

“Stations of Exception”

Revisiting Analog Radio for Live performances



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Abstract

This thesis is inspired from a listening experience to radio in between stations, provoked by the uncharted airwaves conditioned by a soundscape. It questions the possibility of a research practice guided by a sonic agency described as a 'radio artefact'. Demarcating in experiments with radio circuits through the faculties of hearing, independent from a scientific methodology, while acknowledging experience as a creative - reflexive trajectory for the aim to engage with theory. It is an attempt to explore a sonic world inspired by the faculties of indeterminacy emerging from a collision of two opposing entities in a radiophonic space (i.e. micro-casting vs broadcasts), and the urgency of listening it poses in a real-time event conditioned by the various affordances on site. In the course of investigating the sonic environment, I attempt to navigate a language that could describe the process of communication with the radio setup in a context of performance, while briefly looking into concepts of re-appropriation, identity, and the agency of transmission from a lens of hijacking the performance space. Finally, a brief personal speculation of 'atmospheric noise' inspired by an essay "questioning the politics of wavelengths and technologies".

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In telecommunication systems, white spaces refer to 'guard bands',
which for technical reasons are assigned in between radio
channels to avoid interference.

— Introduction

1.1 Encounters

Witnessing for a considerable time a city once glorious by way of its high scale real estate developments, exploiting public spaces to erect high towers while simultaneously demolishing old houses in the midst of neighbourhoods, would eventually introduce new ways of listening to its inhabitants. In such conditions, the sudden acoustic eruptions slowly emerge into the soundscape, as the vibratory aspects emanating from the nearby construction sites integrate themselves into the daily auditory experience. It isn't a magical phenomenon that socio-political initiatives always carry a sound world dedicated to them. Nevertheless, this notion of interference (for good or bad) held in these sound events, surprisingly always succeeds to condition an auditory experience bearing new meanings of communication with the surrounding environment.

To a certain degree and without exaggeration, domestic spaces become resonant chambers in proximity to the events taking place, forcing the listener to develop new strategies of coexistence. In such instances, one could presume that it is likely where subjective forms of listening will start taking place, having to navigate in the midst of sounds, while simultaneously the environment start to materialise the routinely common sounds one would engage with on a daily basis. It is assumed that these new forms/strategies of listening one undertakes to negotiate with the environment will retroactively affect our perception of listening. In such conditions, it is not odd for one to think of such acoustic events are no longer different to any other technological medium at hand (telephone, radio, tv, etc), in the sense that technology always carries a form of reciprocity.

Sometimes certain experiential events are bound to resonate with their respective subjects in unexpected ways. Interested in the domain of sound, it was intriguing in such instances of intense sound activity gentrifying a whole neighbourhood, where I would take a step back and think about audio documentation. Driven by a sense of curiosity to record the soundscape from interior and exterior spaces, there was always something interesting to hear depending on the architectural site and the way it reflected the sounds of the construction sites and other sonic activities surrounding — engulfing — the space.

After spending some time recording and listening to such materials, certain sonic characteristics in

some recordings had an intriguing radiophonic aspect to them, which slowly came to be a reminder of a listening experience on AM radio while driving on the outskirts of Beirut. 'An exhaustion of multiple layers of sounds intervening with each other, masked with layers of noise emanating from sifting sand out of tiny stones resonating like white radio noise through layers of spaces, denoted by a sense of proximity akin to when one tunes the dial away from a radio station.'

Such intermittent feedbacks from soundscape to radio and vice versa, seemed to have sparked an interest from which a sense of direction slowly started to appear. A deeper enthusiasm to investigate such phenomenon of radio was heightened due to other poetic factors related to this experience, signified by the long distanced transmissions and their unpredictability through the medium of the Ionosphere reflecting the electromagnetic waves.

Recalling some notions of this listening experience on the radio could perhaps be similarly explored on a shortwave receiver, in which often times voices seem to convey a sense of distance while they get delayed due to atmospheric bouncing exhausted by the circumference of the earth. Often times they carry mixed signals leaking from neighbouring radio stations along their trajectory, distorted by lightning discharges in thunderstorms, as if wanting to break away from the noise to reclaim back their intelligibility. Sometimes two streams of unrecognisable sound/voices keep alternating in a seemingly random fashion; especially when the surrounding electromagnetic field gets disturbed. When driving a car, the car's motor revolutions (RPM) starts interfering as well, behaving like an oscillator that can be controlled by the gas pedal affecting the incoming reception.

1.2 Investigating prospects

Despite the unpredictability of such sonic patterns, which are always formed and modulated by the ecology of the near and distant places, posed an intriguing prospect to investigate whether there could be a possibility to intentionally recreate these patterns without being dependent on ecological factors. While driving, the primary points of reference had simply relied on the position in space, including the infrastructural urban design containing the inherent elements for certain kinds of interferences, motor revs, and the tuning knob. All of those three factors were highly significant for that kind of listening. In other words, these primary techniques were the only resources used to being

able to capture and hear these floating non purposed amplitude modulated (AM) radio frequencies. Whilst attempting to further explore how these sounds are possibly generated, suddenly a whole new world of electro-magnetics appears on the horizon for further speculation. The general and in depth explanations in the literature of transmission and reception, were of some help, in particular, they helped me understand some of the notions behind these reception artefacts, or at least the literature provided insight to further understand the significance of how each wave sitting in the aether, in theory, is capable of affecting the trajectory of these emitted electromagnetic waves (broadcasts/transmissions) before hitting a receivers antenna.

Clearly, if one needs to conduct an analysis of the specific situational condition of the receptions forming such events, it would potentially be an impossible task to cover all the interactions creating that condition, which in theory we expect them to have endless possibilities. In other words, *micro* (domestic interferences) and *macro* world phenomenon's (ecological conditions contributing to certain audible results such as weather, sunlight, electromagnetic interferences) is at the heart of such a technology, while location is another crucial aspect to stumble upon these sound artefacts constituted by a complex set of relationships. Moreover these relationships are not solely dependent on technological and geographical frameworks, as the socio-economical factor also comes into play (e.g. Urban planning - proximity to local interferences generated by powered electricity grids within the soundscape highly affects AM receptions). Therefore tuning to the same AM frequency on the radio receiver from different locations, at once, will always yield slightly or significantly different results depending on the factors aforementioned.

Regarding the futility of understanding these sets of relationships in the aether manifested on the loudspeaker of a radio receiver, It seemed reasonable that the notions of investigation leading this current research to recreate such audible artefacts will be explored through experiments (e.g. tapping in the circuit) with second hand transistor radios. Delving into the analog radio technology provides an opportunity to physically interact with the sound waves absorbed by the circuit, and to instantly hear the effects of manipulation, hoping to intentionally reveal similar textures that would resemble the sonic qualities heard on the long distance AM broadcasts.

(e.g. MW, LW, SW)

Soon after becoming more familiar with this territory, albeit tuning in search on the AM band (MW), and more often Shortwave (SW) regarding the capacity of this band to carrying out odd signals, since it has the ability to travel around the world like most other AM bands. It has become clearer that the conditions required to hear such artefacts would demand the need to maintain a considerable distance from urban infrastructures in order to receive the un-interrupted distant broadcasts.

In addition, electronic appliances and power outlets surrounding our domestic spaces are always radiating electromagnetics, which in turn hinders or weakens many of the transmissions to be received. Another prominent factor affecting the strength of AM broadcasts, is related to the sun rays ionising the atoms in the Ionosphere reducing the amount of electrons, which in turn significantly weakens the transmitted waves to travel for long distances¹.

During the beginning of the circuit experiments on the AM bands, quite soon it has become notable the significance of a relatively strong bandwidth, and the major effects it implied on the radio circuit. In other words, having become aware that transmission bandwidth(s) generally equals to micro-voltages in the aether is one of the important factors behind the obtained results when tweaking randomly on the AM circuits. Most of the sounds produced during the process of tweaking/bending were generated by the circuit itself (e.g. circuit getting locked to one sound/behaviour) devoid of the environmental sounds of AM. However the aim of intervening into the circuit was more inclined to warping/affecting the reception, curious of what would come out of this process. One could estimate that there is not enough power/energy in the broadcasts to make space for certain reception artefacts to occur, or perhaps following such a random method to generate a complex network of sound possibilities is not self sufficient with regards to the AM format.

In the light of these environmental facts and the circuit experimentations, two major concerns have created a big leap in this project:

¹ <http://solar-center.stanford.edu/sid/StudentWork/LeandraMerola.pdf>

1) The micro and macro environmental conditions of interference aforementioned, which have asserted that the only way to repurpose such radio artefacts into a performance situation, would generally require to leave the city, hunt the desired sounds, sample the results and bring that material back into the performance space. To my intuitions, this method of dealing with the radio defeats the conceptual framework behind working with such technology, since it strips away the factors of immediacy from which radio sounds are constituted and emerged within a complex set of relationships dedicated to a specific location.

2) The circuit experimentations on AM have revealed a domain of sounds/textures from which it did not resonate in the interests of this project. The successful attempts were most of all referring to one locked oscillating sound void of any radio texture. In addition, one could hear a single type of interference generated by the built-in oscillator of the circuit layered with the common sounds of AM, however, it wasn't successful to develop this process further for the time being.

In the light of experimenting with the re-appropriation of the AM radio transmissions, and not succeeding in mediating the immediacy of that context into a live performance situation, I took the decision to shift my focus towards the FM bandwidth, curious about the possible sounds that could emerge in the process of experimentations. In the following pages of this research, I will discuss my approach and techniques regarding the sound transformations occurring on the FM circuits, my personal concerns towards the elements containing the FM broadcasts, and other aspects of the performance.

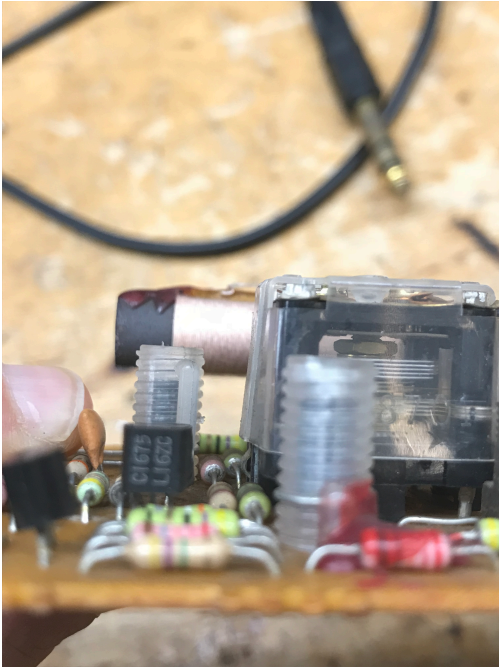


Stay tuned...

In telecommunication systems, white spaces refer to 'guard bands',
which for technical reasons are assigned in between radio
channels to avoid interference.

2. Circuit experiments on FM

2.1 fetching the ultimate circuit



As a present day general knowledge , transistor radio technology is currently at a significant decline in history where its production is becoming obsolete due to major radio providers switching from analogue to digital technologies, particularly since digital audio broadcasting (DAB) is generally more efficient in its use of spectrum than analogue FM radio. The DAB standard was initiated as a European research project in the 1980s and DAB receivers have been available in many countries since the end of the 1990s.

Nevertheless, most of the FM broadcast stations are still emitting with their analogue transmitters in tandem with DAB. In consequence to these market strategies, if one needed to purchase an analog radio receiver, one has to navigate through online second hand platforms, where its availability is reserved to bidding and other indeterminate factors. One of the primary reasons of choosing an analog radio in this project, relates to the vast space given on the circuit board which makes it easy to intervene with soldering, a privilege which has disappeared after the invention of the surface mount technology (SMT). In addition analogue radio circuits are generally more solid in contrast to modern digital circuits, which makes them a good choice for a startup project. They also provide more affordance to intuitive access in regards to the circuit layout, facilitating interventions with tools required to produce instantaneous results, a similar reason why most circuit benders would prefer to work with analog circuits. Moreover, digital radio environments such as the software defined radio (SDR) was not a priority for my purposes, since the project is dealing with bandwidth(s) that could still be accessed via an analog apparatus.

Moreover, since the analog domain is becoming scarce, finding components to replicate certain kinds of circuits or to build one's own has become almost impossible, since it requires to salvage the parts from second hand radios. On the other hand, many transistor radios lack documentation (i.e. schematics) which makes it harder to locate the right parts. It is true that one could always find schematics to build a simple FM receiver with very few components these days, nevertheless it seemed that the chances imminent in such ultra small DIY circuits would not produce certain artefacts that this project was aiming for, circuit complexity was required². This sole technological fact influenced the course of this project in such a way, resorting to consumerism to fetch second hand analog radios. Moreover, the concept of falling into different models of radio designed by skilled engineers, had provoked a high sense of curiosity that ultimately would lead someone to imagine that there could exist much more potential in finding the ultimate circuit (i.e. one that would produce many results). In the course of searching for analog radios, it seemed that many different models were available, which brought some confusion at first to figure out what would work best for this project. One leading thought was kept in mind, which was to avoid radios with digital screens and buttons.

These few indications had radically narrowed my choices, however, I started to realize that even within the analogs, there remained several models to choose from. Size and voltage became another concern. Quickly learning from an amateur approach, that if it is required to touch and manipulate the flow on the circuit board, then ideally the target would be the small portable radios powered with batteries, simply to avoid touching 220 Volts, in addition to having a ground lift from the power mains that would contribute to lessening the effect of 50Hz hums constantly leaking into the circuit. Making specific choices within a broad category seemed practical to initiate the project.

Over the course of the first stages of this process, the aim was to discover the range of possible sounds, without learning what constitutes the different stages of demodulation of the incoming signals. Having started to randomly make connections with alligator clips, carefully listening to what might emerge within

² A complex FM circuit would include more stages to demodulate the signal, therefore the imminent chances to obtain more results is more likely to occur.

that process. In the beginning, it was hard to make one sound or two, barely anything significant to be concerned about. After a while, however, especially after I managed to get a couple of sound results, it had proven worthy to build over the found results, rather than just keep randomly searching for other active points on the circuit. Indeed, following this method (which is to be demonstrated at a later stage of this chapter) proved to be enriching to the primary result, hence some kind of a network configuration slowly started to unfold within that process.

As a result, for practical reasons and to ease the accessibility to control the soldered connections, the circuit had to be mounted in a cigar box, attaching all the connections to bolts and screws. (see figure.1) This method provided a modular type of interface facilitating the experiments with the on-board connections by limiting the visual clutter of wires standing in the way. It also helped to make sure that some unwanted connections were not in touch with each other while at work. This became the principal method to each bare radio. One important aspect that was realised in the early stages of the process of these experiments, is to always listen to the audio output through monitors if possible, or a set of headphones, since there will always be unnoticed sounds from the tiny loudspeaker of the portable radio.

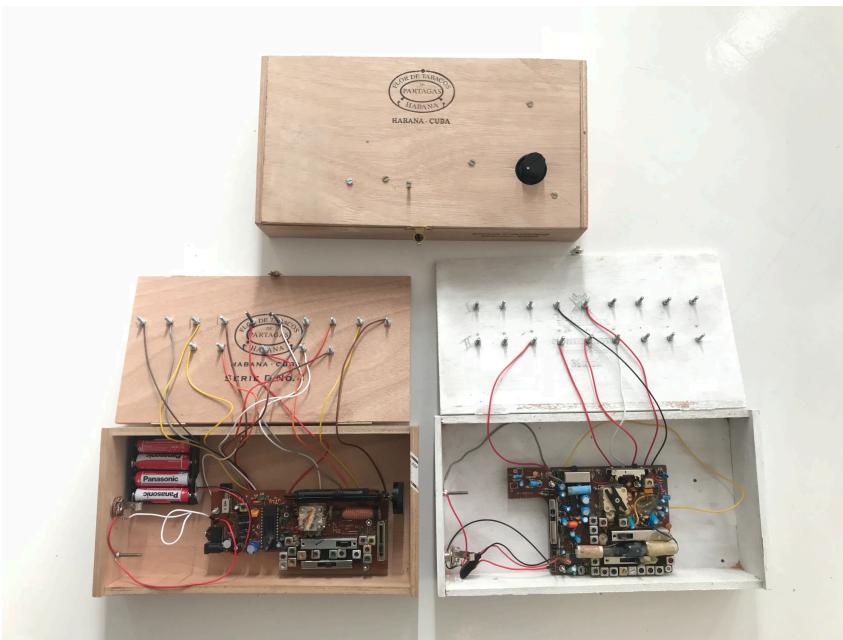


Fig.1: Radio circuits

The primary concern within the first stages of these experiments was to broadly explore the sound palette in each radio, without having any preconceptions of the sound. Having started to systematically connect the pins together via alligator clips, the method was executed in the following manner:

- Connecting the first pin with the second.
- Connecting the first pin with the third.
- Connecting the first pin with the fourth, and so on and so forth.

The next step would follow the same sequence of events, but shifting to the next pin, for instance:

- Connecting the second pin with the third.
- Connecting the second pin with the fourth.
- Connecting the second pin with the fifth, etc.

Following the same method up until the last pin, from then on, depending on the results, it would be fair to decide on which pins to be kept or to be discarded. Moreover, while this process also involved exploring several circuits simultaneously, going through the same sequence of connections as been mentioned previously followed through, albeit this time in between two different radios. Likewise, as it is always advised within the community of electronic machine enthusiasts, it is best to cross over with other circuits operating on the same level of voltage to avoid any hazards. Prior to FM becoming the subject focus of these experiments, the same method of modulation has also been applied on all the different formats within the AM spectrum. Medium wave, Long wave, and Short wave. (go back to the end of the introduction to see why the project shifted to the FM bandwidth)

This systematic process to searching for various possible outcomes that could be heard from FM radio, has definitely yielded three distinct types of results, categorised as:

- 1) One type which is only portraying a single oscillator devoid from any radio textured sounds, where the pitch of this oscillator could be altered by a potentiometer.
- 2) A second type, in which the incoming reception, to a certain extent is modulated with the built-in oscillator of the circuit, without completely blurring the broadcast.
- 3) And a third, where certain frequencies within the incoming broadcast are amplified due to a feedback loop, while preserving much of the content.

Moreover, the second and the third types are also able to create oscillating sounds when

their operation is combined together, but the texture still maintains some qualities of the common radio sounds.

During this whole process of experimenting with radio circuits, one would eventually realise that certain findings on a particular radio circuit does not mean that similar sound textures could be achieved with a different circuit if we replicate the same method. Sound results are also bound to the design of the radio circuit. As mentioned earlier, since there are various types of analog circuits, many have failed to produce any noteworthy results, though they still remain useful in the project for their components. Most of these unsuccessful circuits operate on 9 volts without IC chips, they tend to be quite large, mostly found in the early versions of portable radios.

Experimenting with the several types of analog circuits (e.g. Integrated vs non-integrated) provided a wider experience into what could potentially work following a circuit bending/random approach. Possibly both of these technologies, in theory, should produce similar results, since they both follow the heterodyning principle of demodulation. However the integrated analogs with IC chips somehow seemed easier to manipulate with this random approach. Perhaps the fact that integrated circuits carry multiple operations within one piece of component, could have provided a shortcut to unfold certain processes. Or perhaps the mere fact of getting lucky to come across certain results paved the way for an alternative direction one could proceed from.

2.2 Preserving the Logos

As has been described earlier, during the process of tweaking with FM, three distinctive sound types were revealed. It seemed ideal at this stage to make some determining decisions on the palette of sounds before proceeding any further with experimentations. The main concern I had regarding the elimination process had mostly to do with sounds blurring the common aspects of radio. In other words, all the connections that were only portraying a single oscillator sound devoid of any broadcasts or noise had to be

disconnected. The primary motives were to achieve a sound texture in which to some extent portrays nuances, which are reminiscent of AM transmissions/broadcast artefacts that mostly occur at night or outside urban infrastructures when listening to shortwave. Alternatively, the connections that have mostly yielded radio textured sounds became the armature for progress. As is generally the case with making permanent connections, potentiometers and switches were installed to control the flow of events. (see fig.2)

At a later stage, it would be worthwhile to reconsider if the mounted interface, consisting of only knobs and switches besides the tuning capacitor, serves well the purpose of controlling the allocated parameters.

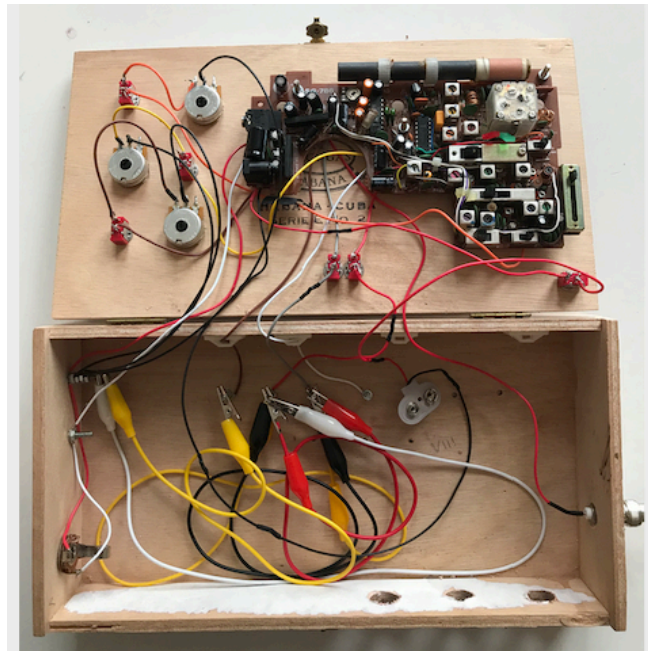


Fig.2

The enthusiasm initially generated by achieving a convincing sound result started to slowly fade away over time. Gradually beginning to realise the limitations/repetition of the findings after spending a considerable time exploring all the possible permutations on the interface, since in theory we do expect that a radio environment should not conclude to the same results (i.e. as has been explored earlier while driving the car).

Simple discoveries emerging by chance, like having two radios interact with one another when tuned on the same frequency, have given a fresh ground to make further experiments for some considerable time, by having several radio circuits react to each other. Yet, within a couple of months of exploration and during practice, as if all the

different permutations have been exhausted. It took some time to realize the aspect of repetition, since even within the existing limitations on the circuit board, often times there were true moments of new emergent sounds showing up. However, the process of unfolding towards new territories was rather very slow, in which it became critical to think about other possible alternatives to hasten the process of discovery.



Fig.3: Two radios - Discussion Concert -
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2.3 *Micro-casting*

Realizing the potentiality of the radio receiver to also act as a transmitter on a very small radius, led me to think about other possibilities of micro casting (using low powered FM transmitters to cover a small surface area). As it was also critical to extend the palette of sounds and to finding quicker ways to unfold new processes. Adding another micro-remission space inside the larger FM broadcast transmissions evoked an imaginary world of sounds that could be worthy to investigate and whether it could provide larger possibilities to sound transformations. Looking back to certain technological aspects in the field of radio communication, specifically with regards to



transmission artefacts that is common to long distance broadcasts also triggered a sense of curiosity to explore the area of micro-casting with DIY transmitters, and whether it could provide a wider scope of indeterminacy, since one of the primary concerns of working with such an environment is the benefit of provoking a large array of indeterminate sounds that become site specific to the context of performance (more details in Chapter 3

- Is it an instrument?). Since the transmitter's main purpose is a tool to propagate radio waves, without any other interactive function to its common purpose, popular techniques from the realm of electronic music like feedback represented a successful attempt by re-appropriating its function in more flexible terms. The transmitter became an element of receiving and transmitting simultaneously.

Within the course of experiments, several have been built following the same schematic³. What has been revealed during this process, as in the case with the radio receivers interacting with one another if tuned to the same frequency. Similarly this feature also worked with the transmitters. From then on, this technique inherently instigated the need to build multiple transmitters to experiment with a broader sense of space. Again, having had the transmitters built, a process of exploring the different permutations within their different set of frequencies in tandem with the receiver is crucial to determine the potential outcomes.

2.4 Resisting Broadcasts

One dominant feature of having a transmitter emitting in space, is the tendency to have it block the incoming local broadcast if it coincides with the same frequencies. In telecommunications, the **capture effect**, or **FM capture effect**, is a phenomenon associated with FM reception in which only the stronger of two signals at, or near, the same frequency or channel will be demodulated. Therefore, increasing emission with several transmitters in space will eventually create a strong electromagnetic shield, blocking local broadcasts. This is to say that a strong EM shield will somehow result in a dichotomy of two or more separate entities to some extent. However, within the course of practice with such a malleable entity, there are no fixed rules to determine a conclusive result. However, it is enticing to do more experiments of such sort and try to come up with more precise determinations in terms of how multiple to many transmitters would eventually interact with each other when tuned on various frequency bands, something to go back to in the near future.

³ <http://anarchy.translocal.jp/radio/micro/howtotx.html>

Provided with such options, and helped by micro casting, this phenomena of shielding has implied two distinctive territories in the course of practice. A foreground; from which sounds are being articulated by ways of interacting in a loop set in motion by the transmitters, in tandem with the receiver while disconnected from local broadcasts. In contrast, local broadcasts could be heard depending on the level of feedback set by the transmitters, while simultaneously turning off the designated functions on the receiver.

As a result of the aforementioned experiments, one could envisage a two-fold environment, which implies a condition of exploring the boundaries between two distinct territories. Sounds of FM signal modulations yielded by the emission and the interactive nature of the medium in space produced by the transmitters (foreground), while simultaneously being surrounded by external local broadcasts piercing through the local magnetic shield (background).

In addition to textures being revealed through the course of tuning with the parameters of the foreground, often times broadcasts are the main cause of its modulation effects without necessarily hearing the content of the radio station. In other times, however, broadcasts also disturb the foreground in ways similar to an envelope follower, influencing the shape of amplitude, while also boosting certain frequencies to a more audible range. Therefore, depending on the content of the broadcasts, the foreground would mostly respond to the contour/form of the material breaking into the EM shield.

The results produced from earlier experiments with micro-casting and the FM receivers, seemed to have generously contributed to various sound results with such a small number of tools at hand. To a certain extent, and besides the social aspect of broadcasting, these kinds of experiments have been retroactively affecting the course of decisions in terms of how the sound should be manipulated, a work process which have been constantly affecting my perception of listening during the development of the project.

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3. From Experiments to Practice and performance

3.1 Acquainting with the found results.

In the light of the accumulated results set forth by investigating the possibilities of re-appropriating FM radio into a tangible way; it seems that the built system (transmitters in correlation to the receiver vs Broadcasts) inherently carries certain tropes that one needs to assimilate an approach to negotiate the various conditions into a meaningful context, if the main purpose is bound to a context of a live performance. Therefore, it is required to spend some considerable time learning about the nature of the system to better understand the affordances (more in section 3.2) contributing to the sonic outcomes that could emerge in the process.

Having had a background and a foreground in such a context, the system implies that one could only exercise control over a single dimension, since there is no possibility of manipulating the received broadcasts. However, having control of the foreground produced by the transmitters and the random functions on the receiver, makes it possible to abstract the content of the broadcasts, to listen to it if desired, or to completely shadow it. Within the three layers, it becomes a matter of weaving through to draw out certain characteristics while simultaneously dealing with aspects of indeterminacy.

Over the course of practicing, it seems that the decision making process of holding on to certain sound events, do not necessarily relate to the same cause within each trial. As has been the concern with unfolding new territories, indeed, an instant evaluation process seems to be the most relevant procedure to negotiate with the content, which helps decide whether or not it is ideal to hold on to certain events in a moment of performance.

In getting more familiar with the system, it becomes clearer to what extent the audible results are dependent on the local broadcasts. Resisting or negotiating some aspects of the broadcasts is an arguable element in this process, since the sound script becomes bound to the listener's social and cultural realm. Deciding what is potentially relevant to hear, and

wether the content forges well in that moment comes into play. Spoken words for example, while they become intermittent in the process of tuning, render an alternative meaning detached from their original purpose. Popular songs could also become figures of micro-samples in the process, depending on the quantification aspect when performing, or could be longer exposed. Thus controlling the duration of exposure to commercial broadcasts becomes a crucial element to the articulation of meaning in the process.

“The blessing and curse of working in certain foreign countries was the ability to treat speech as “pure sound”; it might be gibberish to me, but I remained dimly aware that it might actually mean something to the audience (after one performance I was told that I had unknowingly transformed a corrupt Swedish politician’s economic announcement into the statement “my boots are smelly”).

—Nicolas Collins, *Devils Music*

From Nicolas statement, it could be reasoned that in such scenarios when language becomes part of the musical process in a performance situation provoke different kinds of attention among the audience depending on the language. In retrospect, this will also affect the performer’s decision making in such instances if the language is understood. That is to say, even if language plays an intermittent role in the course of performance, it is still desirable to be caught up when the performer understands the context, which eventually will lead to create certain leaps in the decision making process. Tuning in and out of such instances, the performer could also engage in a process of world collage bringing other aspects of meanings to the broadcasts.

While currently not having had the chance to explore treating several languages in a context of performance, it still remains vague how to further elaborate on this territory. For the time being and mostly in relation to foreign languages, it remains to be treated as a sonic entity from the perspective of the performer, a possibility to help access non-lingual spaces derived from language. A meta language comprised of stuttering where one would hope it resonates to a multiplicity of meanings from an audience perspective. Moreover, it creates social positivity by way of engaging with the audience after the end of the performance, an invitation motivated by a sense of curiosity to communicate the blind spots provoked through the language.

3.2 Some Aspects of performance

Various centres of activity, alternatively known as sweet spots, seems to inhabit the spectrum which appears to be the most interesting segments to reveal. They are highly active areas within the chain of the network (broadcasts - transmitters vs electromagnetics in space), containing a dense material of textural sounds overriding the frequency knob. Such areas are not easy to find, most times they are the signifiers of the electromagnetic identity within a place in correlation to the network. They are the agents revealing the respective sound territories contributing to a specific place. Finding these centres in the context of performance by means of tuning within such an environment becomes an artistic challenge. One needs to find ways to make sense of the trajectory leading to those active areas, which again is always affected by the various affordances in place of the event (e.g. location of the instruments within a space - reception quality - proximity to certain interferences). Therefore one of the core challenges in the context of performance, is very much bound to these susceptible differences existing in certain locations which are always displacing the sweet spots, making possible the production of newly emergent sounds. While tuning in search, the attention required from moment to moment is a state of constantly pushing one's attention not knowing what's going to happen next, since quite often the sound behaviour and texture are not necessarily similar to what have in advance been experienced in another occasion. Thus, manipulating the same knobs over and over on the interface does not mean the results are similar. The interface in this context is a tool to potentially reveal sounds that are conditioned by waves spread out in space ready to be sculpted by commercial broadcasts.

As it may seem so far, the inherent indeterminate features conditioning this system in a live context would certainly impose a critical listening experience if one is concerned about mediating the content to an audience. A critical situation is always present, which demands the performer/listener to guide the sonic materials having stumbled upon. the act of listening during the performance becomes a primary element within the act itself, since the performer is exposing his/her own listening experience in a situation where it is required to address the sound in real-time. Therefore, tuning into something which has not been experienced earlier is the only chance available to make this moment precious by means of refining the audio content. In other words, staying

vigilant to learning how the system behaves in its current moment would facilitate the process of making better decisions while being observant to the cause of changes. It seems to me that one of the most important aspects of listening in this situation is to be able to momentarily perceive the expansive scope of sounds within each event, and to carefully bring their elements to the surface. This challenge inherently carries a listening experience in which it involves careful listening while becoming resistant simultaneously.

3.3 Besides a resonating sound

Apart from the sonic aspects from which have been explored so far, having had a two way communicative radio model after some success of re-appropriating FM transmission on a micro scale, the notion of interference with broadcasts in the presence of an audience might depict certain media ontologies in the mind of the listener which could be worthy to investigate. The situation involving a performance scenario appears to reflect some aspects of hijacking when interfering with real-time media broadcasts, have the capability to re-orient the listener into some forms of resistance to national media broadcasts. Looking at some examples related to the subject of hijacking in media does seem to have various political implications depending on the time and place of the event.

One of the many radio incidents hijacked by un-identified users is the “The Old Tape”, occurred in 1995 when a 15 years old boy recorded the event, it coincidentally happened while he was practicing his routine, recording his favourite songs he could find on the radio. “I’d dial through the stations, and when I heard something interesting I’d hit record for a while, then move on. One night, I came across this. I don’t think this was the beginning of the broadcast, but I caught a lot of it. Right at the end, an announcer says that the station I was tuned to was WKCR 89.9 New York.”⁴

One well-known incident in the realm of Television broadcasts occurred back on the

⁴ <https://www.dazeddigital.com/artsandculture/article/19309/1/worlds-most-mysterious-unexplained-audio-transmission-aural-phenomena>

22nd of November 1987 on WGN-TV, known as the “Max Headroom signal hijacking”⁵. The stations broadcasts were interrupted by a video of an unknown person wearing a Max Headroom mask and costume, accompanied by distorted audio. The first incident took place for 25 seconds during the sports segment at 9:00 p.m. news broadcast; the second occurred around two hours later, for approximately 90 seconds during PBS affiliate WTTW’s broadcast of *Doctor who*. The video ended with a pair of exposed buttocks being spanked with a flyswatter before normal programming resumed. The culprits were never caught nor identified.

Another incident of a different political nature took place on Al-Manar Tv during the 2006 Israel war against Hezbollah in Lebanon. Israel overloaded the satellite transmission of Hezbollah’s Al-Manar TV to broadcast anti-Hezbollah propaganda⁶. One spot showed Hezbollah leader Hassan Nasrallah with crosshairs superimposed on his image followed by three gunshots and a voice saying “Your day is coming” and shots of the Israeli air force destroying targets in Lebanon.

As it may seem, each of these events have occurred in different contexts of time and place, carrying different meaning from one another. The timing aspect in regard to hijacking their viewers attention will eventually result into disseminating the messages required to intervene with current affairs. Ultimately, such interventions carried out by individuals or governments (in the case of Israel) within these various forms of media could be capable to have a succeeding effect in altering audience perceptions, in ways which could make audiences re-question the agency of power/control embedded in commercial broadcasts. In other words, such actions are capable to open up alternative imaginary worlds, where censored technology seems to be as one of the major obstacles in crossing over a threshold to explore other forms of perceptions. It isn’t a surprise that this aspect of one to many broadcasting in which has been largely banned by governments in the early days of radio, and due to the awareness by authorities of the power it would give to the people. In 1932 Bertold Brecht emphasized the idea of telecommunications as an artistic medium in his essay 'The Radio as an Apparatus of Communication'. In this essay Brecht advocated the two-way communication for radio to give the public the power of representation and to pull it away from the

⁵ <https://arstechnica.com/information-technology/2017/11/thirty-years-later-max-headroom-tv-pirate-remains-at-large/>

⁶ <https://archive.org/details/LiveLeakDotCom2507792>

control of corporate media. Harking back to the latter part of the 15th century, restriction over the use of Arabic script in printing was implemented during the decline of the Ottoman Empire. “Muslim religious authorities (*uluma*) were reluctant to support the use of movable type to print Arabic either for fear that some may distort religious texts or may challenge their interpretation of religious texts. The Ottoman rulers at the time also feared that Arabic printing would enlighten the people and thus may endanger their uncontested authority. Accordingly, printing was proclaimed by the *uluma* as “an abomination of Satan’s work.”⁷

The important aspects that could be learned from the motives of hijacking/interfering, opens up the possibility to potentially investigate the perceptive outcomes that could emerge from repurposing or regaining control of certain media technologies. It may also be to some extent, or in which ways repurposing takes form to produce imaginary alternatives. It could be said that sometimes when an extreme form of repurposing takes place (e.g. transforming a TV or a radio into a piece of furniture) would eventually result in a totally different meaning inspired by its source. However, the repurposing aspect being discussed here, is when a tool of technology to some extent preserves its same function, but in addition to its common purpose other layers of intervention or techniques are imposed onto it, in which other perceptive agencies are likely to emerge in the process. A popular example in such instances would be “Nam June Paik” works with modifying inexpensive second hand TV sets. He made his big debut in 1963 at an exhibition known as *Exposition of Music-Electronic Television* at the Galerie Parnass in Wuppertal in which he scattered televisions everywhere and used magnets to alter or distort the TV programmes as they were being broadcast.⁸

3.4 Is it an instrument ?

Exploring experiments dealing with the interface of radio when it comes to re-appropriating such medium into a performance context, sparks the recurring question: when does the radio become an instrument?

One of the major reasons this research have adopted radio as a tool for live performance, is

⁷ Media in Lebanon - Fragmentation and Conflict in the Middle east. p.15

⁸ <https://www.guggenheim.org/exhibition/the-worlds-of-nam-june-paik-2>

to mainly highlight the urgency of temporality emerging from a scope of indeterminacy a radio could provide in a live context, while simultaneously avoiding a sample based environment. A desire to transcend the present, to emancipate a musical syntax inherited from structures of past traditions mediated by musical instruments. A desire to break away from the connotations and references evoked by such histories in a moment of performance, celebrating a moment of pure listening freed from the burdens of genres imposed by past hierarchies. It is a moment of critical listening unburdened by prefabricated sonic materials, not solely critical from the auditory perspective, also critical into opening up to other social and cultural spaces in defiance to a performers psycho-geographical realm of identity. A moment to re-materialise radio and propose a renewed social engagement of sharing a listening experience with the audience, as themselves becoming-witnesses to a decision making process mediated in tension between negation and affirmation, rebellion and reconciliation. A moment to question the possibilities of radio agency and its potential sonic outcomes and affect when hijacked by the auditory capacities of the performer.

From a musical perspective, the indeterminate agency of radio creates a potential to emancipate the repetition-movement related to timbral aspects, evoking alternative sound worlds (e.g. artefacts from the designated setup in addition to commercial broadcasts) that could emerge in the process and the challenges it poses through real-time listening to address the newly emerging sonic territories in a live context. A moment in which it is possible to forge a sonic identity specific to a particular location through guided listening.

While radio broadcasts propagate in tandem with other electromagnetics in space, each environment is subject to a separate agency, one entity strives on the outskirts of capitalism to preserve their radiated broadcasts (i.e. radio stations), while the electromagnetic entities in space emerge as a byproduct of the latter along other causes of interference guided by an infrastructure. If such entities are combined, eventually it would produce a new definition of sounds, a limitation of a desirable quality in which they provide ground to a fertile sound territory manifested in real-time.

Brandon Labelle notes that "pirate radio broadcasting contributes to a perspective on the radiophonic imagination, by not only supplying alternative content but by defining radio's borders

according to an ambiguous terrain.”⁹ Speaking of borders, besides the aspect of piracy, the occupied space claimed with micro-casting would create an electromagnetic (EM) vacuum surrounding the space of an event / performance, where the audience and performer become subject to a hijacked radio space free from the dominion of licence and ownership. A two folded space where the audible acoustics are born out of a collision in between the EM vacuum versus the syntax of broadcasting, in which a resistant sonic entity emerges from the in-between space of the two allocated ambiguous borders. In such instances, the performer re-orientates and interferes in such a muddle of waves, where the border of the micro-casts stands in “negotiation” towards the broadcasts, finding ways to take advantage of a sonic thread by closely colliding the two distinct entities, in which other forms of representation could potentially appear. A new kind of representation is born out of an impenetrable shield of perception, mediated through the performer by the agency of micro-casting.

If we generally consider that locations inherently contain a form of an electromagnetic fingerprints through which all kinds of radio waves occupy the space, (e.g. cellphone towers nearby, FM radio towers, Wifi, domestic 50Hz hums, etc) then certainly such an existing network consisting of the various transmissions would contribute to an electromagnetic identity particular to the confined space. Thus in moments where a person to a certain extent manipulates some aspects of these existing transmissions, a distinct sonic body / sub-identity could potentially emerge as a result of re-routing the existing waves.

Besides the electromagnetic spectrum aforementioned, a person’s identity in the way the system is being manipulated to interact with such existing environment, is juxtaposed/projected to articulate various forms and patterns. In such conditions, it could be reasoned that the person interacting/interfering with the radio waves is himself/herself a conscious radio entity, an intrusive body/agent coagulating in the depth of the network, re-addressing the existing structures of relationships co-existent in space, producing new forms of inter-relationships within such an environment that would eventually contribute to emergent sonic spaces / sub-identities.

⁹ Brandon LaBelle, “Transmission Culture,” in *Re-Inventing Radio: Aspects of Radio as Art*, ed. Heidi Grundmann et al (Frankfurt am Main, Germany: Revolver, 2008), 85.

In telecommunication systems, white spaces refer to 'guard bands',
which for technical reasons are assigned in between radio
channels to avoid interference.

4. Reflections

4.1 Rehearsing the site

The pleasure of working with the radio setup is that it has the capability to engage to a certain extent with the surrounding environment as have been previously explained, allowing the inherent aspects of transmission configure the position of the installation in space, therefore exploring several types of spaces without having any preferences must be considered to culminate a rich experience. For that reason, and prior to each performance, it is always preferable to have access to the place of event if the situation allows and experiment with the system for at least a single day¹⁰. The first step is to investigate if any electromagnetic interferences are present and whether they exercise a prominent function on the sound (i.e. to see whether they are desirable for the context of performance). The next step would be to configure the quality of reception and find the appropriate area containing the strongest bandwidth, since it has the ability to enhance certain dynamics within the circuits (i.e. a noticeable increase of artefacts along to sharper attacks when surfing the frequency knob).

Ultimately finding a desirable spot to position the radios that potentially could negotiate both entities, while keeping in mind that the location of the performer has to be situated amongst the audience, since it is crucial to share a similar listening experience with them when allocating the loudspeakers. One major reason to be situated amongst the audience is to make sure the performer is exposed to a similar frequency spectrum, an aspect which occupies the most significant part of listening during the performance, as it is required to precisely hear the frequency bands for the purpose of equalisation and feedback which frequently indicates a dormant territory of sounds that are significant for the purpose of development. Developing in the sense of providing a continuity to the latter, or discontinuity — a rupture leading to an entirely different event. The other factor deals with the proximity issue from the loudspeakers, as having my own sense of hearing determine the threshold of amplitude, since it is required to adjust the amplitude in real-time which is dependent on the timbre evoked in certain moments. Many times, the amplitude levels are elevated

¹⁰ four hours of interaction can be fairly sufficient to establish a reasonable understanding with the site and test whether certain frequencies are more prominent than others, something to keep in mind during the time of the performance, more on that in section 3.2

to provoke a visceral interaction with the sound, while other times it is required to set it low for the purpose of a tension release after a long period of exposure to high levels of amplitude. Moreover, in certain moments the amplitude must be low to set the appropriate conditions for a listening experience which demands that the body is at rest (i.e. decreasing the tension on the body) in order to shift the focus on sounds which can be described as “eerie” in the sense of not having any precise directionality in space (i.e. in contrast to a loud sound denoting a particular direction in space), while connoting a texture of abstract voices undulating via elements of atmospheric noise.¹¹ In other words, in order to be able to access the sonic agency of such elements, it is estimated that there must be an exercised effort of listening towards the sound for it to manifest its proper duty. The last stage of interacting with the site is having to place the micro-transmitters in a radius which would give them the possibility to be able to interact with each other, while maintaining an appropriate distance from the radio receiver to preserve the wireless connection. The defined distance amongst the transmitters is still limited for the time being due to the limiting range of audio cables.

4.2 Expected durations

Site specificity isn't only an attribute to the aspects of frequencies which determine the ephemeral qualities of the sonic agency, it is also expected that duration is an immanent body that would draw its capacity from the confinements of the space in relation to the audience. In other words, the physical and architectural conditions of the site (e.g. outdoor vs indoor spaces) is a significant element that would suggest a certain feeling of temporality and intensity in relationship to the audience attentive listening capacities while occupying the space. It is expected from the performer to stay vigilant for such tendencies of temporality and its bodily affect from an audience perspective, in which can be utilised as a semiotic tendency for the development of duration. If such temporal tendencies have the capacity to be sensed, then this would lead to a positive engagement with the site provoking a sense of solidarity (i.e. audience - site - performer), in which I estimate to trigger a channel of a meta-site regulating temporality from a communal perspective contributing to a successful performance. For such a best case scenario, temporality is also dependent on being able to

¹¹ Atmospheric noise is radio noise caused by natural atmospheric processes, primarily lightning discharges in thunderstorms. On a worldwide scale, there are about 40 lightning flashes per second.

access a sonic complexity with the radio system, leading to a multitude of sound territories informed by the site and the system represented by the foreground. In other words, trying as much to avoid predominant features within the sonic attributes that might cause a mis-representation of the faculty of such an environment, while maintaining the aim of dis-organising the listener's reflexes contributing to a physiological stimuli. Ultimately if the aforementioned conditions are met, it is estimated that the expected duration of the performance should range for a minimum time of twenty-five minutes up to one hour in a best case scenario.

4.3 Speculations



Within the course of developing the project and the investigation of the sonic agency informing the performance practice, it is becoming increasingly difficult to ignore the aspects of transmission outside its political realm, while its historical backdrop has been significantly tied to warfare and the construction of national identities (Western 2015:77), or in other instances exposing their subjects to forms of sectarian violence (Dajani 2019:59). This is not a call to survey the global context of radio transmissions under the repression of gatekeeping, neither to investigate an emancipatory strategy to evade media structures imposed by capitalistic institutions and governments of polarising and freezing identities as seemingly independent things in the world, rather than what they actually are, processes. Nevertheless, emancipating a sonic identity has been a driving motif into re-appropriating radio into the realm of performance as has been described earlier (section 3.4). Thus, it is a speculation drawn from the aforementioned authoritarian historical backdrops, in which I have

started to believe that the technological development of radio¹² have been retroactively subordinated under the agency of such political motives, engineered in ways to preserve an authoritarian metaphysical omnipresence, while retroactively struggling to suppress the forces of nature¹³. Looking back at the circuit experimentations, and the struggle to interfere with the incoming signals while maintaining the aspects of broadcasts seems as if the circuit is encrypted to resist the forces of manipulation, in which micro-casting becomes essential to trick the receiver with other waves in space to provoke a sonic artefact, subverting the authoritarian management of wavelengths as postulated (Western 2015:78). Moreover, it becomes clearer to what extent the aspects of noise within the frequency spectrum of radio is itself a natural agency which stands against the faculty of design and logic of the circuit, denoting the fact that noise is a form of an ‘immanent truth’ produced naturally in the aether defying structures of authority. However, suppressed and silenced by capitalist infrastructures in promoting the concept of ‘fidelity’ as a form of realism (Western 2015:90), subverting the concept of “White spaces” into a “guard band” degenerating the legitimacy of noise as an undesirable sonic entity designated as “interference”.

— Redrawing the scene —

Re-questioning the sonic agency depicted in real-time, the notion of “taming the beast” through which I come to describe such a process, evokes a realm of conflict where the radio circuit is constantly undergoing two opposing forces; casting vs atmospheric noise. It is a factor in which it materialises the course of performance, drawing a challenge to attentive listening in the midst of a chaotic sound hijacked by the lens of micro-transmission. A lens scanning through a spectrum guarded by an EM shield, transforming itself into a ‘guard band’¹⁴ while drawing its force from the gaps of white spaces, subverting the notions of a normalised institutional violence into an emancipatory sonic experience. A moment that could potentially be accessed through a

¹² The voice of the nation was constructed in terms of purity against outside influence; the management of transnational wavelengths was conceived along lines of national radio manners in tuning out foreign sounds; and an onus was placed on listeners to have high-quality radio sets in order to hear the nation correctly. I frame this as a process of securing the aural border. These practices fed into a much larger programme of delimiting acoustic national identity. Each served to consolidate and authorize the moral geography of the nation in sound. (Western 2015:78)

¹³ Atmospheric noise (ibid)

¹⁴ Re-appropriating the term ‘guard band’ to my own advantages, as believing it has been falsified by telecommunication companies to de-legitimise the immanent truth carried by atmospheric noise.

physiological stimuli brushed against a dense matter of sound, while remnants of voices denoting a past experience or a present event swift through like a flashback, triggering a feeling / psychic response associated to a discarded memory or an unengaged present, potentially capable to produce a multiplicity of experiences. A break, a crack splitting second initiated by a displaced circuit from its original housing to challenge a silenced discourse, under the auspices of 40 lightning flashes per second.

4.4 Final comments & future projects

In the course of developing the project, it seems to me that there are still more possibilities to explore – and extract – via the FM circuits, a wider definition of sound, and to further investigate the inter-relationships and affordances that might suggest alternatives for other configurations of performances, opening up to deeper realms of literature and sound. It would also be fruitful to revisit the possibilities of AM bandwidth(s) and reclaim certain aspects by means of transmission, in which it is estimated that the process will feedback to a wider understanding of wave propagation and its *micro* agency in relation to the *macro* world. As has been personally experienced so far, it was a noticeable progress how the sonic environment of ‘radio artefacts’ in which was mostly concerned towards a phenomenon of sound had been retroactively shaping my listening, while informing other ways of thinking about the environment, driving me to re-question the agency of media via a sonic motif.

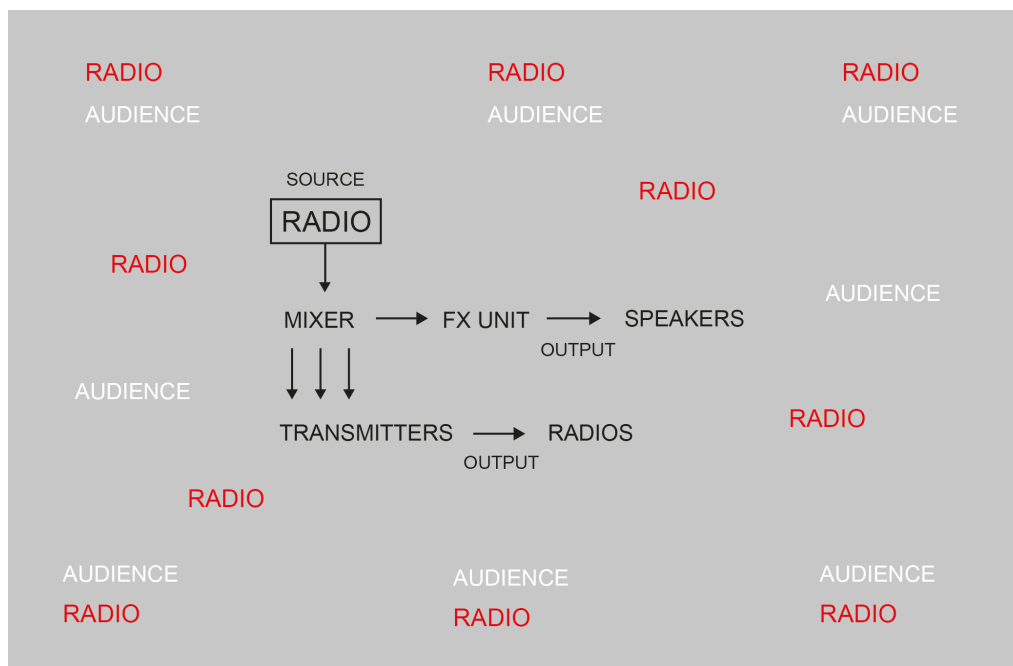
A feeling of gratefulness, to ultimately realise that such a progress has been unfolded by a chance driven process via a transmitted micro wave from a radio receiver onto another in a proximity of a few centimetres (section 2.3), an encounter that lead me to engage and question the agency of transmission. Such event has re-drawn my attention into re-questioning the geo-political aspects of media and their role into instilling violent perceptions that seek to control attention. Such notions of perception management is a highly advanced laboratory in the Lebanese context, extending across the Middle east (Lebanon, Iran, Syria, Israel, U.S, etc) in which conspiracy theories become a naturally occurring phenomenon that reflect the operational dynamics in the power of media to influence perceptions. On such note, I believe that it is in the favour of sound if a radio circuit is capable to surf through such ambiguous boundaries through a strata of wavelengths, hijacking an audience to celebrate a discursive event. Moreover, and in the favour of a beginning to a new project, I believe that the miniature model¹⁵ in which have already been explored for the purpose of live performance, turns itself to the ‘real world’ for two reasons. On a first note, a motivation driven to investigate the sonic world that might emerge in the *macro* sphere , perhaps, a similar approach could be applied from the miniature model, however, such technicalities require a serious speculation. As a consequence to such initiatives, I believe that in the process of trying to

¹⁵ Micro-transmitters are replaced by ‘radio stations’ - the radio receiver is also replaced by ‘a radio station’ transmitting on a specific frequency.

access the gates of the gate-keepers, it will eventually lead to a much wider understanding of the current socio-political dynamics, and again, while acknowledging experience as a creative - reflexive trajectory, ultimately it will feed in the benefit to re-engage with theory, so—on, and so—forth.

— Spatialisation —

During the experiments with micro-transmission, I have briefly tapped into the aspect of spatialisation through the use of multiple radio receivers spread across the space, inspired by the concept of acousmonium. However, not being able to turn the radios on and off remotely during play, seemed like a complicated technical project to realise. Nonetheless, it added an intriguing spatial aspect to the sound source, since not all receivers were reacting similarly, even when approximately¹⁶tuned to the same frequency. Moreover, not all of them were able to demodulate the transmitted signals at the same speed, which adds more flavour to the process. Increasing or decreasing feedback with the transmitters also plays a role in blurring the receptions, while sometimes nothing happens, giving space to broadcasts. This isn't an attempt to delve into spatialisation theory, but rather an idea for the time being. Perhaps it might be fruitful in the near future to materialise such a sonic configuration, that could lead to interesting insights.



¹⁶ It is almost impossible to tune several analog receivers to the exact same frequency, due to the mechanics supporting the frequency knob.

In telecommunication systems, white spaces refer to 'guard bands',
which for technical reasons are assigned in between radio
channels to avoid interference.

————— *An Attempt to transcribe a*

Shortwave excerpt for an aural training — Reception quality : (weak)

Footshh... wetchaa... fa.. khatshh ..khhhoop...

fooo ..da.. fa.. moonkki... nitchiii ...khhaftsi

eeeen.... noovembereg.... for... thee... rriich..

hool... koma ..pin . . .enfol.. imitishen ..ine...

pema ..oof .dooring.... khhwillaann ..khoofeen ...eeenoofdaaggg...

kheelelekweeeik sssebboo ..kelo...fooolkeuushhh ...kommmpuuu de ppuuu

tresooo eehhh ..khobooottt uuu weeezee

ine zoo.... ooyee ku zuulleyk edde foto bleeeyk ...foop foto poto pop

..... o opp op op ppp oooop.

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“We learn from history that we do not learn from history.”
— Georg Hegel

END