Secrets of Corporate Muzak

Psychology, principles and techniques of corporate sound production and design.

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Contents

1 Introduction

This manual contains notions of sound production and sound design. You can learn how to produce a lo-fi track with a smartphone and a bluetooth speaker, the basics of sound related cognitive psychology, how to put brand logos in a track and more sound related facts.

The notions contained in this manual are focused on producing an electronic track through the aid of consumer equipment, such as a laptop running a recent version of Microsoft Windows and a commonly used Digital Audio Workstation (FL Studio from Image Line is used here), one or more Bluetooth speakers (or traditional speakers), an Android smartphone with a recording app installed. But they can be extended to other computing devices, operating systems, sound production software and recording devices. I have collected this info and experimented with these techniques over the years as a personal research especially focused on corporate music, commonly referred to as “muzak”, the kind you hear in traditional TV commercials or background music for some kind of commercial purpose.

2 What is corporate muzak?

Corporate muzak is a kind of music intended for commercial use, as opposed to art music, which is intended to be enjoyed for its inherent entertaining and aesthetic value. Classic examples of corporate muzak are the jingles for TV commercials or mall background music. A more modern example of muzak is the background music for online audiovisual advertising such as videos promoting a software product, for corporate presentations or tutorials, but also for government sponsored communication, to mention a few uses. “Muzak” was originally a derogatory term, implying that music designed for commercial purposes was artistically inferior to legitimate music, but over time it became a common way to refer to this branch of Corporate Communication. Since the 2000s, the line between commercially sold music such as Top 40 hits and muzak has been blurred by new practices, such as producing a Top 40 hit starting from a TV commercial, but the distinction stays valid. During the golden era of TV, some legendary commercial jingles became hits in their own right, competing in popularity with the great songs on radio of the biggest acts of the time but, generally speaking, most of us don’t pay much attention to background music or anyway to music designed to underline a message or to promote a product. But this doesn’t make muzak less important, because a lot of elements that stay in the background and don’t make the receiver of the communication aware of their presence end up transferring subliminally to the brain. Hence the importance of muzak as a key part of Corporate Communication techniques, although it’s an often overlooked subject in schools and other training institutions. This short manual intends to teach the basics principles of electronic muzak production, through the use of widely available software applications running on standard computer equipment and common consumer electronic devices such as Bluetooth speakers and Android smartphones.

In order to be wanting to get into music production, it’s assumed that you have some kind of musical training, understand notes, intervals, chords, patterns, how to play a MIDI keyboard connected to a computer, how to create or tweak a synth preset and how to sequence notes on the typical piano roll feature built in the most popular DAW applications. Being able to score on a classical pentagram is a plus but not mandatory. For those who don’t know, a DAW is an acronym for Digital Audio Workstation and consists of an application which includes a MIDI enabled sequencer to record from a MIDI instrument or to score directly with a pointing device, audio recording capabilities, an audio mixer to route the different parts and instruments to faders to adjust volumes, panning and add effects such as reverb and equalization, a pattern sequencer to arrange in a longer sequence and overlay the individual patterns to create a song. This manual will refer to a very popular one called FL Studio, available for download from the producer’s website www.image-line.com. FL Studio is a commercially sold product which, as of writing, sells for 89€ in its most basic configuration, but on the other hand entitles you, once purchased, to a lifetime license with perpetual unlimited upgrades. For the techniques described in this manual, you need the Producer version which, as of writing, can be purchased for 189€.

Before getting into techniques, you need to understand a little basic theory of music related cognitive psychology and physics, in order to understand what, exactly, transfers subliminally to the brain when you are exposed to background or commercial recorded sound.

3 What is synesthesia?

Synesthesia is the ability to experience a sensorial stimulation through another sense. This includes, for instance, hearing a voice when reading a text (like Marshall McLuhan explains in his seminal essay Understanding Media), feeling the temperature or experiencing the taste associated with a color but, most of all and what concerns us for our purposes, experiencing inner sensations of space perception, image, texture, material, color, taste and smell when listening to recorded sounds. In rare cases, this is observed as an innate ability in some individuals. Most of us can only achieve this level of altered perception through the use of controlled substances such as cannabis, LSD, cocaine, MDMA and other psychotropic drugs. Goes without saying, doing drugs is never a good idea, because everyone knows drugs are addictive, bring unavoidably to abuse, which will destroy your brain cells, cause severe cognitive and behavioral impairments, which will in turn impair your ability to cope with social challenges, carry out tasks, study for school tests, drive a car, impress a potential employer at a job interview. Have no doubt that drug abuse will make you poor, unemployed, homeless, lonely and desperate. The good news is you don't have to do drugs, because someone else did for you many years ago and shared with the world their observations, a selection of which is collected in this handbook. So, when you listen to a commercially produced song or to background music, you know that a "picture", with spatiality and perspective, images, material textures, colors, tastes and smells is transferring to your brain subliminally. Which means, although you are not aware of these features, they do have an effect on your brain. In the case of muzak, if you are advertising a strawberry flavored soda and your track contains images of a strawberry, a strawberry red colored sweet liquid, a sweet smell and a glossy texture, listening to it in a resonating condition may have the effect of triggering a strawberry soda craving. Of course, people are not Watson dogs or Pavlov chickens, who could be trained for certain behaviors with a simple stimulus, so this is not a precision science. Again, the effect is achievable on an audience in a very resonating state of mind, such as the typical audience of peak time in the golden years of network TV. These days, people's attention is split between a much greater number of information sources, such as social networks, chat programs, apps, videogames, online streaming media and it's hard to recreate the "magic" effect of sense-making and self-validation of classic network TV. Not to mention how the wide availability of online stores killed the magic of shopping malls, which were designed in the 1950s to be the ideal haven for TV fans – TV was then a new media – and are now closing one after another all across the USA. In spite of this, being able to convey the correct sensorial and subliminal stimulations through recorded sound is still an art worth mastering, because the digital world creates lots of new occasions of exposure to recorded sound by audiences in the right listening conditions.

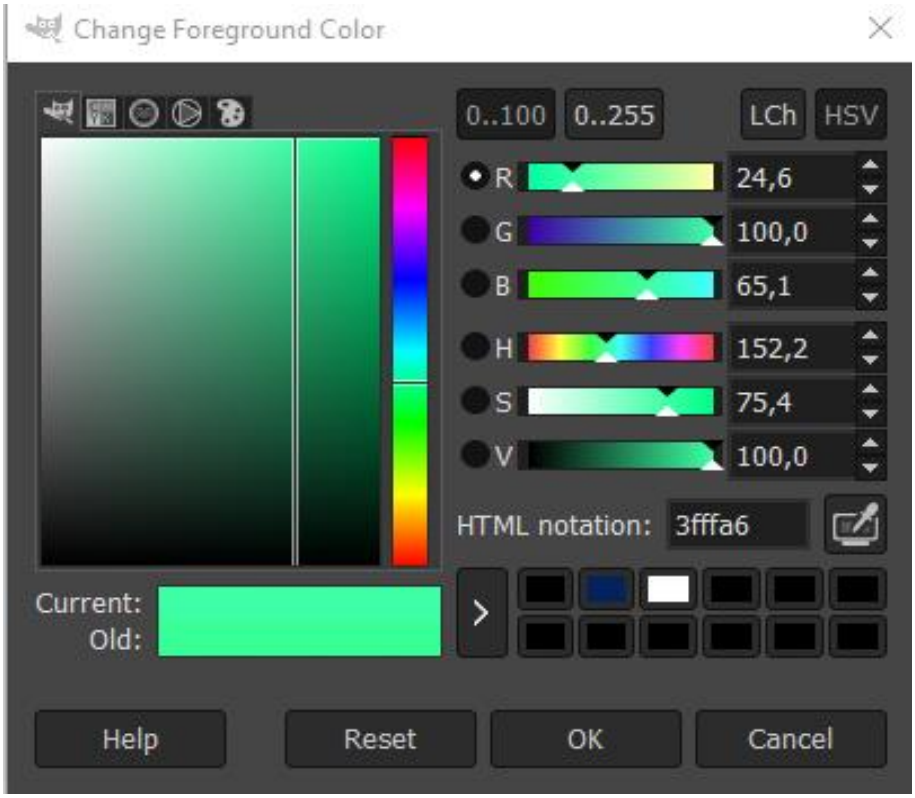
4 How to create synth sounds of a particular color

This part will teach you how to give a synth sound a “color”, which means when the part that uses that synth is played with the rest of the track it will transfer that particular color to the brain. For this, we will use the 3 channel oscillator plugin built in FL Studio, called 3x Osc. This will also require a little color theory, which is very easy to understand through the aid of an image processing application such as the free and open source GIMP. So, you need to install a copy of GIMP, if you don’t already have one. If you open GIMP and select a color from a photo with the color picker or from the preset swatches, you will notice you can change it by tweaking the RGB or CMYK sliders. RGB stands for the Red, Green and Blue values that compose a color and CMYK stands for Cyan, Magenta, Yellow and Black, used for printed images. Electronic synth sounds are in RBG, so we need to note down the RGB values of the color we want to create, before adjusting the corresponding parameters on the 3x Osc plugin. Let’s suppose we want to create a green hue. Click on the foreground color selector in GIMP. A window titled “Change foreground color” will open. You can now create your color using the RGB sliders or use the eyedropper tool beside the HTML notation field to pick it from an image. You can also copy an HTML notation code from a website or another source and past it into the corresponding field. Any way you decide to create your color, you will notice you can read the different values for R (Red), G (Green) and B (Blue) on the right side of the sliders. You can select between two scales, one 0-255 and one 0-100. FL Studio synth adjusting knobs work with a 0-100 scale, so you have to select 0-100. Let’s suppose our color has the following values:

R= 24,6

G= 100

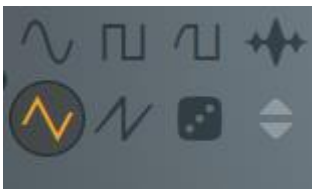
B= 65,1



GIMP color chooser

How do we transfer these RGB values to the 3x Osc synth?

We need to know what corresponds to color channels on the synth. The answer is: the waveforms. Clicking on the plugin in the step sequencer, you will notice the synth has three oscillators and you can select the waveform for each one.



The triangle waveform corresponds to R (Red)

Triangle waveform

The square waveform corresponds to G (Green)

Square waveform

The sine waveform corresponds to B (Blue)

Sine waveform

Starting from this basic principle, we can create any color.

Start giving all 3 oscillators the same pitch, setting the knob midway on the 24 position.

3x Osc

Notice the waveforms are not in RGB sequence, because the square wave (G) is first. This is for a reason. The first oscillator has no volume knob, so you have to put there the color channel with the 100 value, in this case the Green (G). But keep in mind, in order for the waveforms to mix properly, the values must be divided by half.

The other two oscillators have a volume knob, which must be set at 12 (24/2) for the second one (the triangle waveform, corresponding to Red) and 32 (65/2 without the decimals) for the third one (the sine waveform, corresponding to Blue). You will notice this corresponds to the RBG values of the green hue we created in GIMP. And this will make our synth green. You can now adjust the other synth parameters such as envelopes, cutoff, resonance, phaser and any other effect you wish to apply.

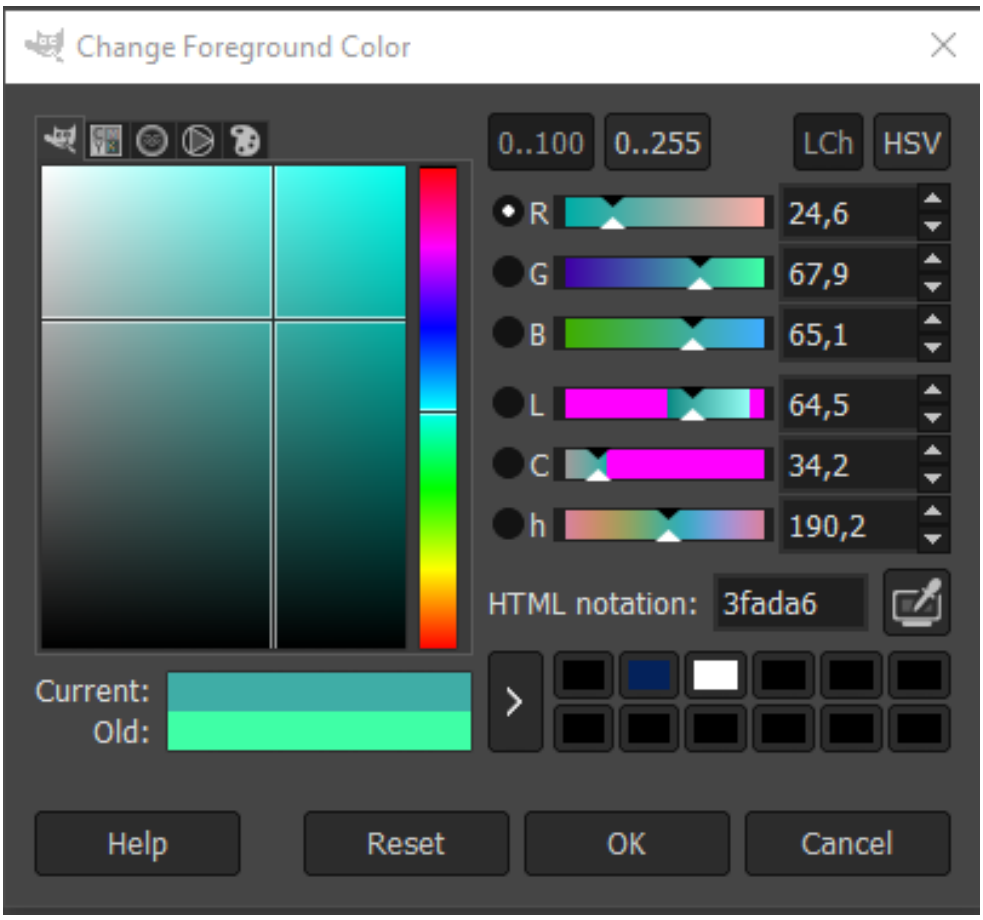
But this approach only works for colors with one of the RGB channels at max value of 100 (pop colors). What if we want to create a shade, a darker variant of our base color?

This requires some extra work and a little calculation. Let's suppose we want to create a darker shade of the same green color with the following values:

R= 24,6

G= 67,9

B= 65,1



GIMP color chooser

In order to translate these values to volume values for each waveform on the 3x Osc synth, we must apply a formula that translates them to a 0-100 scale, which means the 67,9 Green value must become 100 and the other values must be modified proportionally. This happens through a proportion:

67,9 : 100 = 24,6 : R

67,9 : 100 = 65,1 : B

Solved this way:

100 / 67,9 * 24,6 = 36,2

100 / 67,9 * 65,1 = 95,8

So the general formula is:

Waveform volume value= 100/ (highest color value) * (lower value)

Or, written in classic school style rather than computer programming style:

Waveform volume value= 100 : (highest value) x (lower value)

This way, we have the new following values:

R = 36,2

G = 100

B = 95,8

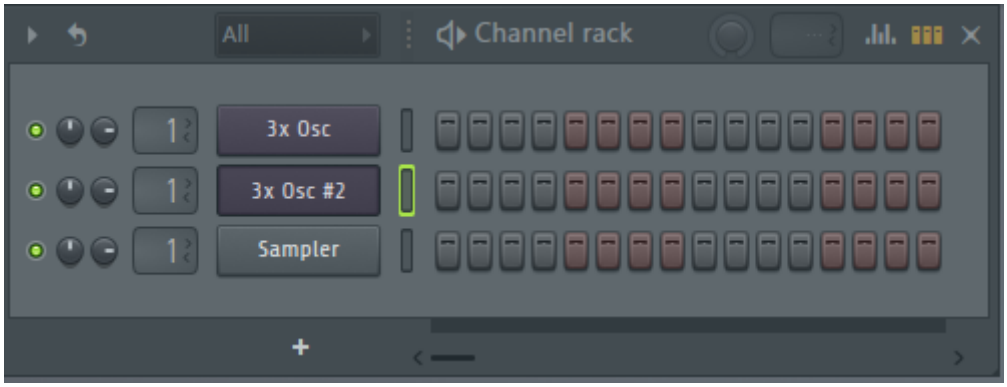
But this is no longer the color we designed, as it's easy to verify introducing these values in the color selector on GIMP.

So how do we get the color we want?

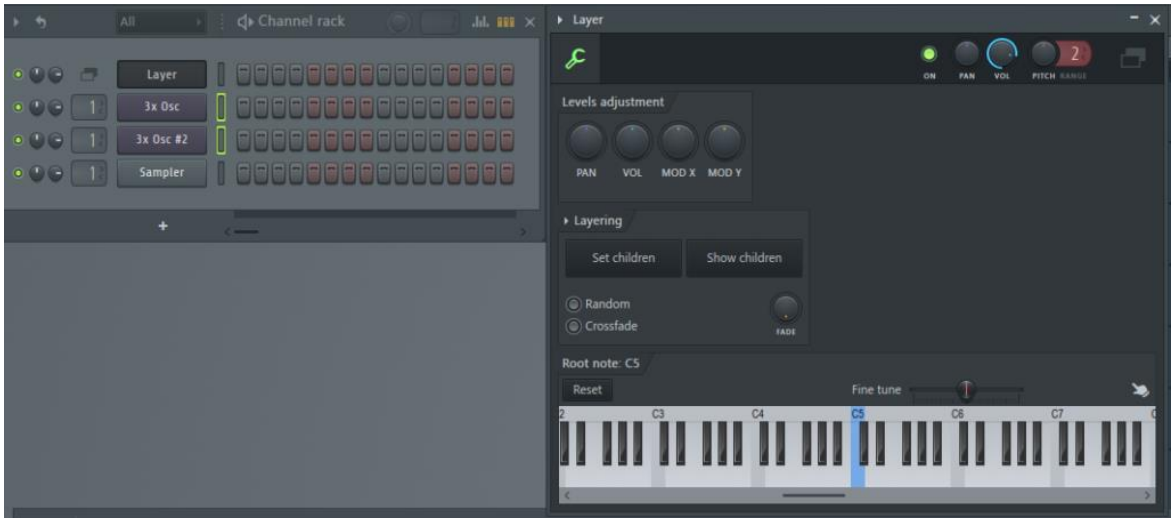
We must use another parameter in the GIMP color selector, the Value, which we can access by clicking on the HSV tab on top of the color sliders. The Value slider is the one on the bottom of the HSV (Hue, Saturation, Value) group of sliders below the RGB sliders. If we slide left to right this slider we notice the color becomes darker or lighter. For our green shade, the Value is set at 67,9. In order to translate this lightness value to our synth sound in FL Studio we must create a layer of synths. First, we create our color with these values translated to waveform values, once again divided by half, which means the triangle waveform has a value of 18 (half of R 36) and the sinewave 47 (half of B 95):

3x Osc

Now we must clone the synth on the step sequencer, add a layer and set the 2 synths as children.



Clone channel



Create layer

Now we must use the additional synth to create the Value parameter, which will set the color's lightness value. Actually, because we have translated the color values proportionally to the highest value set to 100, which makes our color lighter than intended, this procedure will set the darkness value of the color. This happens by subtracting from 100 the Value parameter we can read on the GIMP color selector:

$$100 - 67{,}9 = 32{,}1.$$

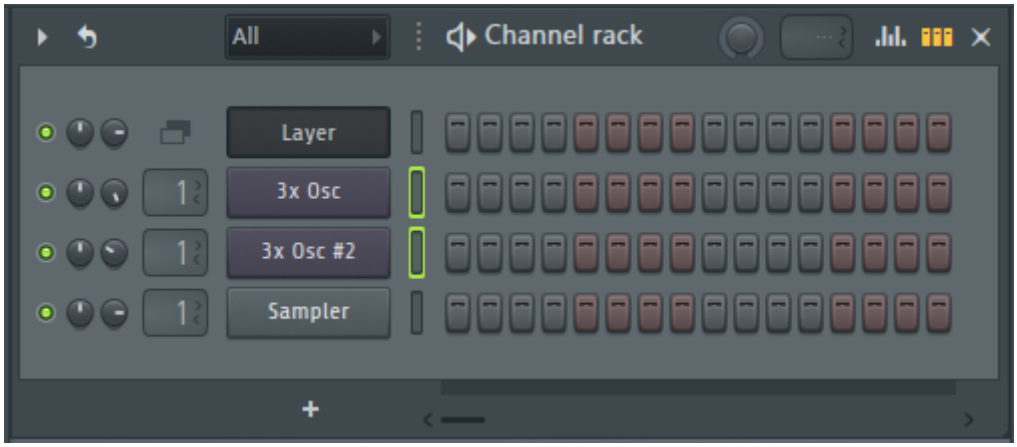
Thus our darkness value will be 32. Let's now select the clone #2 and invert polarity on all oscillators, by clicking on the polarity inversion icon.

Invert oscillators on cloned channel

Finally, let's transpose this synth one octave below, by clicking on the gear, then on the clawhammer, then right clicking on the C6 note on the keyboard.

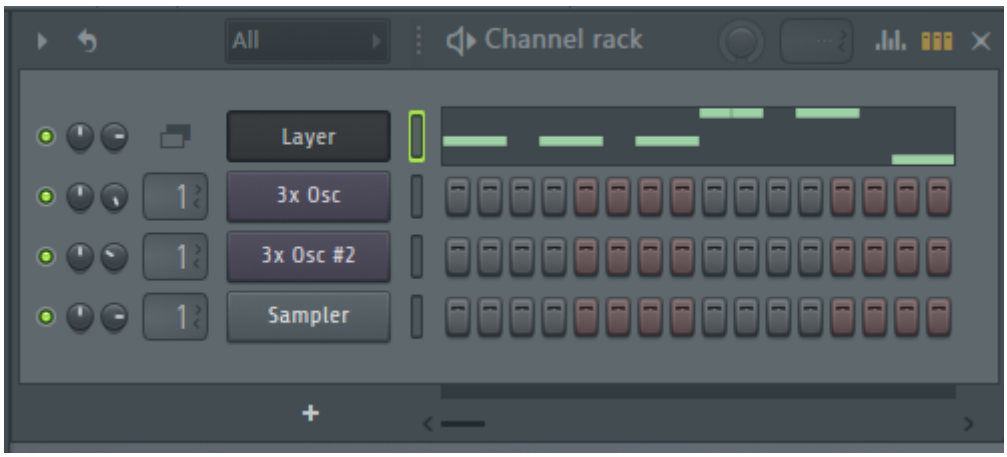
Transpose one octave below

This will make our darkness value. In order to give it the 32% value we want, we must turn up the volume to 100% on the main synth, and to 32% on clone #2.



Adjust volume on layer channels

This way, when we add notes to the layer channel, through a MIDI controller or clicking on the piano roll with a pointing device, we get a pattern which plays back a synth of the green shade color we have set at the beginning of this procedure.



Pattern

An alternate procedure could be setting only one oscillator on each plugin and create a layer with 6 plugins. 3 plugins for the color, 3 plugins one octave below inverted with a volume value corresponding to 100 – the Value parameter on the HSV GIMP sliders.

This procedure shows a basic principle which can be extended to all other synths capable of producing triangle, square and sine waves. I assume you have some knowledge of how to set an envelope, how to set any detuning, panning and other effects found on the 3x Osc or other plugins you may wish to apply. Or, anyway, that you are willing to experiment with what is visible and available on the DAW and just need this cognitive psychology information to complete your training. Keep in mind that what you get with this procedure is not the perfect aural correspondence to the color. The "color" is perceivable only as a "relative" sensation, when played in combination with synths of other colors forming a "palette". If you design a very dark color, almost black, it will only reveal as such when played together with "lighter hues" and in form of a slight "mirror" sensation, not totally corresponding to the equivalent of the visual sensation. So these techniques work better with color ranges that lie mostly in the midrange, in other words not too extreme.

If you want to speed up this process, you can try Color To Waveform, my free and open source program to generate, from a color you choose, an oscillator waveform for the 3x Osc or another synth provided with the option of loading custom waveforms.

Click here to go to the program page

or use the QR-Code

The result will be slightly different, compared to this procedure, because the program uses a 11.025Hz 8 bit WAV format, rather than the high resolution 16 or 32 bit format used by FL Studio. I plan to rewrite the code for higher resolution as soon as I can.

4.1 How about acoustic sounds?

The acoustic world tends to produce more "rounded" waveforms. Usually you don't hear a perfectly square or triangle wave in the real world. Yet different materials produce different colors. For what concerns music production, it's important to understand especially three:

- Wood – and most importantly paper, which is a wood derivate – produces a square-ish wave. So the output of a loudspeaker, which works with a vibrating paper membrane, produces soundwaves of a green-ish color
- Metal produces a triangle sort of soundwave. For instance, a guitar metal string will produce a red-ish colored sound.
- Most plastics produce a sine (round) sort of soundwave. So, for instance, a guitar nylon string will produce a blue-ish sound.

So when you degrade through a loudspeaker you get an image with colors rendered in a green tint. A way to balance the tint would be degrading/mastering the sounds three times, first with the naked speaker and then with the speaker wrapped in kitchen foil and saran wrap. For a blue sound image you can also build a loudspeaker with a plastic cup, but you need a very silent setting and a very sensitive microphone to record a very low quality output, so this goes against the point of this tutorial, which is to suggest techniques to produce a track easily with consumer equipment in an urban setting.

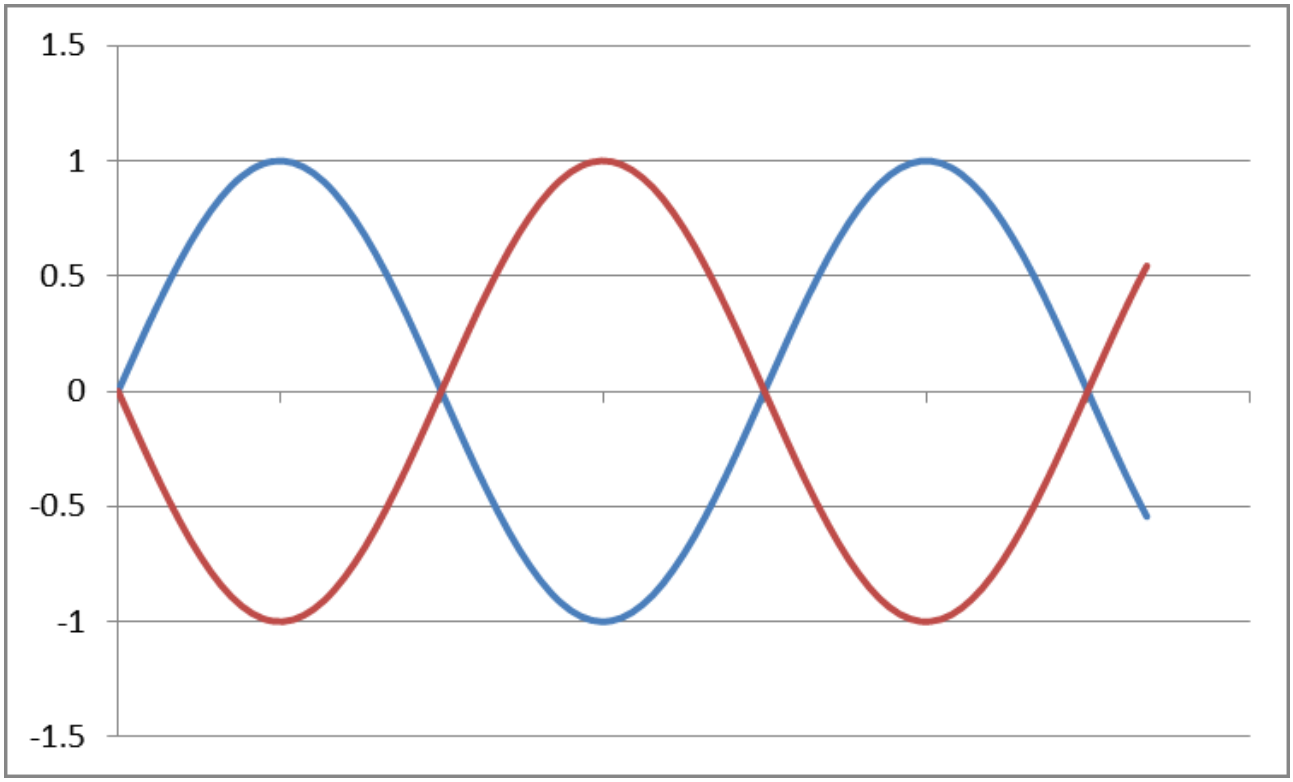
Since we have seen that metal guitar strings produce a red sound, you understand that 1960s style amplified clean electric guitar sounds have a fluorescent pink coloration. Now, it's common knowledge that guitar sounds transfer to the brain the ancestral image of human hair. The long-term effect on the brain of such exposure is receding hair and baldness, because when you listen to a very pleasing vocal performance accompanied by clean electric guitar sounds and you identify with the performer, in the long run your brain will tell your body to make your hair look pink, which is the color of your scalp if you are of Caucasian race (white). As a result, your hair will fall, revealing the scalp.

5 Taste and Smell

We've seen in the previous chapter how to create a synth of a particular color.

How about taste and smell?

This part is less precise compared to color, as it relies on a single basic feature of the soundwave whence these synesthetic features originate: the wave phase. In short, a positive phase corresponds to a sweet/acid/fresh taste and to a sweet/spicy/flowery smell, a negative phase corresponds to a salty/sour/bitter taste and a fresh smell. In the picture below, you can see an example of positive phase (the blue wave) and negative phase (the red wave).



Wave phase

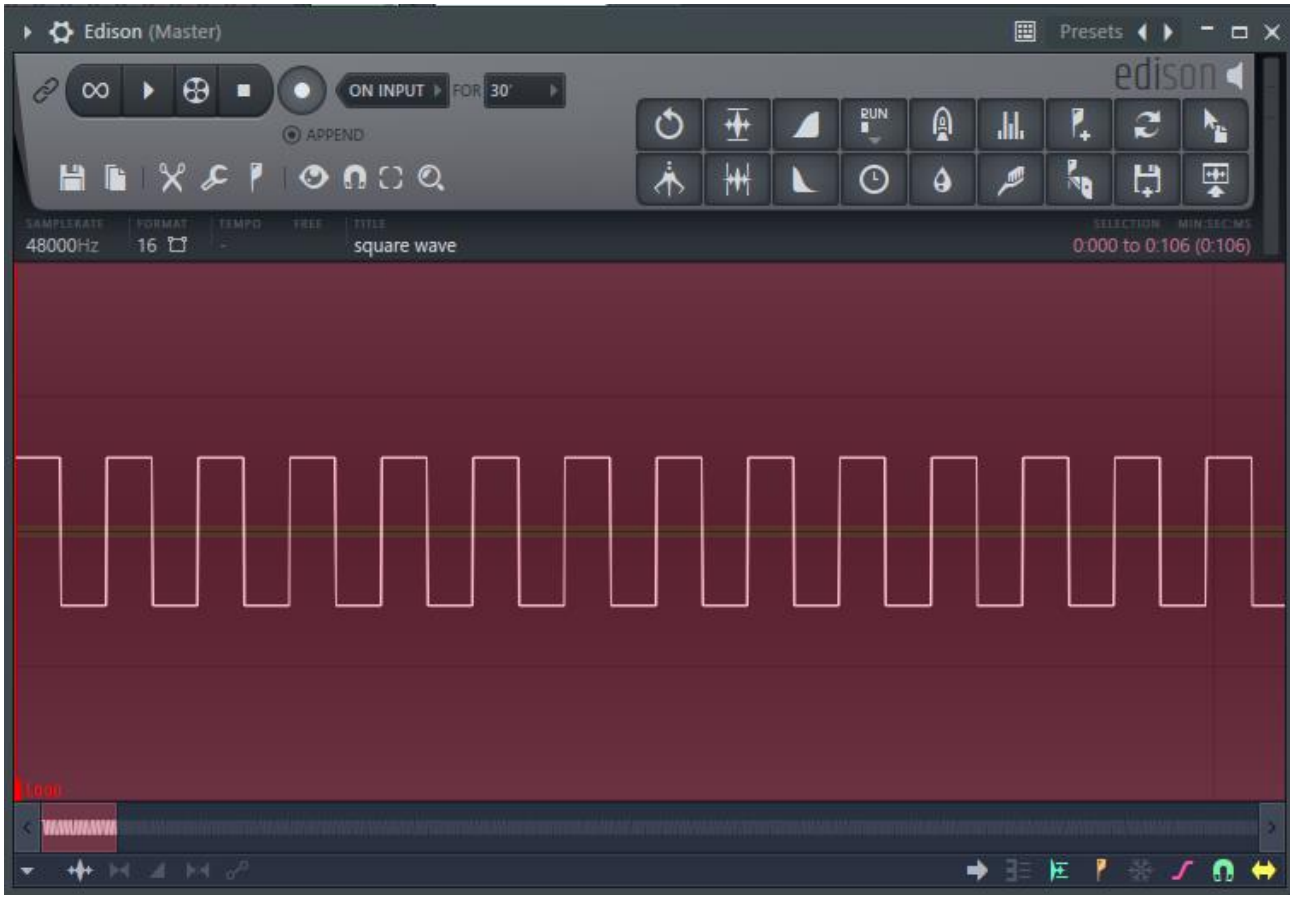
Live acoustic sounds have a positive phase, so they taste sweet and smell spicy/flowery. Sound recording through a microphone inverts the wave, just like a simple camera lens inverts the image when we take a photograph.

Recording inverts the sound wave

So, in order to invert the phase of a live acoustic sound all we need to do is record it. If we need, say, a sweet taste for a recorded acoustic sound we can invert again polarity once recorded. This is especially useful for vocals, since a recorded sound will create a mental image of what's performed, and an upside-down vocal track will create the mental image of a person singing upside down, which is obviously not desirable when it comes to transferring a pleasing or consistent image to the brain. Keep in mind certain systems, such as most standard soundcards working on recent versions of Microsoft Windows, invert again the recording, so you get a straight recording the first time. Most Android smartphones will record an inverted sound. In order to verify whether your recording system inverts polarity, you can play a test wave with a very recognizable phase, such as a loud square synth at a low frequency, and analyze the recording to determine whether the phase corresponds to the original electronic phase.

Square wave

For instance, if you create a sound selecting a square wave on the first oscillator and turning down to zero the volume on the other two (see picture above), play a long C3 note and save a sound file, you will come up with a sound wave looking like the one in the picture below.



Inversion test wave

If you play this sound and record it again with a microphone placed in front of the speaker, you should be able to tell, by analyzing the resulting waveform in the Edison sound editing tool that comes with FL Studio, whether the phase looks like the original electronic sound or it got rather inverted by the recording device.

Pure electronic sounds, such as the sound of an oscillator, usually have a negative phase, so they taste salty and smell fresh. In order to make them taste sweet, we must invert polarity.

The quality of the sweet taste, whether cherry-sweet or custard-sweet or chocolate-sweet depends on several sound features, such as color, texture, pitch, kind and quality of the sound and sound dynamics. I.e., a certain kind of compression, such as a maximization preset combined with a mid-low knee, will create a “glossy”, “smooth” and semi-compressible surface resembling that of certain fruits. Giving the synth a purple color could, for instance, convey the idea of a fresh plum. Smell is mostly localized in the low frequencies, below 250Hz, taste is localized in the mid-high frequencies. So if you want a sweet taste and a fresh smell for an electronic kick, you must invert the frequencies above 250Hz. But it depends a lot on all the other factors affecting the sound. Once again, this is not a precision science, and this is the part where artistry kicks in to replace pure theory and strictly technical considerations.

6 Temperature

We've seen how to give an electronic sound a precise color, how to make it taste and smell in a way that suits our project purposes, now let's see how to set the right temperature. This is an even less precise part, compared to the other three synesthetic sound features, and it requires some understanding of how a feeling of temperature is conveyed in visual art.

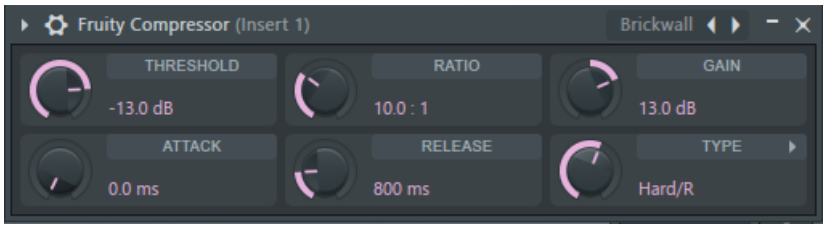
Have you noticed how heat creates ripples in the air, as you can see in these photos?

Jet taking off

Boiling water

This is more or less what unprocessed reverb does to a sound. It surrounds it with a "warm" halo. So this is a way to make your sound warm. You can send the reverb to a separate fader and turn down completely the 500 Hz to make it sheer.

If we compress the reverb heavily, with a high ratio, a low threshold and a hard knee, then turn all the way down the 500 Hz, we get a glossy ice "frosting" effect over our sound that will confer to it a low temperature.



Reverb compression

Reverb equalization

If you compress the sound itself, tweaking these parameters to adjust the amount of “freezing” you are seeking to achieve, you can “cool” it down to your needs. An expander will work the other way round, warming up your sound. Set a hard knee on the compressor to make the surface hard, set a soft knee to make the surface soft (useful to “cool down” hats and percussions to create a “fresh drink”). The lowest knee is the hardest, the highest knee is the softest. You understand these are simple extreme examples and you can experiment with everything that’s in the middle, to achieve the particular effect you have in mind.

7 How to Put Brand Logos in a Track

As well as synesthetic sensations of color, taste and smell, recorded sound can carry images, in the literal sense of pictures. This may sound complicated but it's pretty straightforward: when we record a sound, the microphone will record not only the sound source, but also physical information of the ambience where the sound is being played, such as material textures, colors, images found in the room or any other space where the sound is recorded. In other words, if we record ourselves clapping our hands in a small empty square neon lit room with the walls painted red, the handclap sound will register the sound dynamics (echoes, reverberations, etc.) of a small square room and will also transfer the color red to the brain. So what if we put a big brand logo on each wall? If the room is well lit and the sound is loud enough, those brand logos will "be" in that recorded sound. So this would be a way, degrading our tracks through a big speaker in a room painted with our logo. But, of course, this is not a very practical way. An easier way to do this would be using a smaller speaker inside a box padded with one or more prints of our logo. This can be done with each loop, but the result wouldn't be very pleasing, because the loops are better degraded in a dark box, to neutralize the ambience and bring out the sound coloration. What we need to do is use the logo branded box to record a reverb, which can be later EQd, compressed and mixed together with the dry loops (as explained in the "how to produce a track" chapter). In the olden days, you had to play the whole track in real time inside the box, these days you can use a "convolution reverb". A convolution reverb is a special kind of reverb that will recreate virtually a reverb ambience, starting from an "impulse" (a short, loud sound) recorded in that ambience. There's a good one bundled with FL Studio.

Convolution Reverb

The instructions generally say you have to record a loud noise – shooting a blank gun or popping a plastic balloon – inside the room you want to use as reverb ambience. But really, clapping your hands loud inside the room also works. If you want to use a box with prints of the brand logo on the inside walls, you can record the impulse through a pair of cellphone headphones plugged into the audio jack, because the typical laptop jack will carry microphone input and speaker output at the same time. So you can record the impulse in FL Studio through the following technique

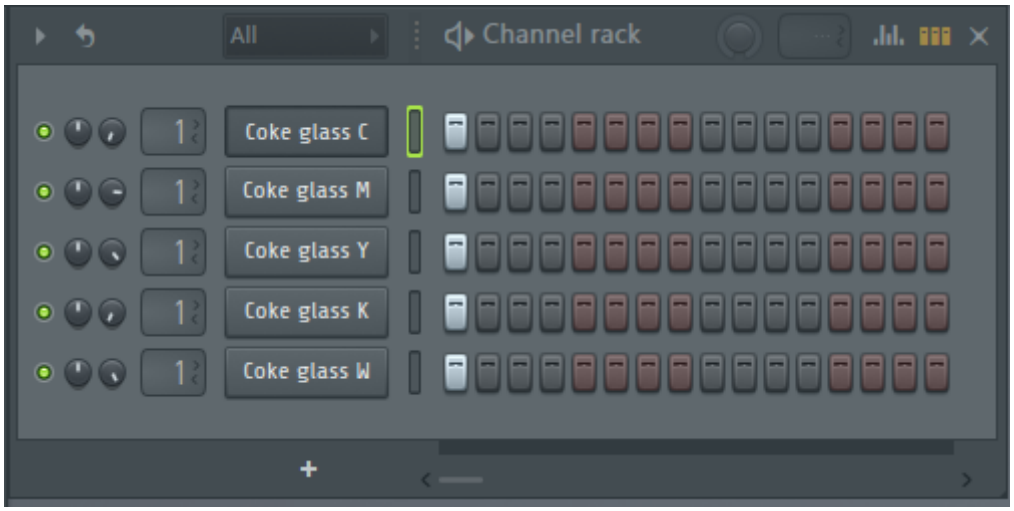
- place the earplugs on the bottom of the box
- hang the microphone midway in the box space
- cover the box with a translucid sheet such as an office kind plastic punched pocket folder
- light from above with a torch
- play a crisp short sound such as a snare on a FL Studio fader
- record the earplugs output back into the microphone input on a different FL Studio fader, disabling the master output to avoid feedback (select external audio only). Alternatively, you can record the output with another program, such as Audacity.
- Clean the noise, amplify, trim and save

This will be the impulse you will load in the convolution reverb and will recreate the ambience, size, shape, material texture of the box you used, as well as any images contained in it. You must now put this reverb on a separate fader, send the dry sound to the reverb fader, turn down the dry signal on the reverb. Then add effects to the reverb fader. Most of the times you want to make it transparent, by turning all the way down frequencies around 500Hz, and you want to roll-off annoying frequencies, turning halfway down 5000Hz and 1500Hz. At least for lo-fi sound produced with a cellphone. But it's really up to your taste.

For the demo track below, I've used a Coca-Cola glass with the logo embossed and I've made it red in CMYK Technicolor quadrichromy, which is, I've recorded 5 separate impulses lighting the glass with a colored light obtained by shining a torch through acetate sheets colored Cyan, Magenta and Yellow. For the Black channel, I just turned off the lights and recorded the impulse, then I recorded a White light impulse to be mixed in a proportion equal to 100 – K (Black) value.

Torch, colored acetates and glass

Then I've put all the impulses on separate channels in the step sequencer and gave each volume knob the CMYK values of a red hue I grabbed from a commercial Coca-Cola illustration, using the GIMP color picker.



CMYK impulses on the channel rack

Finally I saved the resulting pattern to a sound file, which I then loaded as an impulse into the convolution reverb. This way, I obtained a red reverb with the Coca-Cola logo embossed in glass.

Coke glass convolution reverb

I have used the reverb on the drum hats, which always describe to the brain the ancestral image of water – or a liquid anyway – and the percussions, which remind of soda bubbles. The hats and percussions were inverted to make them taste sweet, the reverb was heavily compressed with the knee to zero, to make the surface hard, and made transparent by rolling off entirely frequencies around 500Hz, to make it look like the reflex of the sound on a bubble surface. So when you listen to this track, the image of a sweet bubbly liquid with a red Coca-Cola logo

transfers to your brain. To be honest, this probably sounds rather like a warm PET plastic bottle of Coca-Cola, the way you find it on the grocery store shelf, rather than icy cool Coke inside a glass, because I couldn't spend enough time refining the sound, but it's enough to show you the principle. Usually the reverb must be inverted, in order to get the bubble effect, so you must plan carefully all the polarity inversions in order to create the image of an inverted reflex on a transparent hard surface with a sweet taste. Here's the result.

Click here or load the QR-Code on your phone to listen

This is just an example. Lots of combination of boxes, containers and prints can be tried, keeping in mind that a graphic kind of image, better if black on white background, transfers more effectively compared to a color image or a photo.

If you don't want to use a brand logo, you can reverb in colored boxes or boxes padded with paper painted with acrylic, printed with an inkjet or laser printer, other colored materials such as plastics, fabrics (but fabrics tend to absorb and dull reverb), etc. As explained, this can be done in CMYK, mixing impulses of each color and a White value of 100 – K (Black). An interesting experiment is degrading or creating a convolution reverb inside archive boxes sprayed with day-glo paint and lit enough to make them shine in the dark (once the box lid is closed and you place the recording equipment), such as those used for certain 1960s psychedelic rock tracks.

8 How to produce a lo-fi track

8.1 Method 1 – First degrade, then EQ

First degrade, then EQ.

- Score the patterns on a DAW. FL Studio is a good one.
- Export each loop of the score to two lossless, gapless files (WAV, FLAC), one for Left one for Right channel.
- Join all the resulting audio files in a long track, leaving several measures of silence at the beginning, to allow time to place the recording equipment
- Degrade the resulting long track with a smartphone and a Bluetooth speaker inside a fabric padded shoebox or archive box:
    - place the speaker on one side
    - place the phone in front of the speaker
    - close the box lid, bury under fabric coats for soundproofing (better inside a closet)
    - play the track at half volume to avoid recording distortion
    - record through a recording app on the smartphone set to hi-bitrate WAV file (at least 44.100 Hz 16 bit). ASR Recorder is a good one.
    - Degrade the bass subs with a subwoofer and the bass highs with the speaker inside the box.
    - Degrade each drum piece separately, so you can sequence the drum part with the degraded sounds.
    - Degrade the kick subs with a subwoofer and the kick highs with the speaker inside the box.
- Download the audio file from the smartphone
- Denoise the audio file
- Split the audio file in Left channel and Right channel part and save to two separate files
- Put the Left and Right audio file on two separate channels, sync them, pan Left all the way left and Right all the way right, save to a stereo audio file.
- Splice the stereo audio file to extract all the individual loops and save each loop to FLAC, WAV or other lossless, gapless format.
- Roll-off above 380 Hz the bass track degraded on the subwoofer. Roll-off below 380 Hz the bass track degraded on the tweeter and invert polarity. Mix together the two tracks. You will have to roll off 250 Hz on the final bass loop, in order to avoid distortion when the track is amplified.

- Roll-off above 250 Hz the kick degraded on the subwoofer. Roll-off below 250 Hz the kick degraded on the tweeter and invert polarity. Mix together the two samples.
- Sequence the drum parts with the degraded drum pieces.
- Sequence the degraded stereo loops.
- If the microphone inverts (see this section to check microphone inversion), invert polarity on all loops, leaving hats and percussions straight
- If the microphone does not invert, invert polarity on hats and percussions, leaving all loops straight
- Roll-off completely below 250Hz on all loops except kick and bass
- Turn down halfway 5000, 3000 and 1500 Hz on all loops except vocals and hats
- Turn down halfway 1500 Hz on hats
- Turn down halfway 650 Hz on all loops except drums
- Feed each loop to a separate reverb fader except hats
    - Turn all the way down dry signal on reverb
    - Roll-off below 250Hz on reverb
    - Compress heavily the reverb turning down knee to 0
    - Turn down halfway 5000 and 1500 Hz on reverb
    - Turn all the way down 500 Hz on reverb
    - Invert polarity on reverb
- Reverb hats and percussions separately
    - Turn all the way down dry signal on reverb
    - Roll-off below 250Hz on reverb
    - Compress heavily the reverb turning down knee to 0
    - Turn down halfway 5000 and 1500 Hz on reverb
    - Turn all the way down the way 500 Hz on reverb
    - Unlike the rest of the tracks, leave the reverb straight
- Export to mp3

8.2 Method 2 – First EQ, then degrade

- Score the patterns on a DAW. FL Studio is a good one.
- Roll-off completely below 250Hz on all tracks, except kick and bass

- Turn down halfway 5000, 3000 and 1500 Hz on all tracks except vocals and hats
- Turn down halfway 1500 Hz on hats
- Turn down halfway 650 Hz on all loops except drums
- Export each loop of the score to two lossless, gapless files (WAV, FLAC), one for Left one for Right channel
- Join all the resulting audio files in a long track, leaving several measures of silence at the beginning, to allow time to place the recording equipment
- Record the resulting long track with a smartphone and a Bluetooth speaker inside a fabric padded shoebox or archive box:
    - place the speaker on one side
    - place the phone in front of the speaker
    - close the box lid, bury under fabric coats for soundproofing (better inside a closet)
    - play the track at half volume to avoid recording distortion
    - record through a recording app on the smartphone set to hi-bitrate WAV file (at least 44.100 Hz 16 bit). ASR Recorder is a good one.
- Degrade the bass subs with a subwoofer and the bass highs with the speaker inside the box.
- Degrade each drum piece separately, so you can sequence the drum part with the degraded sounds.
- Degrade the kick subs with a subwoofer and the kick highs with the speaker inside the box.
- Download the audio file from the smartphone
- Denoise the audio file
- Split the audio file in Left channel and Right channel part and save to two separate files
- Put the Left and Right audio file on two separate channels, sync them, pan Left all the way left and Right all the way right, save to a stereo audio file.
- Splice the stereo audio file to extract all the individual loops and save each loop to FLAC, WAV or other lossless, gapless format.
- Roll-off above 380 Hz the bass track degraded on the subwoofer. Roll-off below 380 Hz the bass track degraded on the tweeter and invert polarity. Mix together the two tracks. You will have to roll off 250 Hz on the final bass loop, in order to avoid distortion when the track is amplified.

- Roll-off above 250 Hz the kick degraded on the subwoofer. Roll-off below 250 Hz the kick degraded on the tweeter. Mix together the two samples.
- Sequence the drum parts with the degraded drum pieces.
- Sequence the degraded stereo loops.
- If the microphone inverts (see this section to check microphone inversion), invert polarity on all loops, leaving hats and percussions straight.
- If the microphone does not invert, invert polarity on hats and percussions, leaving all loops straight.
- Feed each loop to a separate reverb fader except hats
    - Turn all the way down dry signal on reverb
    - Roll-off below 250Hz on reverb
    - Compress heavily the reverb turning down knee to 0
    - Turn down halfway 5000 and 1500 Hz on reverb
    - Turn all the way down 500 Hz on reverb
    - Invert polarity on reverb
- Reverb hats and percussions separately
    - Turn all the way down dry signal on reverb
    - Roll-off below 250Hz on reverb
    - Compress heavily the reverb turning down knee to 0
    - Turn down halfway 5000 and 1500 Hz on reverb
    - Turn all the way down the way 500 Hz on reverb
    - Unlike the rest of the tracks, leave the reverb straight
- Export to mp3

These procedures work with a bluetooth speaker and a smartphone, but you can also degrade through a microphone and speakers connected to a laptop or desktop computer, placing one speaker inside a fabric padded shoebox or archive box and recording directly into the DAW.

You can make your track more "hi-fi" through a trick. You can master/degrade the tracks following the procedure described above, only slowing down at half-speed the long track containing the pure electronic loops. Once you have the file downloaded on the computer from the phone, you can speed it up at double speed. This can be done in a number of ways inside FL Studio (with the Edison sound editor, with the Time Stretching feature in the channel rack) and will have the effect of making the sound more crisp and the ambience less "dead", as if it was recorded at a higher resolution in more lively ambience. Keep in mind, though, this will alter the

quality of synesthetic sensations (see “Synesthesia” section). The smell, for one, will most likely become “unpleasant”. Tracks at normal speed may sound a bit “dead” and “dark”, but will actually convey more “natural” sensations. All the polarity inversions required in this procedure also have a synesthetic purpose (see section).

8.3 Drum Sounds

If you want better results on the drums, you must degrade through a speaker each drumkit piece. Play each piece (kick, snare, hi-hat, open-hihat, tom, etc.) through a speaker and record the output through a microphone on a recording device. To get “big” drums, you must record the samples from bigger speakers, but you can also use the same bluetooth speaker + smartphone inside a soundproofed shoebox or archive box described above. If you are using speakers with a subwoofer, you can play the kick and snare original electronic sounds first on the subwoofer and record the output, then do the same on the tweeters, then mix together the resulting samples, rolling off all the way frequencies above 250Hz on the subwoofer recording and below 250Hz on the tweeter recording.

To make kick and snare sound louder, crisper and “punchier” you can use the built-in “BOOST” effect on FL Studio. Click on the drum sample channel in the channel rack, find the “Precomputed effects” section in the window (on the right side, below the “Time stretching” section), click on the icon on the right of the claw hammer (the second one, near the word “Precomputed”), turn up the “BOOST” knob. Optimal results usually are achieved if you turn up the knob halfway and enable the “CLIP” option below the knob. Because the degradation procedure tends to take “click” and “punch” off a drum sound (especially kick drums), most of the times, for kick sounds you will have to add some “click”, turning the POGO knob slightly counterclockwise (see picture below). Sometimes snares sound better with the POGO slightly turned clockwise.

Boost

By degrading an electronic drum sample you will get a much longer sound, which could sound "muddy", noisy and flat if not properly treated. To give the sample more dynamics you can apply an envelope to shorten it, add cutoff or other effects you may wish to apply.

Envelope

You can also use the Transient Processor plugin, which will make the drum dynamics more exciting and suitable for dance beats.

Transient Processor

Traditionally, a longer kick transient and a shorter snare transient are used for pop genres, the other way round for urban genres, but styles are constantly evolving so there's really no set rule. It may sound as a paradox, but with corporate muzak you really have to find your own beat,

unlike legitimate commercial music genres, which require you to understand deeply first, then be able to effectively deconstruct and later skillfully recreate the particular feel the beat is supposed to convey. In this sense, you may think as corporate sound bordering somehow with more “serious” genres, such as avant-garde, jazz and classical music, unlike mainstream and underground commercial music genres, which of course find inspiration in social rituals, shared values and collective imagery of youth urban cultures.

Once you have a separate sample for each drum piece, you can sequence them in a track on the Step Sequencer or by loading each sample into the FPC drum machine VST.

FPC Drum Machine

9 Sound Design

The theories and techniques described in this manual can be employed to produce original custom instrument and drum sounds. The following subchapters contain a few examples I created and a brief description of the procedures you can follow to create custom sounds.

9.1 Drum kits

These are drum kit (kick and snare) sounds I created from scratch. I used a vocoder to generate the kick and snare samples, with a short noise as a modulator and a layer of long synth bass notes as a carrier. Most of the times the short noise is me tapping my finger on an object, such as a laundry detergent bottle or a grocery store food package. The carrier was a layer of notes for the kick, a layer of notes mixed with noise for the snare. The carrier long note always has a pink coloration, because percussive rhytmical sounds describe to the brain the ancestral image of human skin, so I translated skintone hues to synth sounds to create these kits. A negative phase of the carrier (salty) will create a woman's skin, a positive phase (sweet) will correspond to a man's skin, so you will have to carefully plan the correct polarity inversions in order to dedicate your track to the right gender, according to your sexual orientation. Please refer to the "Color" chapter of this manual for instructions on how to control the color of a synth sound and to the "Synesthesia" chapter for more info about synesthesia. If you create your own drum sounds, remember to select a natural human skintone color or you'll end up creating "aliens".

After creating the electronic kick and snare samples, I had to degrade them through a subwoofer and a tweeter (see "Drum Sounds" for instructions), mix together the resulting samples, apply effects (boost, pogo, EQ) and perform the necessary polarity inversions to confer to them the desired synesthetic features.

Drum Kit 012 – Drum Kit 013 – Drum Kit 014 – Drum Kit 015 – Drum Kit 016 – Drum Kit 017

9.2 Presets

9.2.1 City Town Country

This DirectWave instrument is composed of synth presets created from scratch with LMMS and Audacity. It contains a bass, a short synth and a synth pad created converting the words "City", "Town" and "Country" to colors, the colors to waveforms and then loading the waveforms into the Triple Oscillator synth built in LMMS. Then the words were directly converted to waveforms, loaded into the Triple Oscillator, and the resulting synth presets were fed to a vocoder as modulators, while the "colored" presets were used as carriers, to generate the samples to assemble the instrument. Each word was converted to a melody, which was used as a starting point to compose the corresponding pattern for the demo track.

The conversion between text, colors, waveforms and melodies was carried out employing the free and open source programs – Text to Color, Color to Waveform, Text to Waveform, and Text to Melody – found on my website.

9.2.1.1 Direct Wave + FL Studio demo project

Download

9.2.1.2 SoundFont

Download

9.2.2 Soda Can Piano

This DirectWave instrument contains a short synth preset resembling an electric piano.

It was created from scratch with FL Studio starting from a sample of a chopstick hitting a soda can. A looped long note was obtained by isolating a small portion of the sample where the waveform patterns starts repeating, to create a sound with an aluminum “feel”. The long note was then fed to a vocoder as a modulator, using a “red colored” long synth sound (made with FL Studio 3x Osc) as a carrier.

The carrier synth color was created according to the instructions found in the “color” chapter.

Download

Use the QR-Code below to download these sounds from my website and listen to the demo track.

9.3 Download my programs

Text to Color

Color to Waveform

Text to Waveform

Text to Melody