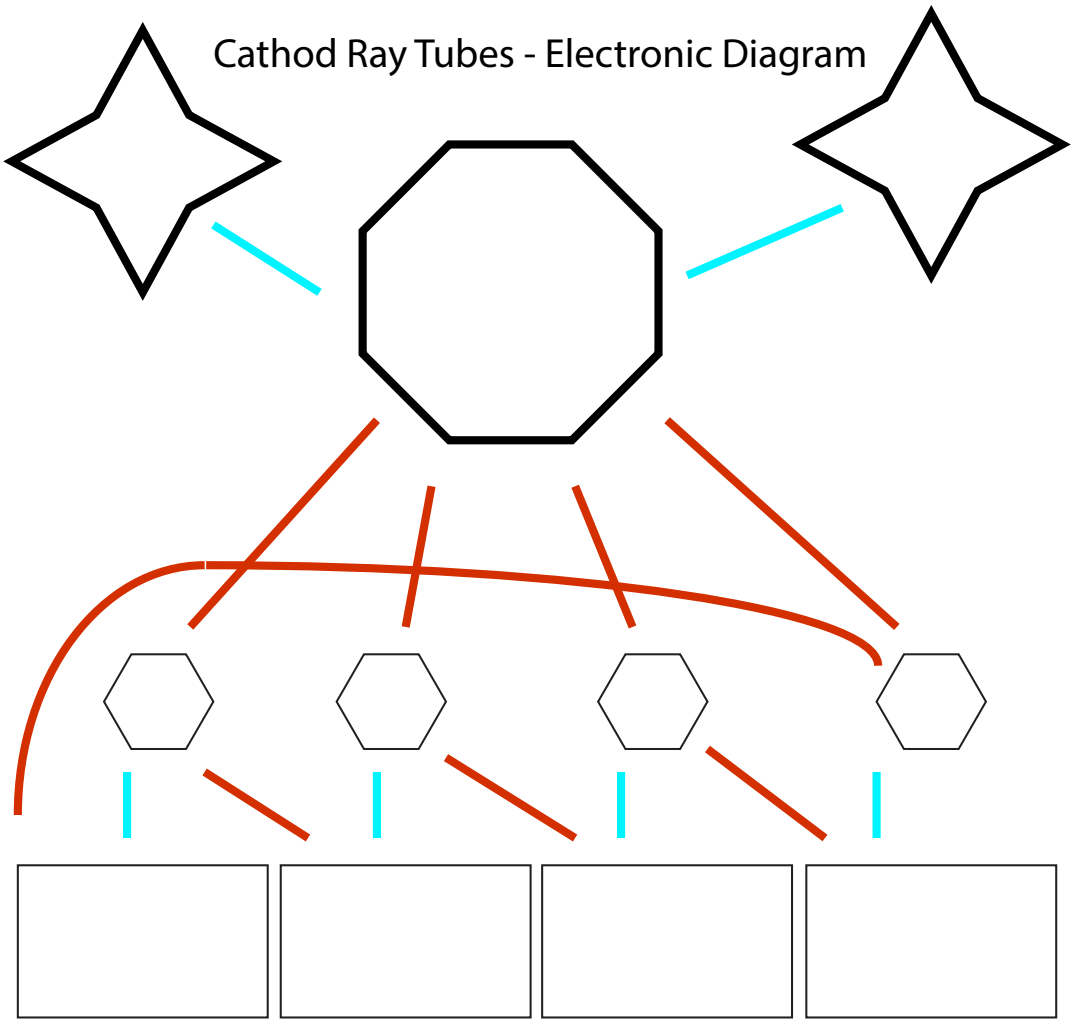
Cathode Ray Tube strives to bring people closer to the technology they use and exploit every day by having people hear, touch and even feel electricity. Cathode Ray Tubes seeks to explore our relationship with electronics and electricity by visualizing,

sonifying and exposing aspects of electronic circuitry that is usually hidden from our view. Cathode Ray Tubes strives to make people think about the magic of all the electronic devices around them while having fun.

3. A diagram of the physical layout of the piece in the gallery



4. A system diagram of any electronics



The Squares are TV's, the Hexagons are Retron Video Synths, the Stars are Monitors and the Octagon is the video to audio (VA) circuitry

The Red lines are video signals. The Video output from the Retrons is split so that one copy is sent to the next TV in the Loop and the second copy is sent to the VA converter. The Audio is sent to the same TV that the retron is placed in front of.

5. Pertinent links to your current / previous work that may help us understand the work you are proposing

Cathode Ray Tubes – POF Videos (so far)

Proof of concert for the feedback loop using two TV's and two Retrons.

https://www.youtube.com/watch?v=3WovzVABXLc

What the video generally looks like that the Retrons create:

https://vimeo.com/143563194

Digital Rain: Grid of 196 relay switches that created music from the weather reports from around the country in real time.

https://www.youtube.com/watch?v=x87EnplNm88

Toys: Controlling circuit bent children's toys with a custom built interface.

https://www.youtube.com/watch?v=Lxgry-iFIAs

https://www.youtube.com/watch?v=jlbxIBrCLqA

1990: Circuit bent SNES:

https://youtu.be/C2SuXUqXMpE?t=23s

https://youtu.be/__MrRWzerhc

Website: (somewhat out of date)

http://bitdeph.com/

Bio:

Nathan Villicaña-Shaw is a programmer, composer, digital artist and creative technologist that is passionate about engineering, physical computing, interaction design Nathan's research focuses on examining, building, exposing and subverting systems. He enjoys creating work that explores and questions our relationship with technology and living in the ever changing modern world. Nathan Villicaña-Shaw is a MFA in the MTIID department at CalArts where he obtained his BFA in the same department. Nathan's graduate work focuses on the concept of OpenHacking or the creation of art through exposing systems and creating inherently open systems with the intention of subversive insertion by users. Nathan spends most of his time creating installation art, creating new

instruments, or hacking electronic systems. You can find out more about Nathan on his website bitdeph.com .