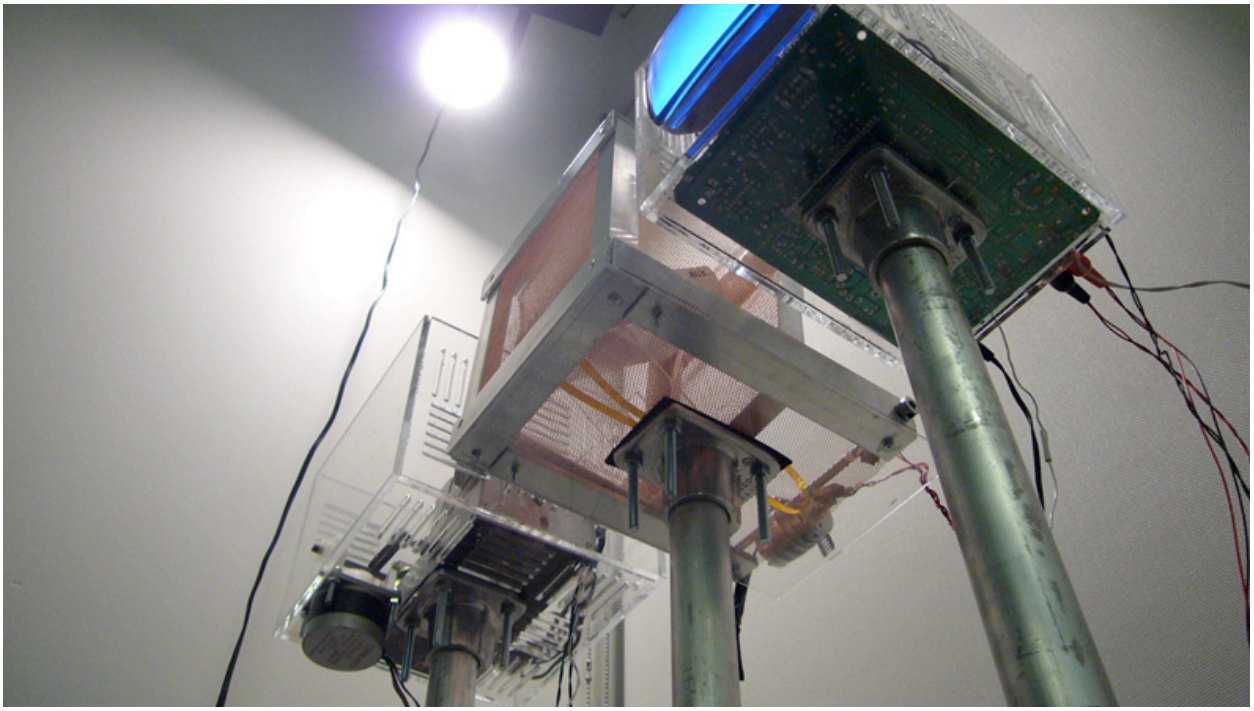
THE SPECTRAL TRILOGY



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Right now, you are being bombarded with invisible rays. There is little you can do to prevent their penetration of every centimeter of your body. Each passing moment sees you exposed and violated, completely at their mercy. It is as inevitable as your death.

But can they do harm? Can they help? What is their effect?

To be honest, I don't have an answer. I can only hypothesize. This conjecture has become the inspiration of my thesis, The Spectral Trilogy.

In order to properly convey my project, it is important to take a step back and consider the creative process.

It is my belief that the creative process is three-tiered. There is inspiration, that spark that drives the artist to create, execution, the process of physically realizing the inspiration, and finally rumination, the reflection of your work and decision on its success.

INSPIRATION

Inspiration comes in many forms. For me, a series of findings and discoveries led me to this project. It started when reading an interview with the pop musician, Björk. In describing her motivation for using stringed arrangements in her music she said "adore strings and I've always thought that our nervous system, if amplified, would produce the sound of a violin, a viola or a violoncello." This introduced me to the idea that our bodies naturally generate musicality and respond to music on a physiological level. I became obsessed with the idea, seeking proof that such a thing was possible. In my search, I came across a study called Infrasound.

Infrasound is an experiment that explored the effect of low frequencies on the human experience of music. Their results found that “infrasound boosted the number of strange experiences (sense of coldness, anxiety and shivers down the spine) reported among the audience, even among those who were unaware of its presence” (Angliss, 2003). This study highlights the possibility that that which we don’t hear can significantly affect our perception.

The imperceptible forces that engulf us are not lost on our bodies. Consisting of vibrating organs and resonant chambers, our bodies constantly generate sounds in space below our listening threshold. A dialogue exists between our bodies and our environment. Constantly adapting to the quantifiable measures of a space (temperature, light, sound), it is safe to assume that our bodies attenuate according to where we are. In other words, our bodies are imperceptibly aware of the invisible.

John Cage’s composition, *4’33”*, is a reflection on silence inspired by Cage’s visit to an anechoic room at Harvard University in 1951. Expecting to “hear” perfect silence, he was surprised that two distinct sounds were audible. Talking about the experience, Cage said “When I described them to the engineer in charge, he informed me that the high one was my nervous system and the low one was my blood circulation" (Cage 1961). *4’33”* redefined “silence as simply the absence of intended sounds, or the turning off of our awareness”.

Hoping to replicate Cage’s experience, I visited an anechoic room at McIntosh Labs in upstate New York. I wanted to see, rather hear, if what he discovered was true. Though I can’t say with certainty that I heard the high-pitched nervous system sound I can say with conviction that I heard the low pitch, the sound of my blood pumping through the

veins in my ears. Like Cage, I was struck with the fact that this sound is ever-present yet inaudible unless all other sound is filtered out.

A world of sound opened up all around me.

Attempting to define this inaudible sound, I discovered that the body communicates using the electromagnetic spectrum. Every pulse of the heart is an electromagnetic charge, as is every firing synapse.

Table 1 (Reynolds, 2005) shows the scale of biological rhythms in humans. The pulse, brain activity and even sexual anticipation generate quantifiable frequencies. Since all frequencies belong to the electromagnetic spectrum, all human activity contributes to it.

Table 1. Scale of Biological Rhythms in Humans

200 Hz	Pulse transmission on nerve fibers (upper theoretical limit might go as high as 500–1,000 Hz
20–60 Hz	EEG gamma waves
5–50 Hz	Flicker fusion depending on intensity of light stimuli
14–18 Hz	EEG beta waves
10 Hz	Small amplitude tremor accompanying contraction of voluntary muscles
8–13 Hz	EEG alpha waves (2 Hz amplitude variation superimposed)
7 Hz	maximum speed for voluntary actions (tapping, chewing, *etc.*)
4–7 Hz	EEG theta waves
6–0.3 Hz	Uterus contractions
4–5 Hz	Contractions of the small intestine
3.5–0.5 Hz	EEG delta waves
2 Hz	Spontaneously satisfactory speed for voluntary actions
1–2 Hz	Contractions of the large intestine
1–2 Hz	Penis and scrotal contractions
1–2 Hz	Heart auricle contractions
1 Hz	Pulse rate (superimposed variations at intervals of 15, (0.6–1.7) 30 and 60 seconds may occur)
0.3 Hz	Heart apex contractions
0.2–0.3 Hz	Respiration rate (with superimposed variations at intervals of 1, 4, 9, 20, 40, 150 minutes)

Neil Strauss asserts in the introduction to his Radiotext(e) that “every time you turn a

page of this book you are creating an electromagnetic wave, and radio waves never die”(Strauss, 1993).

This perspective that every action we make contributes to the electromagnetic spectrum led me to re-consider what the spectrum actually is. No longer an elementary school science subject, the electromagnetic spectrum illuminated the air around us, carrying our thoughts, movements and futures.

Every living body you pass, then, is emitting waves that penetrate your body. If it were possible to hear these frequencies, we may be able to determine the thoughts, feelings and desires of all we encounter. Charles Halary asserts that there are “permanent subliminal relations produced by electromagnetic murmurs between humans” (Halary, 2003). I tend to agree. This idea, then, that our bodies are sending packets of information into the ether inspired me to think of the electromagnetic spectrum as an extension of human existence.

Another inspiration for this project came from Marcel Duchamp. Specifically, I was inspired by Duchamp’s Readymades. The Readymades re-contextualized the mundane, lifting them to the lofty position of art simply by calling it so. As R. Mutt, Duchamp defended the idea of the readymade in writing “Duchamp attached a great deal of importance to the act of seeing that gives birth to art, and suggested undulatory changes of our ways of seeing to resonate with and create art”(Halary 2003).

I decided to consider the electromagnetic spectrum as a Readymade. It is pervasive, ubiquitous and free. In viewing the electromagnetic spectrum as a Readymade, new possibilities for creative expression exposed themselves. It is a natural resource, ready to be re-contextualized.

In 1961, Nam June Paik placed a magnet atop a television. This singular action introduced the world to a new medium, video art, and exposed the potential in re-thinking the commonplace. Like Duchamp, Paik understood the significance of context in artistic expression. “The set itself seems to reference the viewer's own familiar and private association with the medium, draws him in, thus implicating and involving him in Paik's re-contextualization of art, technology and pop-culture” (Nankivell, 2004).

EXECUTION

Taking this inspiration, I wanted to present the electromagnetic spectrum in a way that could inspire my adoration of it in others.

Step One: Materials

Using common objects, I wanted to connect and re-present them. I chose to work with a television, 2 radios, plexiglass and exposed wires. In the spirit of Duchamp’s Readymades, I wanted to take an everyday object and re-contextualize it. While doing more than re-presenting the objects, their stripped down appearance thematically exposes not only the objects subjugation to the electromagnetic spectrum, but the observer’s as well. I purposely extended wires to make them more obvious to illustrate the technology’s limitation and dependency on generated electricity. Hopefully this illuminates our lack of mastery over appropriating nature to the extent that we can work completely within Her bounds. The use of both a 1947 vacuum tube radio and “modern” portable radio challenges advances in radio technology and highlights the timelessness of radio waves. The portable radio is painted white to not only remove corporate markings but to elicit a sense of purity from the object. Plexiglass was used because of

its “invisibility” allowing me to create transparent boundaries between the objects much like the copper mesh between the plexiglass, visually and conceptually disrupting their physical connection with wires. Because of my reliance on wires, I chose to highlight their presence, over-extending them to generate a chaotic nest of electricity. All of the wires enter a black box, housing the circuitry thus blocking them from view. This is to add an element of secrecy (read: magic) that is ever-present with the electromagnetic spectrum. The box is topped with the user interaction, a simple switch. While the switch affects The Spectral Trilogy, what actually happens is beyond the user’s control. This is to force a sense of helplessness on the user, giving them only slight control. In approaching The Spectral Trilogy, a user can decide to passively appreciate the default, resting state, of the installation, where the AM radio slowly tunes up and down the available spectrum, emitting AM artifacts that are present around us. The Faraday Cage is closed, masking the sound of Bloomberg Radio and the television is blank, playing the John Cage audio collage. If the user is more active, they will activate the switch, initiating a series of repeating patterns they can only turn off. The hope is the user will recognize their inability to completely control the installation. They can only turn it on and off, much like tuning in to the electromagnetic spectrum. Its existence does not change, the user can only decide to listen or not.

Step Two: Construction

Part 1: AM Artifacts

The radio signals surrounding us are always there. John Cage, in a conversation with Morton Feldman, said “radio simply makes audible something you’re already in” (Cage 1967).

The steady tuning of the AM dial generates a soothing repetition of low AM artifacts. Their presence is recognized, but not necessarily obvious. The air around us is alive with activity. The stepper motor that controls the dial offers a convenient mechanical distraction, slowly rotating interconnected gears.

Part 2: Television

Marshall McLuhan said, “Now with TV as it goes right in to the human nervous system, it goes right in to the midriff, the image pours right off of that tube into the nerves, it’s an inner trip, the TV viewer is stoned… It’s addictive” (McLuhan, 1970).

By not showing any imagery on the television, its function is removed. I present it as a light while allowing the cathode tube to continue its emission of penetrating waves. The monotonous glow re-contextualizes the television as a beacon to follow, rather than a distraction to engage,

The whole experience is narrated by John Cage, in a 30-second sound collage I created taken from various interviews and discussions he had in the 1960s & 70s. The sound bytes I used have a clear relationship with *The Spectral Trilogy*, addressing topics like the radio, telepathy and artistic expression.

The quotes I use are:

> “You are bathed in radio waves, TV broadcasts, probably telepathic messages… But all that radio is is making audible something that you’re already in.”
> “Radio simply makes audible something that you thought was inaudible.”
> “The reality is the environment, what you want to do in it is an intrusion.”
> “The work of an artist, is it not an incisive intrusion?”

Part 3: Faraday Cage

The appropriation of the radio spectrum by corporations is commented on in the Faraday Cage. By tuning in to Bloomberg Radio, and silencing it with a faraday cage, I

am attempting to illustrate our ability to protect ourselves from the corporate takeover of the electromagnetic spectrum. While corporate appropriation of the spectrum is all but total, we can easily distance ourselves from its effects simply by not listening.

Step Three: Implementation

When activated, the stepper, and thus radio dial, begins to randomly jerk back and forth. The artifacts become more pronounced, replacing the steady tuning with erratic jumps in incidence. The picture of the television, too, affects the sound of the radio. By wrapping the antenna around the cathode tube of the television, interference from the firing tube generates slight bursts of sound from the radio.

This is achieved, technically, by placing a bare wire on an analog pin of the PIC. Mapping the analog readings to step positions, a random rotation begins. When the user turns opens the switch, the analog readings are ignored, and the smooth tuning returns.

When activated, the light begins to wildly flicker, making obvious the emissions. The flickering of the television is primarily controlled by triggering a relay that maps the audio to the video input. This creates a rhythmic pattern on the screen, with loud sounds generating dark visuals and low sounds light visuals. At the same time, two other relays are randomly triggered, generating horizontal flashes in the picture. These other relays connect the grounds of the tube to the common ground of the circuit, affecting the way the cathode tube translates it's electronic signals.

Presenting the television as such turns it into something closer to a canvas than media. The point is to ask the viewer to think of their consumption of media and to look for different uses of the technology. Like Paik's *Magnet TV*, my television challenges the

way we perceive art, technology and pop culture.

Upon actuation, the cage rhythmically opens and closes, phasing from silence to “news.” The transmission becomes noise, disrupting the serenity of silence. It is a obstacle to be overcome, rather than focused on.

RUMINATION

The most difficult part of completing a piece is knowing when it is finished. While I would argue that the creative process has no end, ‘finishing’ a project means holding it up against public scrutiny. As the creator, it is easy to recognize your inspiration in the execution, but if that is lost on your audience, you have failed. It is in this stage, that of rumination, that the life of your creation begins. The success of The Spectral Trilogy depends, therefore, on whether or not my intention is successfully conveyed. My goal was to present the electromagnetic spectrum in a new light, helping others to discover its influence and significance. I am pleased with the result, as I believe I was successful in getting my point across. As with any creative endeavor, personal tastes differ and the universal acceptance of The Spectral Trilogy as a contemplative sculpture cannot be guaranteed. This is true with all expressions. Universality is not a goal artists should consider. The creative process is for them alone.

In the end then, while the success of a piece depends on its understanding in the minds of the audience, the artist should not strive for this success. Rather, the artist should trust in their inspiration, perspective and creation. For this reason, I am pleased with The Spectral Trilogy, regardless how it’s accepted.

CONCLUSION

The opportunity to conceptually follow a project over the course of a semester has taught me a great deal about the creative process. It was in this effort that I came to terms with the role of creative expression in my life and the necessity for trusting your instincts. Over-thinking inhibited my expression, as I allowed logic to interfere with my inspiration. Conceptualizing the project in terms of the three-tiered creative process helped to focus what it was I needed to do. The end result benefited by trusting the realization of my inspiration, that the pervasive invisible spectrum is a force to be reckoned with.

Bibliography

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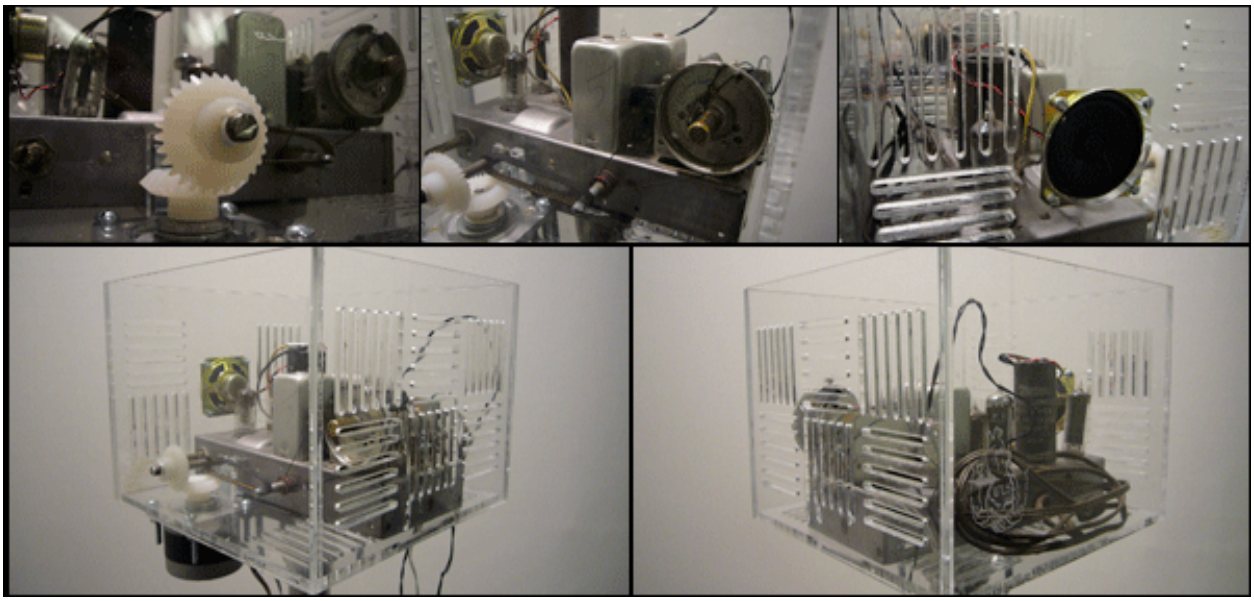
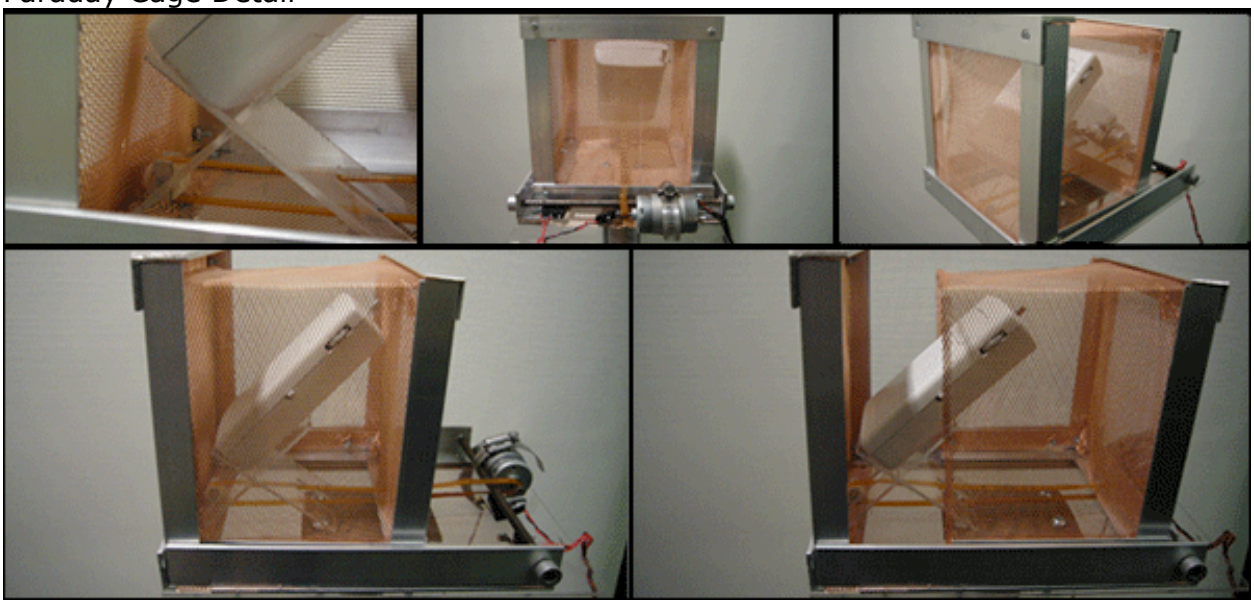
APPENDIX A. Photo Documentation

The Spectral Trilogy

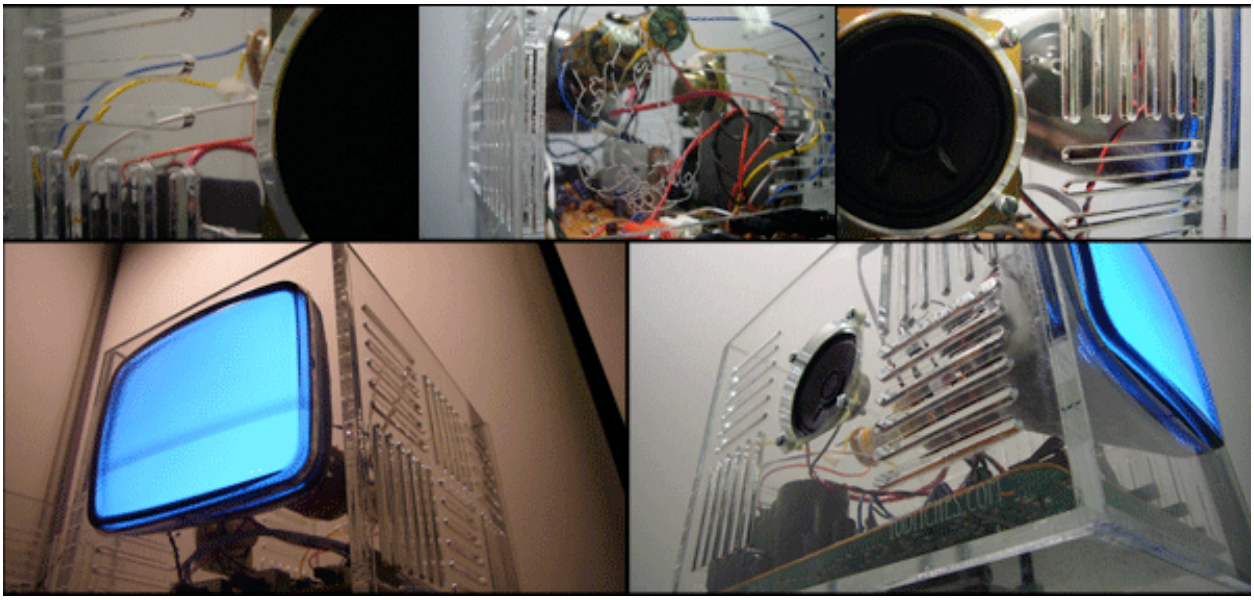
AM Radio Detail



Faraday Cage Detail



Television Detail



APPENDIX B. Code

```
'*****************************************************
'*  Name    : ALL.BAS
'*  Author  : [Michael J. Horan]
'*  Notice  : Copyright (c) 2006
'*          : All Rights Reserved
'*  Date    : 5/02/2006
'*  Version : 2.0
'*  Notes   :    yobitches.com
'*          :       Detroit what.
'*****************************************************

define OSC 20

DEFINE ADC_BITS 10
DEFINE ADC_CLOCK 3
DEFINE ADC_SAMPLEUS 50

input porta.0 ' Set PORTA to all input
ADCON1 = %10000000 ' Set PORTA analog and right justify

DEFINE CCP1_REG PORTC 'Hpwm 1 pin port
DEFINE CCP1_BIT 2 'Hpwm 1 pin bit
DEFINE CCP2_REG PORTC 'Hpwm 2 pin port
DEFINE CCP2_BIT 1 'Hpwm 2 pin bit

adcvar var byte
direction var bit
cageready var bit
tunerready var bit

leveron var portb.7
leveroff var portb.6
cageup var portb.5
cagedown var portb.4
tunerleft var portb.3
tunerright var portb.2

status1 var portb.1
status2 var portb.0
'relay1 var porta.5
relay2 var porte.0      ''perspective' scroll
relay3 var porte.1      'line
relay4 var porte.2      'audio-video

input leveron
'input leveroff
input cageup
```

```
input cagedown
input tunerleft
input tunerright

output status1
output status2
'output relay1
output relay2
output relay3
output relay4

'dc
    motor1Pin var portc.5
    motor2Pin var portc.4

    output motor1Pin
    output motor2Pin

'stepper
    stepdirection var bit
    x VAR BYTE
    steps VAR byte
    stepArray VAR BYTE(4)
    clear

    output portd.0
    output portd.1
    output portd.2
    output portd.3

    stepArray[0] = %00001010
    stepArray[1] = %00000110
    stepArray[2] =%00000101
    stepArray[3] = %00001001

    stepdirection = 0
    steps = 50

    cageready = 0
    tunerready = 0

    Pause 1000

initialize:
'high relay1
high relay2
low relay3
low relay4
if cageready = 1 then
```

```
   high status1
endif

if tunerready = 1 then
   high status2
endif

if cageready = 0 then
if cageup = 0 then
'DC up
    hpwm 1,64,1000
    low motor1pin
    high motor2Pin
endif
if cageup = 1 then
    hpwm 1,64,1000
    high motor1pin
    low motor2pin
    pause 200
    hpwm 1,0,1000
    cageready = 1
endif
endif

if tunerready = 0 then
if tunerleft = 0 then
    steps = steps - 1
    portD = stepArray[steps //4]
    pause 20
endif

if tunerleft = 1 then
    steps = steps
    steps = 0
    tunerready = 1
endif
endif

if tunerready = 1 && cageready = 1 then
    pause 500
    goto main
endif

goto initialize


main:
low status1
low status2
```

```
'high relay1
high relay2
low relay3
low relay4

if leveron = 1 then
    goto action
endif
if tunerready = 0 && cageready = 0 then
    goto initialize
endif
if leveron = 0 then
   goto default
endif

'if leveron = 0 then
'    goto initialize

goto main

default:
high status1        'green led on
low status2
'high relay1
high relay2
low relay3
low relay4
hpwm 1,0,1000       'stop DC
if direction = 0 then   'left limit reached
    steps = steps + 1
    portD = stepArray[steps //4]
    pause 20
endif
if direction = 1 then   'right limit reached
    steps = steps - 1
    portD = stepArray[steps //4]
    pause 20
endif

if tunerleft = 1 then   'if left limit reached
    direction = 0
endif
if tunerright = 1 then  'if right limit reached
    direction = 1
endif
goto main

action:
high status1
```

```
high status2
'low relay1
low relay2
low relay3
high relay4
tunerready = 0
if cageready = 1 then
    'DC down
    hpwm 1,64,1000
    high motor1pin
    low motor2pin
    if cagedown = 1 then    'reach bottom go down
       GOTO moveup
    endif
    if cageup = 1 then      'reach top go up
       goto movedown
    endif
endif
if leveron = 0 then
   cageready = 0
   tunerready = 0
endif
goto main

moveup:
high status1
low status2
'high relay1
low relay2
high relay3
high relay4
if leveron = 0 then
   goto action
endif
'DC up
    hpwm 1,64,1000
    low motor1pin
    high motor2Pin

'stepper randomizer
adcin 0, adcvar
if direction = 0 then   'left limit reached
    steps = steps + adcvar/10
    portD = steparray[steps //4]
    pause 5
'    if tunerright = 1 then
'    steps = 100
'low relay1
high relay2
```

```
low relay3
high relay4
   endif

if direction = 1 then   'right limit reached
   steps = steps - adcvar/10
   portD = steparray[steps //4]
   pause 5
'    if tunerleft = 1 then
'    steps = 100
'low relay1
low relay2
low relay3
high relay4
endif

if tunerright = 1 then
   direction = 1
endif
if tunerleft = 1 then
   direction = 0
endif

if cageup = 1 then
   goto movedown
else
   goto moveup
endif

movedown:
low status1
high status2
'low relay1
high relay2
high relay3
low relay4
if leveron = 0 then
  goto action
endif
'DC down
   hpwm 1,64,1000
   high motor1pin
   low motor2Pin

'stepper randomizer
adcin 0, adcvar
if direction = 0 then   'left limit reached
   steps = steps + adcvar/10
   portD = steparray[steps //4]
```

```
    pause 20
'    if tunerright = 1 then
'    steps = 100
'high relay1
low relay2
high relay3
low relay4
endif

if direction = 1 then   'right limit reached
    steps = steps - adcvar/10
    portD = steparray[steps //4]
    pause 20
'high relay1
low relay2
low relay3
high relay4
'    if tunerleft = 1 then
'    steps = 100
endif

if tunerright = 1 then
    direction = 1
endif
if tunerleft = 1 then
    direction = 0
endif

if cagedown = 1 then
    goto moveup
else
    goto movedown
endif
```