Skywave Documentation

Zotero|Github| Drive

March 17

Done this week

- Brainstorming: see documentation files, skywave_brainstorm.jpg
    - Listed our project's core concepts/keywords and their relationships to one another
    - Refined more key ideas
    - Focused on developing concepts of the material/tangible aspects of the project along with thematic concepts
- Continuing work on our final report and presentation

March 24

Done this week

- Bought and started reading Technosis
- Proposal report & presentation (See: Proposal Folder)

Glitch Feminism & Chronogenica

- Regarding the theory & theming behind this project, Glitch Feminism provides excellent inspiration; tying in to our themes of witchcraft, coexistence with humans and non-humans, and sisterhood.
- Chronogenica provides similar inspiration in their co-op consisting of mechanic workers, with rights and employment benefits working in collaboration with human colleagues.

Outputs

- Looking to refine between digital and analog signals.
- Digital:

        - PSK31 (text-based protocol, “texting”) provides a data-rich a/v output in the form of a ‘waterfall’. This data is rarely archived and allows for open listening to transmissions from multiple users.
- Analog:
    - Cosmic radiation often appears as an audio/visual output in the form of noise. A percentage of noise received from radios or tvs is of cosmic origin, as many cosmic objects emit EM radiation. This noise can be received. With very precise tech, very precise readings are possible as in radio astronomy. Some of this noise is actually remaining from the big bang!
        - NASA expresses some telescope info in the form of sonographs which communicates the data audibly. Similar data processing protocols could be used to produce a data rich A/V output.

Readings

- NASA Sonographs
- Legacy Russell, Glitch Feminism
- Chronogenica Co-op
- Davis, Erik. 2015. TechGnosis: Myth, Magic, & Mysticism in the Age of Information. Berkeley, [California]: North Atlantic books.
- Schröder, Frank Gerhard. 2012. Instruments and Methods for the Radio Detection of High Energy Cosmic Rays. Springer Theses. Berlin Heidelberg: Springer.

March 31

Done this week

- Interview with Cheyda
- Met with Sabine, Gabriel
- Proposal feedback
- PSK31 TouchDesigner demo (with retained data!)

Notes from Ceyda Interview

Readings

- https://www.vice.com/en/article/z3meny/artificial-intelligence-cult-tech-chatgpt
- Hayles, N. Katherine. Unthought: The Power of the Cognitive Nonconscious. University of Chicago Press, 2017, https://press.uchicago.edu/ucp/books/book/chicago/U/bo25861765.html.

April 7

Done this week

- Bought a radio, radio kit, radio chips
- Readings & research: technopaganism, technosis, witchcraft
- Met with Sabine, Gabriel

Hardware

- Shopping
    - Bought a radio. AM/FM SSB
        - SI-4732 radio chip
        - Potential for modifications - arduino? Maybe bypassing certain mechanisms, like the tuner to allow for sensor data inputs?
            - The radio should be capable of transmitting data to a computer via usb
        - Radio tutorial with SI4732
    - Bought Radio assembly kit from abra ^o^
    - Also bought some additional radio chips

Current Goals

- Begin recording data with the radio, outputting to td if possible
- Play with radio kit
- Continue research on biometric sensors: heartbeat, temperature, breathing
    - One emotibit available, checking with elio for available sensors

Readings

- (Techno)Paganism: An Exploration of Animistic Relations with the Digital
- Cyberspace as Sacred Space: Communicating Religion on Computer Networks
- Gods in the machine? The rise of artificial intelligence may result in new religions

April 14

Done this week

- Radio building in progress
- Researching radio electronics & hardware
- Sensors, wearables and ritual
- Continued work on research paper draft

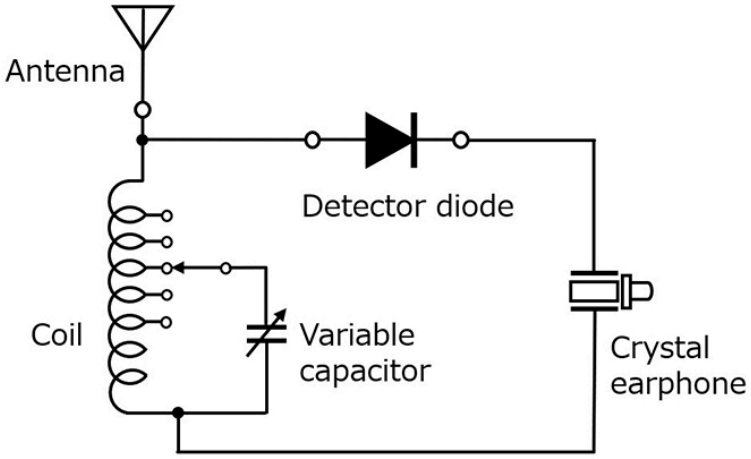
Hardware

- We opened up the Si4732 radio:
    - [images]
    - The radio consists of an Arduino Nano connected to the Si4732 receiver module. It contains a potentiometer for tuning, several button inputs for bandwidth and mode, a speaker, and a display screen. It allows for an antenna connection, and allows reading via USB download or audio jack.
    - Datasheet
    - Library for Si47xx chips, documentation website
        - Code example from library for ATS-20
- Looking into ways to bypass the tuning mechanism (potentiometer) with biometric sensor data. The library appears to provide some simple functions for controlling the receiving frequency and mode directly via the nano microcontroller with the Si4732 module.
- Unsure of how best to bypass the existing protocols. The Nano may allow for shield attachment for additional modules, sensors, or we may opt only to modify the software. Seeking a method to decompile the existing code on the Nano.
- Narrowing between digital receiving (PSK31) and analog receiving (background radiation). Info on CMB (Cosmic Microwave Background) i.e., radiation remaining and redshifted to the microwave spectrum leftover from our universe's primordial era.
    - On listening to CMB
    - Notes on CMB & its discovery
    - Great video on CMB & the early universe

Radio Electronics: Research

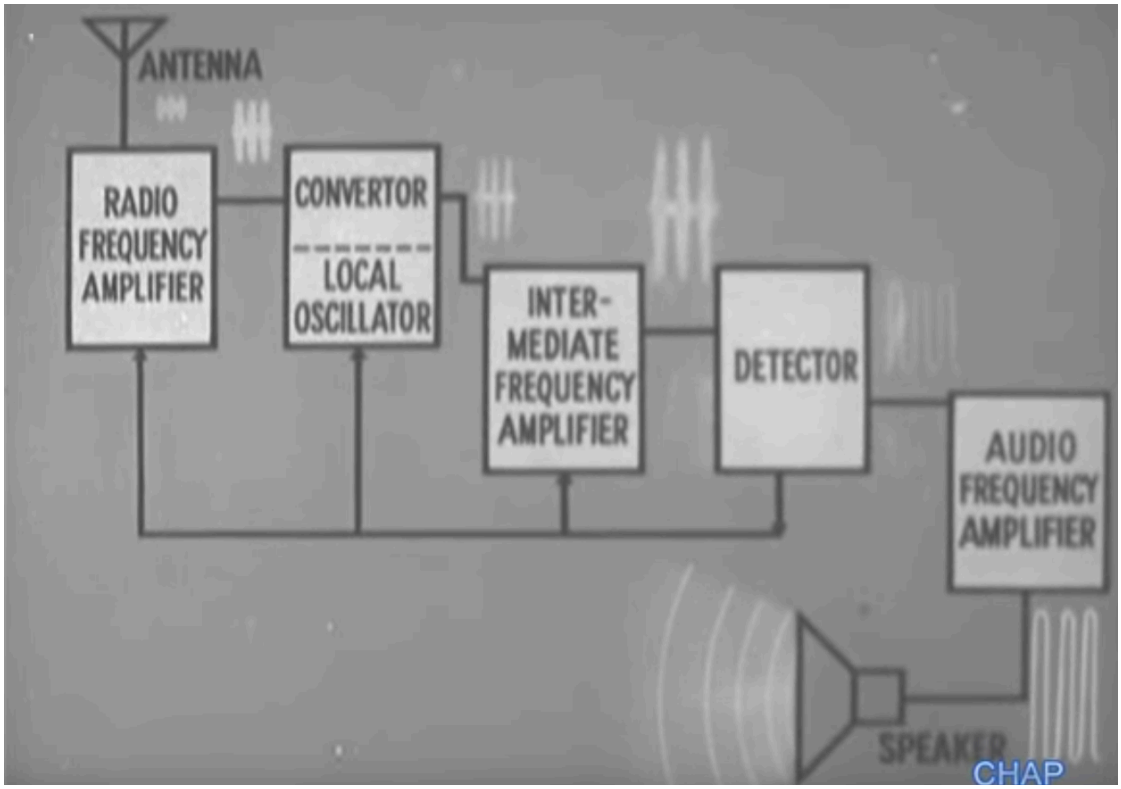
Basic Principles of Radio

- Antenna to receive signals, tuner to select the signal to be received
- Detector differentiates high and low frequencies. One is a carrier (high), discarded. Low frequency (message) is passed to a reproducer which converts the information to an audible signal.
- Crystal set:
    - Antenna led thru coil to ground, to tank (carrier) crystal semiconductor diode acts as a rectifier (detector). Small capacitor allows for low frequency carrier signals to be conducted. The high frequency signal is then redirected to the earphones to produce an audible signal.



- (Schematic)
- All modern radio receivers (1949) evolve from this basic schematic

Anatomy



- Antenna: receives many frequencies ->
- The tuner (capacitor?)dictates which frequency should be listened to ->
- The RF amplifier amplifies the desired frequency ->
- The frequency (RF signal) is passed through a local oscillator to a converter which outputs an intermediary signal (IF) at a constant frequency

    - The IF is passed through the intermediary frequency amplifier and is strengthened
    - The frequency is passed through a detector, where the low carrier frequency is split from the high frequency message ->
    - The message is passed through the audio frequency amplifier and output to a speaker.

Ritual

- Use of crystal oscillators in radio
- Thinking of options for wearable sensors: potentially a wrist/hand cuff with a sensor (heartbeat?) that extends to finger cuffs and out to the radio/machines via wires extending from the hand
- Pinterest

Current Goals

- Digest data this week
- Transmit data vis osc (TD or Wekinator) this week
- Prototype TD output
- Continue project report
- Draft wearable sensors & methods for bypassing radio mechanisms, meet with Elio to discuss

April 17

Hardware

- Not opening Tina Tuner - we have one working radio right now that functions great and not enough time to find a backup if something goes wrong.
    - Opting for an external machine (arduino) to sense biometric data. Both machines (radio + sensor) will have a wired connection to the computer containing the ML model.
    - Still considering a greater conjoined machine for this project's future: several Si4732 chips are incoming from AliExpress (likely not arriving until after the project)
        - Similarly, note that Tina uses that same chip and an Arduino Nano, so there is potential for her modification in the future <3
- Investigating possible biometrics sensors:
    - Option 1: Muse Mu-01 EEG headband
        - Using this in combination with Metrics software (PC) or Mind Monitor (iOS) for OSC transmission

        - Allows the sensing of brain waves. Designed to be used as a meditation tool to sense between stressful and relaxed states.
    - Option 2: Emotibit
        - Potentially borrowing one from Illiez. Provides lots of biometric sensing options that could be useful. Transmits over OSC.
        - Emotibit Features include: temperature, respiration, perspiration, heart rate, electrodermal (skin conduction) response

ML & Touch Designer

- Considering a variety of outputs via TouchDesigner. Priorities: an updating audio/visual display, data-rich, decryptable
    - Options: character-based encoding, reconfiguration of the spectrogram in different contexts (harmonics, multidimensional)
    - Inspirations (photos link to source):