

Simen Støen

“From voice-memo to mix-ready song”

How to utilize reference tracks to improve your productions

Bachelor's thesis in Music Technology

Supervisor: Daniel Buner Formo

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Norwegian University of Science and Technology
Faculty of Humanities
Department of Music

Sammendrag

I denne bacheloroppgaven vil jeg utforske hvordan bruken av referanselåter kan være en verdifull ressurs i arbeidet med å videreutvikle sine ferdigheter som produsent. Basert på videoklipp, intervjuer med ledende produsenter og relevant litteratur, kombinert med personlige erfaringer, ønsker jeg å belyse hvordan man kan bruke referanselåter på en effektiv måte. Dette innebærer blant annet hvordan man kan identifisere en god referanselåt, og hvordan man kan bruke funnene man gjør i analysen av låtene i ens egne produksjoner. Jeg vil også vise eksempler på hvordan jeg selv har brukt fremgangsmåtene som blir presentert for å finne og utvikle flere aspekter av mine egne produksjoner. Til slutt vil jeg diskutere hvordan også låtskriving påvirker produksjonsprosessen, hvordan referanselåter også kan oppleves som demotiverende om de brukes ubevisst, og hva jeg selv har lært av denne prosessen.

Abstract

In this bachelor's thesis I will explore how reference tracks can be a valuable asset in the development of a producer's skill set. Based on videos, interviews with leading producers and relevant literature, combined with my personal experience, I seek to shed a light on how one can use reference tracks effectively. This includes among other things what to look for in such a track, and how one can utilize the findings of their analysis in one's own productions. I will also give examples on how I have used the methods provided myself to find aspects of my own productions that I have been able to develop further. Lastly, I will discuss how songwriting also impacts the production process, how reference tracks also can be experienced as de-motivating if used unconsciously, and what I have learned from this process.

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1. Introduction

Since EDM's emergence in the 1980's underground and rave scene, Electronic Dance Music has evolved into getting mainstream acceptance and it has been an integral part of charts and hitlists for more than a decade. (Alvarado, 2015) Groundbreaking hits, combining EDM productions and pop-inspired vocals, such as David Guetta and Sia's "*Titanium*", released in 2012, and Avicii and Aloe Blacc's "*Wake Me Up*", released in 2013, has racked up a total of over 2,6 billion streams on Spotify alone.¹

Avicii's first EDM single featuring a topline inspired by the conventions of pop, "*Seek Bromance*", initially released in 2010 under the old artist name "Tim Berg", was in fact the track that opened my eyes for EDM in the first place. The combination of a catchy vocal and lyrics more commonly found in mainstream pop, and an energetic production built around it, lit a spark inside me. I simply wanted to be able to recreate this sensational feeling of a song that you could both sing along to AND dance to. However, being 11 years old at the time I had no idea of what neither a rave nor a big festival looked like, but the vibe of the song was instantly recognizable and resonated well with both me and my peers.

At this time I played the guitar in a blues-rock band, and although that was fun and an integral part of my seasoning as a musician and songwriter, I realized the second time we were in the studio that to me it was just as fun watching the engineer do his "magic", both setting up the microphones and mixing the tracks afterwards, as being part of the band. I simply wanted to be able to control the direction the music took myself.

By now, almost 12 years after the release of "*Seek Bromance*", I have spent countless hours in my home studio and in the facilities I have been fortunate to have access to over the years. During those years I have bumped into more seasoned producers and professionals, making a living in the music industry. The tip I have received the most, and that "always" has been regarded as the best tip by the professionals themselves is:

¹ **David Guetta - Titanium (feat. Sia)**

1,117 billion streams at 25.04.2022

– retrieved from the single's Spotify page

Avicii - Wake Me Up

1,554. billion streams at 25.04.2022

– retrieved from the single's Spotify page

“Use reference tracks, analyze other tracks and try to recreate them or the vibe they are giving you. Over time your tracks will close in on them.”

The problem was just that I did simply not know where to start when I was first told that. When you are trying to learn “everything” at the same time, and the comparisons are somewhat “unfair” (more about that in the Method and Discussion chapters), it can be truly overwhelming for a young, aspiring producer to use reference tracks. Although I would not consider myself as neither a professional nor a master of my craft, I have spent enough hours in a studio to feel that by now I have a better foundation for using this valuable resource to its’ full extent. Frankly, I think this thesis is something that might have been helpful if I had read it five years ago.

Using literature and videos with respected producers and audio professionals, combined with some of my personal experience, as well as technical data from a representative reference track, I will present, not a definitive answer, but a suggestion and an introduction to the approach of using reference tracks systematically to improve your own productions. My working thesis has therefore been:

What, and how, can I learn from reference tracks made by experienced professional producers, so that my own tracks are closer to fulfilling their potential?

Disclaimer:

I do not claim to have found “the” solution that will make you a good producer. I do however hope, and believe, that this thesis can be an interesting read. This paper is intended as a suggestion on one of the ways an aspiring producer can utilize the tools and methods available for their own personal development. There will (certainly) be details and aspects of both using reference tracks and music production in general, that I do not understand to its full extent, but this thesis is the result of the past five months of testing different approaches, finding a method and then put my findings into practice.

2. Theory

2.1. What is EDM?

EDM – Electronic Dance Music

To find a short definition of EDM turned out to be more complicated than I first anticipated. Due to the vast amount of different sub-genres with entirely different characteristics it has become apparent that EDM is a superordinate, similar to both rock, jazz and other genres, incorporating a lot of different styles in a single “box”. The book *Electronic Music* (Collins et al. 2013), however, has pointed out a few common traits that we can find in most music that is labeled as Electronic Dance Music.

- The presence of multiple complementary layers, some co-dependent in creating aggregate effects, most capable of being independently dropped in and out.
- Prominent bass, careful EQing of highs, mids, and lows.
- Percussion parts, from synthesized instruments to sampled loops such as breakbeats.
- Groove, from tight sixteenth note grids to looser swing patterns (the latter naturally working better at mid to slow tempi).
- A variable role for melody and harmony, from no deliberate harmonic or melodic associations (material as texture) to explicit chord sequences and riffs.
- The status of vocals, from instrumental tracks, through vocal cut-ups and vocoded manipulations, to diva vocals and MCing.
- Dance-orientation, leading to extended workouts, establishing substantial and addictive repetition sufficient to continually energize dancefloors and assist DJ set construction. (Collins et al., 2013, 114)

As stated previously it is quite hard to establish a rigid framework to put EDM into, but especially the first two points about layering and prominent bass, as well as the last one, dance-orientation, are in my opinion defining for just about every track that is considered EDM.



Ishkurs Guide to Electronic Music – An overview of the various sub-genres of EDM (Ishkur, 2019)

When did EDM enter the Pop scene?

It is also difficult to pinpoint when EDM entered the pop scene, however the shift started when the second last point from the previous section, the status of vocals, became more important. The most relevant place to find a more specific answer is to look at when EDM music started to appear on the world's most influential mainstream hitlists, such as Billboard Hot 100 (USA) and the UK Singles Chart. Some of the most influential songs that helped EDM propel into mainstream pop are (streams counted the 18th of May 2022):

David Guetta – *When Love Takes Over (feat. Kelly Rowland)* (Released the 21st of April, 2009)

- Reached 1st place on the UK Singles Chart as well as 1st place in Italy, European Hot 100, Ireland and Switzerland.
- Guetta's mainstream breakthrough. **295 million** streams

Tim Berg – *Seek Bromance – Avicii Vocal Edit* (Released the 17th of October 2010.)

- Reached 13th place on the UK Singles Chart, 4th in Norway, 5th in Netherlands, 12th in France and 5th in Denmark.
- Avicii's first single with a Pop topline. (initially released before he changed his name to Avicii). **142 million** streams.

Rihanna & Calvin Harris – *We Found Love* (Released the 22nd of September, 2011.)

- Reached 1st place in Belgium, Canada, France, Germany, UK, USA and many other countries.
- Considered to be one of the first massive EDM hits that dominated mainstream pop charts. **876 million** streams.

Avicii – *Levels* (Released the 28th of October, 2011.)

- Reached 1st place in Sweden and Norway, 4th place on the UK Singles Chart and 60th place on Billboard Hot 100.
- Avicii's definitive breakthrough. **619 million** streams.

David Guetta – *Titanium (feat. Sia)* (Released the 9th of December, 2011.)

- Reached 1st place on the UK Singles Chart and 7th on Billboard Hot 100.
- **1,130 billion (!)** streams.

Based on the success of these EDM-tracks on mainstream pop charts, I will claim that EDM entered the mainstream pop scene approximately in the end of the 2000's. (West, 2019)

2.2 Characteristics of EDM tracks

As I mentioned initially, according to professional producers, one of the most efficient ways to improve your songs, both regarding the general songwriting and production, and the further stages such as mixing and mastering, is using **reference tracks**. In short, reference tracks are songs that have specific qualities you strive for in one, or several, aspects of the process of making and finalizing a song. (In The Mix, 2018) If we look back at characteristics that define EDM, one can observe that most of these questions are related to those.

The qualities that could be interesting to pay attention might be the following (with accompanying relevant questions):

- **The structure and flow of the track**

How does the track build tension and release? Is there a soft chorus before the final drop to enhance the climax? How long does it take before the chorus or drop is introduced?

- **The overall vibe it gives you as a listener**

Which instruments are used? Does the main lead have many layers or is it a simple layer such as a whistle or a hum? Is the climax a chorus that make you sing along, or is the main part a melodic or rhythmic segment?

- **The use of drums and rhythm**

Is there a 4/4 kick drum or is the kick playing in a specific rhythm? Is the snare placed on the second and fourth beat, are the hihats playing a steady 16th note throughout the chorus or is the shaker playing offbeat?

- **The spectral balance of the track**

How much bass, mids and highs do the track contain? Does it sound powerful, weak or balanced?

- **The energy it gives you, and the dynamics of the track**

How dynamic is the track? Is there a big difference in perceived loudness between the verse and the drop? How compressed does it sound?

Using these questions one can begin to analyze the reference tracks using the methods that will be presented later in this paper. Overall, the most important feature of a reference track is to give you a benchmark, or an end goal, to aim for. That said, the objective of a reference track is virtually never to be copied, however it can be a very useful guideline if you're intending to go in a specific direction with your own song.

Another important thing to remember when using reference tracks is that you don't need to use all the features throughout the full length of a single, specific, reference track. Often one can realize that maybe "Song A" has amazing percussion, utilizing the entire stereo field, "Song B" has a powerful sounding main lead, and "Song C" has a mix that sounds crystal clear whilst it makes the walls rumble when played on a speaker system with a subwoofer. Therefore, using several different tracks with various, yet specific, qualities can be very beneficial.

2.3 Structure and length

A crucial element of EDM is named "Drop". It can also be referred to as a "Post-Chorus", however the most commonly used name in both EDM and Pop is "Drop", and I will therefore stick to this terminology throughout this thesis. The drop is in short, a high intensity section of the track containing the song's hook and other crucial elements to make it stand out and accomplish what all EDM tracks aim for, to make people dance. When EDM first entered the pop scene this was not a common feature, as it essentially took the place of the traditional pop chorus as the most important element of the song. This meant that the structure of a typical pop song was challenged, meanwhile traditional EDM drops were shortened. The book *Switched on Pop* (Sloan & Harding, 2019) have therefore named this feature a "Pop drop". They elaborate further on the "pop drop", using *We Found Love*, by Calvin Harris and Rihanna as an example:

“Rihanna and Calvin Harris ushered in the first major revision to conventional pop form in decades when they inserted a new musical section borrowed from electronic dance music (EDM) into their hit “We Found Love”... The song ratchets up intensity like a rollercoaster by migrating the “build and drop” approach of EDM into pop. The sections are two sides of the same coin: the build generates pent-up energy and the drop releases it, all but requiring listeners to bounce up and down in fifteen seconds of ecstatic joy. It is hard to say whether the pop drop is a permanent change, or a passing fad, but the result in “We Found Love” is a song that generates a feeling of ecstatic liberation not only through a pounding beat and celebratory lyrics, but also through its denial of formal expectation.” (Harding et al., 2020)

The tendency the past decades is that tracks, especially in the pop segment, have become shorter and shorter due to the excessive amount of music available. This is said to have decreased the listener’s attention span. It is generally advised to reach the Chorus or Drop within a minute after the song’s start, meeting the modern audience’s requirement of getting swifter to “the point” of the track and keeping their attention longer.

This was a major step away from EDM’s background of songs rarely being less than 5 minutes long, with excessive intros and outros to help the DJ transition between the songs fluently. Between 2014 and 2015, 75% of all songs on Billboard Hot 100 was between 2 minutes and 30 seconds, and 4 minutes long. (Tough, 2017, p. 35) Therefore, to be able to fit the format of pop and radio, DJ’s and producers began making “radio edits” of their songs. As EDM gradually became a mainstream genre with its’ pop infusion, the version that is released on streaming platforms and radio now is what earlier on was called a “radio edit”. However, producers, and especially those who are artists/DJ’s as well, make “extended edits” that often have an 8, 16 or 32 bar intro and outro to be able to fit the tracks into a DJ set.

2.4. Genre-defining instruments

The list of instruments that has defined and inspired EDM is long, however one can narrow them down to the most important ones by looking at the rate of which they are used in the most successful songs. Another feature of many EDM tracks that have found their way into pop charts is that they use real instruments such as grand pianos and guitars, in addition to the signature electronic soundscape. A list of instruments commonly found in EDM can be found in Appendix A.

2.5. Dynamics, spectral balance and loudness

EDM is traditionally a genre with a low dynamic range, materialized in loud, heavily compressed tracks. Intended to make heads bob and feet move, EDM is often played loudly at clubs, festivals, and parties. Even though these venues usually have sound systems capable of playing tracks with a high dynamic range at a high volume, the DJs and promoters working in the scene quickly realized that louder concerts often left the audience with the impression of a more exciting show.

This started what seemed to be a never-ending campaign for tracks with a higher integrated and perceived loudness. While I will not cover the “loudness war” debate in this paper, it’s not negligible that the stride for louder and louder tracks has shaped EDM’s signature sound of rumbling bass combined with screaming high-end. Although Spotify and other streaming services has started to normalize tracks to a specific LUFS² level (Spotify, 2022) to combat the search for ever-more loudness, the characteristics of a very compressed and limited track has retained in virtually all sub-genres of EDM.

²

LUFS, or LKFS, is a k-weighted dB-scale, which is specifically tailored to the human ear’s response to different frequencies (ITU-R, 2017)

3. Method

3.1 Approach

In this chapter I will present the methods I have used to attempt to build a foundation that I can base my analysis of reference tracks on. Firstly, I will go through the template I have used to analyze the different tracks' production. Further on I shall present some of the findings, similarities and patterns I have found using this method.

The approach I am using for this analysis is one I have adapted from Flow Prod's YouTube video "*The Producer's Guide To Analysing Songs*". (Flow Prod, 2020)

His method is relatively simple; however, I find that it gives a good overview of both the track's structure, the instrumentation, and the production in general.

His approach has these steps:

1. Import the reference track into your DAW – Digital Audio Workstation.
2. Find the BPM, either using a site like songbpm.com or tunebat.com, or manually, for instance using the "tap tempo"-function in your DAW.
3. Add markers to the different parts of the track at the adjacent bars. This could be "verse", "chorus", "drop" etc. Other relevant changes can also be written here. Color code the different parts to highlight the changes for extra clarity.
4. Listen through the song and write down the different instruments, e.g. "guitar", "bass", "synth", "drums", used in the chosen track.
5. Make empty MIDI-clips for each instrument, name and color code them accordingly. Then place the clips where the different instruments play throughout the track.
6. If there are certain trademarks used in the track, make separate MIDI-clips to highlight them specifically.
7. Listen for specific production techniques. For example, if a lead is gradually introduced before a drop, you can for instance make a separate clip named "Filtered Lead".

Following these steps one can relatively quickly get a good starting point for further analysis and critical listening. In addition to using this method for analyzing the productions, I have also used two free VST plugins (software to be used within a DAW), inserted to the master channel of my DAW, to acquire an understanding of both the spectral balance and the loudness of the tracks. The tools I have used is Voxengo SPAN and Youlean Loudness Meter 2. SPAN is a spectrum analyzer, displaying the spectral information of an audio source, and the Youlean Loudness Meter is a loudness meter, displaying various information regarding the loudness of an audio source.

The reason why I use these tools is to make sure that the spectral balance and loudness of my own track is comparable to the reference track. Not to necessarily “copy” it, but to ensure a “fairer” comparison between the tracks, and at the same time have something tangible to aim for. This is the main reason why I have selected a reference track that contain similar elements and focal points in the production as mine, making the core of the track transferable to my own songs.

While I will not cover the topics of neither mixing or mastering in this thesis, I strongly encourage beginner and intermediate producers to use these tools, or similar ones, to get an indication of how one can balance out the differences between song A and B. Most importantly, with regards to the loudness meter, to make it easier to take decisions based on how it sounds, not how loud it is. The mentioned loudness meter and spectral analyzer are excellent instruments to accomplish it. Appendix B describes how this can be done.

3.2. Analyzing a reference track

In the following analysis I will examine the features of a reference track from an artist duo who have experienced commercial success and praise for their work. It will be a relatively thorough walk-through of prominent features of the Swedish production duo NOTD's track *I Wanna Know*, featuring vocals from American singer Bea Miller.

Although my intention was to include more of the numerous analyses I have made this spring of different songs, and make several tracks myself, I quickly realized that from my perspective it would be more beneficial to dive deep into a specific reference track, to display how a single song could be broken down, in this paper. This is simply because of the already quite large extent of this thesis; however, I believe that this analysis showcases the essential steps of the process in a representable way.

I would however like to repeat the previously mentioned notion regarding the possibility of using several reference tracks, finding inspiration from different elements of those tracks, and then try to put together a combination of those features in your own original track. Also, if one use different songs as reference tracks, one might easier omit the possibility of making an exact replica of a single track.

3.3. NOTD – *I Wanna Know* ft. Bea Miller

Key: F# Major **BPM:** 120 **Length:** 3 minutes and 17 seconds

A. Song info and background

I Wanna Know is a dance pop track made by NOTD featuring vocals from Bea Miller. It was written by Shy Martin (Sara Hjellström), Shy Nodi (Nirob Islam), Jason Gill and NOTD (Tobias Danielsson and Samuel Brandt). The song was mixed by NOTD and the Mastering Engineer was Kevin Grainger. Since the single was released on the 16th of March 2018, it has accumulated over 295 million plays on Spotify.³ *I Wanna Know* has also received Platinum plaques in both Canada, Sweden, USA and Australia.

In my opinion this song is a good example of a successful dance pop track that combines what essentially is an EDM production with a pop topline from a popular vocalist. Personally, it is also very relevant for my own productions as my background as a guitarist makes NOTD's use of guitar especially interesting, bringing a human touch into a soundscape and genre that has been accused of sounding both digital and robotic.

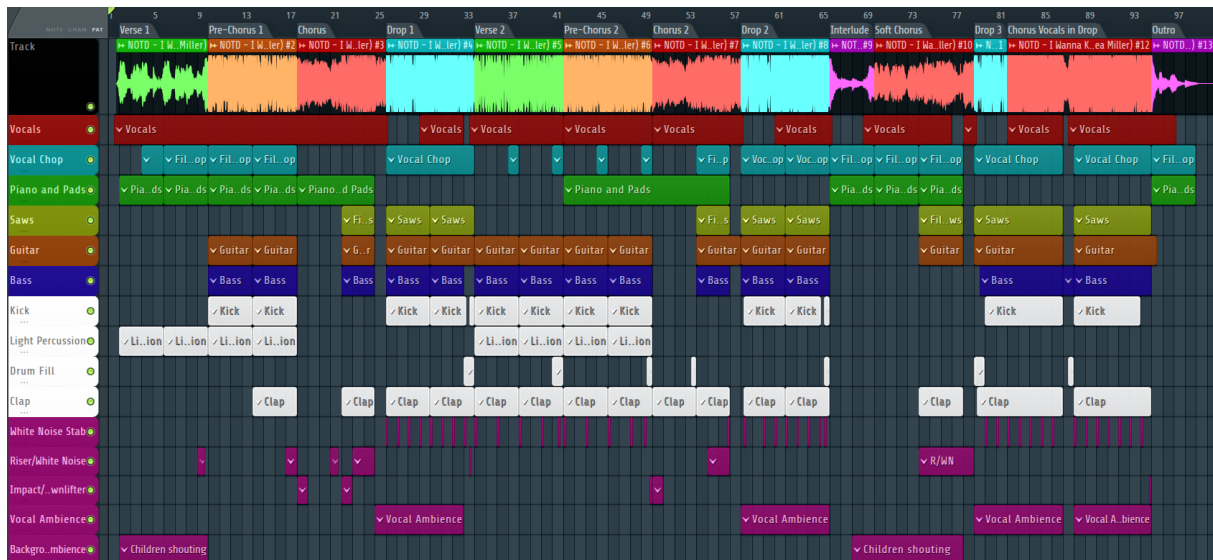
B. Structure and arrangement

The track is three minutes and 17 seconds long. The structure of the song is a typical “pop drop” arrangement consisting of:

Verse – Pre-Chorus – Chorus – Drop – Verse – Pre-Chorus – Chorus – Drop – Interlude – Soft Chorus/Bridge – Drop – Drop with Chorus Vocals – Outro

For practical reasons we can name the Verse “A”, the Pre-Chorus “B”, the Chorus “C” and the Drop “D”. This gives us the slightly simplified structure ABCD-ABCD-CDD. Like we discussed in the Theory section the track increases swiftly in intensity and progresses quickly into a chorus after a mere 34 seconds. The drop starts at 0:50.

³ Retrieved from the single's Spotify page.



Screenshot of the project file in FL Studio where I have analyzed both the structure and the instrumentation of I Wanna Know.

C. Instrumentation

The instrumentation of I Wanna Know is quite typical for a dance pop track, with perhaps the excessive use of guitar and vocal chops as the instruments that makes the track stand out from the rest. The main instruments used in the track are:

Vocals by Bea Miller

- Clean vocals with reverb and delay

Vocal chops

- Heavily processed vocal samples that are chopped up and pitch-manipulated

Electric Guitar

- Distorted electric guitar with a lot of reverb and delay

Piano

- A large sounding piano with a lot of reverb

Piano Pad

- A piano with a swelling effect. Recorded with excessive amounts of reverb, then reversed.

Bass Synth

- Several layers of synth bass, ranging from the sub-frequencies to the lower mids

Bass (emulating an electric bass)

- A distorted electric bass, played with a slap technique

Drums

- A pounding kick, several claps with different intensities as well as various percussion and toms

FX

- White noise (actually used as a percussion element in this particular track), risers, downlifters, atmosphere and ambience to increase tension and release (dynamics)

D. Key elements of the production

In my opinion *I Wanna Know* is a good example of a modern EDM/Pop production, because it reflects many of the points that were highlighted in Schedel's list of EDM characteristics. The track is packed with different elements that is introduced and removed as the song progresses, and the drop is dense with many elements playing at the same time. However, all these separate parts of the track are tied together by a solid mix, as well as clever, yet relatively simple, production techniques. In my opinion there are two elements, and the extensive use of those, combined with some clever production techniques, that stand out in this production.

Vocal Chops

The vocal chops, which is the main lead of the track, is made from small snippets of a vocal sample, which is pitched up two octaves during most of the track, and three octaves in the outro. Then it is heavily processed as shown in NOTD's own walkthrough of the track. (NOTD, 2018) The lead is introduced very early, playing the hook melody, where it is kept in the background using low-pass filters that open and close during the entire first verse to enhance the dynamics of the track. It is also playing, although less prominently, during the second verse.

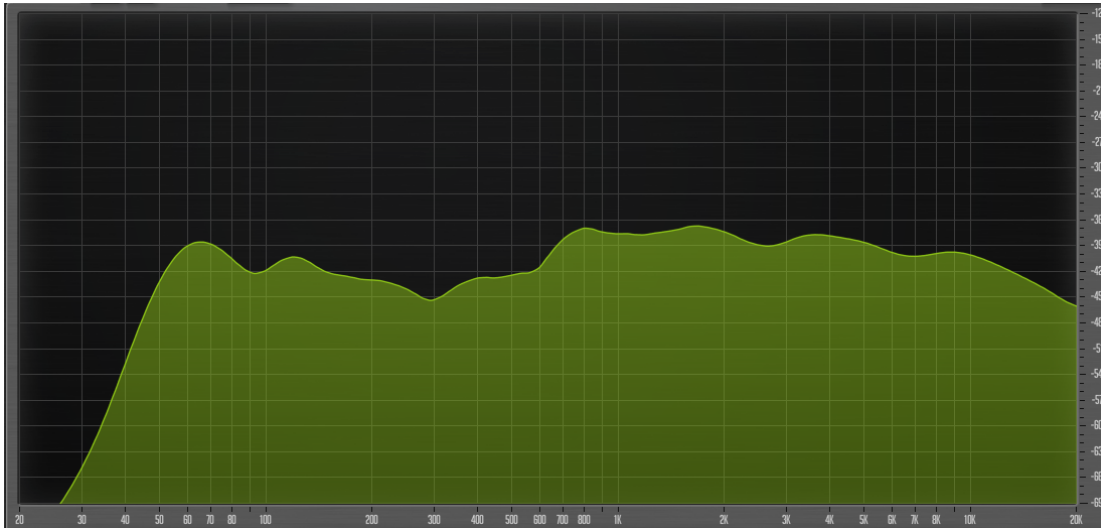
The use of a filtered main melody in the verses also helps the listener familiarize themselves with the melody. This is a very powerful way of utilizing a main element to make the track's melody both more memorable and recognizable for the listeners. As the listener has been teased the main melody throughout the track, I would say that it feels like a revelation when the entire melody is played in its full length during the first drop, giving the listener an experience that affects him or her in a more powerful way.

Use of FX and percussion

Another common feature that I have noticed in both *I Wanna Know* and other songs in the mainstream EDM scene is the extensive use of background ambience and atmospheres to fill up the frequency spectrum and give extra drive to the different parts of the track.

In *I Wanna Know* there is an ambient vocal atmosphere that is barely hearable as it is introduced both in the second half of the first drop and the second pre-chorus. It is however quite prominent in the second drop, as well as the soft chorus before the third drop, where it is quite loud and noticeable for an ambience. This brings extra energy to the song and is strongly contributing to the increasing intensity of the track leading to the climax, which is the third and final drop, although the main elements are repeated several times. Another artistic touch is adding the sound of children's laugh and talking in the first verse, as well as and in the transition into the soft chorus before the final drop.

E. Spectral balance and loudness

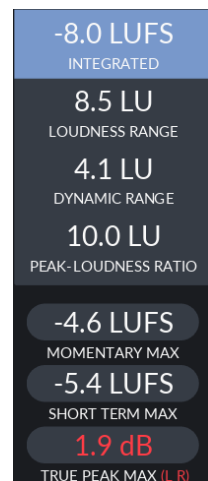


Screenshot of an average measure of I Wanna Know's spectral balance during the drop using SPAN

The spectral balance of I Wanna Know is typical for a dance track with this instrumentation. The kick is the main reason that there is a bump in the 60Hz range, and while the verses and chorus have more information in the 2-300 Hz region due to Bea Miller's vocals, we can notice that in the drop itself the track actually has less low-mids than what one might expect.

The amount of treble is also an average measure, meaning that the short transients from percussion and the white noise don't impact the bigger picture in a noticeable direction. Nevertheless, we can see that the track is relatively balanced across the entire spectrum, apart from the slight bump in the low-mids range.

The tracks integrated loudness ticks in at -8.0 LUFS, which is quite average compared to other similar dance pop tracks. It is also interesting to observe is that the dynamic range is only 4.1 LU. This indicates that the track is very heavily compressed which, as mentioned earlier, is another key feature of an EDM track. Throughout the track one can notice that the "short-term max level" increases for every drop with a peak of -5.4 LUFS, registered in the last drop, as the highest recorded level.



This might be the reason that they have removed some of the low-mids (dip at around 300 Hz) and used a low-cut filter (obvious, even slope from 50 Hz and downwards) on the lowest frequencies to gain additional headroom. This is something one must keep in mind when referencing your own tracks, where the mix you are working on might have an integrated LUFS of just -14.0 as the ears will simply process the different loudness levels differently due to the effect shown by Fletcher-Munson curves.⁴(LedgerNote, 2021)

⁴ The Fletcher-Munson curves are also known as equal-loudness contours and describes how the ear and brain responds differently to various frequency ranges when exposed to different loudness levels. Today, the initial curves from the 1930's has been replaced by standards such as the ISO 226:2003.

4. Results

4.1 *My Mind* Feat. Carine

Key: C Major **BPM:** 120 **Length:** 2 minutes and 34 seconds

A. Background

Using NOTD and Bea Miller's *I Wanna Know* as a reference track, I have made a dance pop track with a female vocalist. The vocalist is Carine Gaaren, who I was introduced to during the Song:Expo 2022 Regional Camp, which is a writing camp for songwriters, producers and topliners from Trøndelag and Møre og Romsdal in central Norway.

Following the process of analyzing the track thoroughly, I quickly realized that there were several things that stood out, both regarding the songwriting, and the production of the song. Some of those are mentioned in the previous segment. Even though the vocal chops are a main component in the reference track's success, I made an artistic choice and chose to play the main lead melody with several synth and string layers instead of using a vocal chop.

Although it is an essential part of the reference track, I felt that the melodic content of my own song could be conveyed just as clearly using another type of sound. Another aspect of using reference tracks, especially if you have been producing for some time and start to develop your own sound, is that you should try to replace some elements of it with original ideas that makes the two songs separable.

B. Workflow

As every producer's workflow is different, the relevance of me describing my own process might be of variable interest. However, I will give a short insight into the process of making the song from scratch. It all started out with me listening to *I Wanna Know* at a party, and I got several ideas regarding how I could be able to recreate the vibe of the song myself.

Succinctly, the process from there contained these steps:

- Record a voice-memo of an idea for a hook
- Record the melody into my DAW
- Find chords that fit the melody
- Make the “skeleton”. I always structure and finalize my song ideas just using a piano or a guitar. (More about that in the Discussion chapter.)
- Listen to the reference track innumerable times. Analyze the song using the framework provided in the Method chapter.
- Produce the track, constantly A/B-testing my own production and the reference track, gain-matched to my production’s levels.
- Brain-storm with a topliner, send some ideas back and forth. Adjust the production according to both her and other peers’ feedback.
- Record the topline.
- Mix the track.
- Master the track.

C. Structure and arrangement

The track is two minutes and 34 seconds long. The structure of the song is similar to the one in *I Wanna Know*. However, I have made it a bit shorter, not including a soft chorus/bridge before a final third drop. This gives us the structure ABCD-ABCDD, using the same system as the analysis, as the track has only two drops.



Screenshot of the project file in FL Studio where I have displayed both the structure and the instrumentation of *My Mind*.

D. Key elements of the production

To a great extent, the production (and songwriting) of *My Mind* and *I Wanna Know* is quite similar. The following elements are more or less the same as the ones described in the previous chapter:

Vocals by Carine Gaaren

Electric Guitar

Piano

Synth Pad

Bass Synths

Bass (emulating an electric bass)

Drums

FX

The only major addition to this list is that the main lead, consisting of six synth layers and a layer of strings from a sample library, has replaced the vocal chops from the reference track.

Otherwise, the elements of the production are quite similar, and mostly fill up the same space in the production.

E. Key techniques of the production

It is not just the instrumentation in the production of *I Wanna Know* that it is possible to find inspiration from, there are also several production techniques and tricks that I have tried to utilize in my own production. I will now go through those that I deem to be the most effective and important ones. I also want to highlight these, because they are some of the techniques that have improved my own production the most, leading back to the working thesis.

Teasing the hook melody. When listening to *I Wanna Know* it becomes apparent that the hook melody is intended to be stuck in your head. This technique is covered more extensively in the analysis. I have tried to utilize this trick by implementing fragments of the hook melody in the verses of my own song.

Using small bursts of white noise to control the energy of the song. In addition to using the kick and fx as obvious tools for managing tension and release, there is an extensive use of small bursts of white noise in rhythmic intervals, as well as to underline certain turning points of the song. When looking at the overview of the instrumentation in the analysis, one can observe that the white noise bursts are introduced in the first drop, and then kept almost throughout the track.

This is a useful way of controlling the track's energy as the track progresses and it supports the song's dynamic development. Whilst it is a subtle addition, it is a highly effective trick that I have incorporated in my own production to enhance changes in intensity, with a special eye to keeping the intensity up after the end of the first drop.

The last technique that I want to highlight is **adding or removing elements at rhythmic intervals**. Although this was a trait included in Schedel's "EDM characteristics list", it is easy to forget how one must keep the listener interested. This technique is used in both *I Wanna Know* and almost every other hit song, whether it is an EDM/Pop song or a pop song with roots in another genre. The attention to adding small variations at given intervals, most often every 4, 8, 12 or 16 bars, contributes to keeping the listener interested in the song as it progresses. When looking at the breakdown of the track we can observe that there is either added or removed a percussive element, a melodic instrument such as a piano or fx, such as the white noise bursts mentioned in the previous paragraphs, every 4 or 8 bars.

There are of course also utilized many other techniques in NOTD's production, but personally I find that these are the ones that stand out. Especially because some of them are obvious when one is aware of them, but they can be easy to forget when working with a track over time. I believe that the combination of these is what makes the track so interesting, as it keeps the listener engaged and eager to find out what comes next. The listener is also taken on a journey through the dynamic range of the song. In *My Mind* I have tried to utilize the same production techniques and attention to details that contribute to a dynamic song. This is apparent when comparing the breakdowns of both *I Wanna Know* and my own song.

5. Discussion

5.1. The process

During the past six months I have tested out several different methods for utilizing reference tracks in the most effective way possible. I have listened to vast amounts of music that has inspired me to keep pushing my own capabilities as both a producer and songwriter. The same music has also been my benchmark for several aspects of how I want my own music to sound, whether it is by using a certain production technique, a specific instrument or a track's overall spectral balance.

The more I have listened to music that I enjoy and admire, the more I have started to believe that the key to being a successful producer is rooted in being able to distinguish all the different components of a song, take them apart, and over time acquire the skills and knowledge needed to make those individual components and put them together in a new package that make your own productions stand out.

This is however a never-ending process as music evolves constantly, and personally I feel that the approach that is required to be able to get where most professional producers are, at least in the EDM/Pop-segment, is to always be eager for listening to new music and develop one's skill set, as one will never have a full overview of every available production technique or learn all new software and hardware by heart.

It is important to underline that I do not claim to have found the "ultimate" way to become a better producer. However, the experience the research and exploration I have done, working with this thesis, has left me with the impression that my skills, and maybe most importantly, my listening skills and my understanding of different components of a commercial production, have improved immensely. By using a framework like the one presented earlier, I have become aware of aspects of production that has never crossed my mind, such as the use of ambience, atmospheres and fx, teasing the lead melody/hook throughout the track, and how relatively simple changes in instrumentation and the production can impact the song's interest, intensity, and vibe massively.

Nevertheless, working with a thesis that I find interesting, entertaining, and rewarding to work with, has been a pleasure. At the same time, it has also been brutal because of how demanding and harsh it can be to switch between an early draft of your own song, and then comparing it to a commercial reference track. Therefore, it has become increasingly important to me to highlight the immense effect loudness plays when it comes to production, mixing and mastering. Although it is not the decisive factor to determine whether a song is good or not, it is relevant to keep in mind when taking decisions, because the loudness aspects undoubtedly can affect the choices taken.

“Loud is better”

The main reason that I have included several sections regarding spectral balance and loudness is that keeping these properties of a track in mind is an integral part of A/B-checking several songs. As mentioned earlier, the human brain is simply programmed to think that “loud is better”, by perceiving louder sounds as more engaging and more energetic. (LedgerNote, 2021) Therefore, a mastered track with a very high perceived loudness, meaning high LUFS-levels, will trick our brain into thinking that track A, which has an integrated LUFS level of -8.0 such as NOTD’s *I Wanna Know*, is “better sounding” than track B.

Track B could for example be a mix of your own song, clocking in at -14.3, or an old recording from before the CD-era, which was mastered with the loudness ideals of its’ time. This is also the reason why many old albums have been remastered, to limit this apparent lack of loudness compared to newer music. Not only have the expectations to what is strictly technical features of a track evolved over time, but the craft of making music has also changed throughout the past decades. Even though I have deliberately directed my focus towards production only in this thesis, songwriting is also a factor that should be taken into account when we are discussing the art of creating music.

Modern songwriting and production

Songwriting and production have become even more closely connected in 2022 with modern and advanced digital tools accessible for the masses at a relatively reasonable price, at least compared to the studio-based production and recording up until recent times. In the earlier days of recorded music, songwriting and production were two completely different processes. One would often write a song, introduce it to, and rehearse it with a band, making it a “finished product” together, and then enter the studio to record and polish the song, under the guidance of a producer, which had the main responsibility for shaping the band’s sound and instrumentation, as well as a recording engineer.

Today these two processes are often closely intertwined, especially for young songwriters and producers sitting in their bedroom recording their music, however, I find that it is beneficial to differentiate between the two. One of the reasons that I have done it this way is obviously the potentially vast extent of this paper if songwriting was also an aspect to take into consideration. Yet, the main reason is that I personally believe that a production can elevate a good song. While I will not dive into that debate either, I personally consider a good song to be one that is thoroughly written with a certain intent, whether that is a specific message, vibe or emotion.

This implies that a song without character, or properties that make the listener connect with it, cannot be a good song, no matter the quality of the production. Nevertheless, in certain genres, sound design for example, can be an integral part of both the songwriting and production process. For instance, if you are basing the melody on the character of a given sound such as a vocal chop or a one-shot bass growl. Despite this, I believe that this is more often than not an exception, rather than a standard, when it comes to the songwriting aspect of making music.

I also relate to this personally as my own background has pretty much been centered around my abilities to play the guitar. Firstly, in a band being part of shaping the sound of the band, somewhat like how a producer works in the studio, and then further develop my skills into being able to write songs, both on my own and with other talented topliners and producers. This background enables me to experiment with different sounds, characters, and textures

that I have acquired knowledge of through years and years of practice, and simply mimicking other people's songs and playing style. And just like when I tried to play the iconic *Smoke on the Water* by Deep Purple (Deep Purple, 1980) when I bought my first electric guitar, I started my journey as a producer literally reproducing the songs of my idols.

What I also found interesting was that any of my greatest inspirations, such as Avicii (Tim Bergling), Martin Garrix (Martijn Garritsen), Illenium (Nick Miller), Said the Sky (Trevor Christensen) and Kygo (Kyrre Gørvell-Dahl) have a background that is similar to the one I just described. They have all started their musical careers by playing an instrument, mainly either the guitar or the piano, and from what I can tell their approach to both production and songwriting is the same as the one I described in the previous chapter.

This is based on interviews, documentaries, vlogs and videos from the studios featuring the artists, producers and musicians I just mentioned. Although I had seen some documentaries and vlogs featuring my idols beforehand, such as Avicii's *True Stories* (Tsikurishvili, 2017), I was surprised when I realized the extent of this similar musical starting point, and how our workflows were strikingly similar as well. However, at this point it is important to underline that many, if not all, of their songs are collaborations with other songwriters, topliners and producers.

Firstly, they also focus on the songwriting before making a full production. This means that they have a "skeleton" of a track, where just a single instrument, whether it is a guitar, piano or something similar, and often a lead vocal, make up the entire sketch. Then this "raw" draft is used as a foundation to develop a professional sounding production, which potentially can elevate the track to new heights.

Because of this, the mentioned quintet has also been able to share several acoustic versions of their tracks, in addition to the fully produced tracks. Songs such as the acoustic version of *Lonely Together* by Avicii and Rita Ora, the "stripped" version of *Crashing* by Illenium and Bahari, and the acoustic live version of *Firestone* by Kygo and Conrad Sewell all testify to the notion that good songwriting is an integral part of making music.

Quality, quantity and collaboration in modern songwriting and production

Due to the fact that good songwriting is an integral part of making music, it is obvious that not all songs have the potential to be a good song. Simply because not all ideas make good songs.

I was lucky to attend *Song:Expo 2022 Regional Camp* where I met several people that have songwriting and production as their day job. A number that came up several times when talking to experienced professionals was “a 10% cut-rate”. In short, this meant that 10% of all songs the songwriter was a part of got a “cut”, that is, a song that will be released by an artist. Furthermore, I was told by several of the same professionals, signed to major publishing companies, agencies, and labels as both songwriters, producers and topliners that their personal goal was to make 104 songs a year. That equals to two songs a-week every 52 weeks of a single year.

Even though my personal aim is not currently to make two songs a-week, and these professionals’ main concern is the mainstream pop market, I think that this statement gives insight into the magnitude of a professional songwriter or producer’s quantity when it comes to finishing tracks. Finishing a single track can be a mountain to climb for a producer at a beginner level. Especially when your own track might sound like it is a cover version played by 10 year olds in a school show, even if you have spent 40 hours “perfecting” it. In this way, music production is like just-about every other skill-demanding activity.

One needs practice, lots of trial and error, some guidance, and a long-term perspective on one’s desire to make music that is comparable to what professionals make. Although one might be able to acquire the long-term perspective, and moreover, accept that your own track will not sound as good as your favorite song (yet), a simple A/B comparison of your own track and the reference track can still be pretty daunting. This leads me into the last section of this discussion. Being conscious about the fact that it is virtually impossible to be a master at all parts of the process of making music.

As mentioned earlier almost all of my idols' songs, as well as most pop music, is made through collaborations between several songwriters, producers and topliners. According to Dr. David Tough's thorough analysis of all songs featured on the Billboard Hot 100 between 2014 and 2015, the average number of writers or contributors to make a pop song that reach the Billboard Hot 100 is between approximately 3,5 and 4 persons. (Tough, 2017, P. 43) I was also made aware of this through the Song:Expo Camp where we were intentionally put together in groups of 3 and 4 songwriters with different strengths, which also was said to be the standard "industry-wide".

This leads me to claim that most music will benefit from a collaboration with someone else that has another focus point in the songwriting process. When in such a session one can bounce ideas off each other, and together one might unleash the potential of a song that is significantly better than if there was just a single person making it alone. However, I am not claiming that good music cannot be made by a single person. There are thousands of examples how it has, and can, be done. Personal chemistry, as well as similar intentions and taste are also factors to consider in this setting.

The final point of this section is that if one already is open for collaborating with others when making the song, why should one not seek the opportunity to have someone else collaborate with you on finalizing the finished song as well, such as a Mixing or Mastering Engineer? Although this is not necessarily required, it can provide interesting perspectives from fresh ears, and help you to push the final percentages out of a track's potential. These perspectives can also be obtained by receiving constructive feedback by your peers, whether they are producers, engineers or just have an interest in music.

Just like improving your production skills, mixing and mastering demands a massive effort to be able to make a production sound like every-other commercial song. Seasoned professionals, with years and years of experience, more often than not, hire people to do the final mix and master on their songs. The big question is: How could you then expect that your own song should sound like theirs if you have just started out yourself?

Despite this, I would in general not recommend spending money on this until you feel that your productions are at a level where this might be the final step to make the most out of

the song. We stated in the previous segment that not all songs can be hits, and that an acceptable cut-rate for professional songwriters, topliners and producers lie at around 10%. Is it really worth paying an engineer for helping you with the other 90%?

6. Conclusion

When looking back at the starting point of this thesis, I believe that I have ultimately come closer to finding an answer to:

What, and how, can I learn from reference tracks made by experienced professional producers?

The simple answer turns out to be: **A lot!**

By analyzing productions using a structured framework, as provided in the Method section, one can break down commercial productions relatively efficiently, and combine the bigger picture view of a visual project file, highlighting the different elements significance, whilst also providing the opportunity to take a more in-depth look on specific features that catch the listener's interest.

In my opinion I have been able to analyze the main features of *I Wanna Know* and bring the essentials of it into one of my own productions, without completely replicating the original song, at least from my point of view. Although I may not have been able to shine a light on every single aspect of the production process, I personally feel that my skills as both a producer, and a critical listener, has undoubtedly improved throughout my work with this thesis.

Working with analysis in a structured way has helped me draw my attention to all the minor details that enhance a production in a way that I previously have considered difficult to do, because of the all-over-the-place workflow of a producer still refining his craft. At the same time, I feel that I have also been able to lean back and take a look at the bigger picture.

I believe that many producers can relate to the feeling of just not knowing where to start when listening to a reference track, because there are just so many details and techniques utilized at the same time. I therefore hope that this paper also can help other aspiring producers to work more structured and more targeted in the process of fulfilling a song's potential. I will at least continue to use it as a reference myself in the process of improving my productions.

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Appendix A – List of instruments that are commonly represented in EDM:

This list of instruments is in no specific order (their respective place in the production is my own interpretation):

- **Kick (The basis of virtually every EDM track)**
Whether the kick is playing a pounding “four on the floor” pattern or a more creative pattern this is ultimately what drives the track forward in the EDM scene.
- **Synth**
Whether it gives the track a powerful bassline, emotional chords, a percussive pluck or a screaming lead, the synthesizer is an integral part of just about every EDM production.
- **Snaps/Claps/Snares**
Often used to define the intensity of the track the use of snaps, claps and snares are also a very important part of the regular EDM production.
- **Hihats and rides**
Add rhythm and excitement to the tracks. Often used in specific ways in different genres with various “conventions”.
- **Various percussion (Shakers, toms, foley)**
Often used as “ear-candy”, variation and in drum fills to mark a start, end or transition into another section of the song.
- **Guitar (Both Electric and Acoustic)**
Used in various amounts in different genres, but especially prominent by leading producers in both house genres such as progressive and melodic house (Avicii, Martin Garrix etc.) and bass genres such as future and melodic bass (Illenium, Said the Sky etc.)

- **Saxophone**

Saxophone is widely used in several EDM-genres, providing a playful and human vibe, contrary to the rest of the soundscape.

- **Vocals (Both lead vocals and vocal chops)**

A good lead vocal has been increasingly important in commercially successful EDM tracks. It is crucial for the broader appeal of the EDM/Pop tracks.

Vocal chops have been a popular “instrument” for many years in various EDM genres, heard in many leading producers’ tracks. Both Kygo, Illenium and NOTD, to mention a few, have all embraced the vocal chops’ potential to be both catchy and utilizing the tracks’ vocals to the fullest.

- **FX, ambience and atmospheres**

White noise, impacts and cymbals build tension and release throughout the track, enhance the songwriting and the production’s progression through verses, choruses and drops.

Ambiences and atmospheres placed in the background of the song can enhance a certain vibe or fill out some space in the frequency spectrum. Often unnoticeable at first, but the importance is apparent when removed.

Appendix B – Using SPAN and Youlean Loudness Meter for referencing:

This is a suggestion on how one can use SPAN and Youlean Loudness Meter to get a better understanding of what the spectral balance and the loudness is of a reference track.

Feed both a high-quality stereo file of your own song and the reference track through separate mixer tracks to the master. Notice your own track's LUFS-levels, mute it, and adjust the gain of the reference track (in most cases lower it) until track A and B have corresponding LUFS-levels. If the tracks are still sounding very different, you feel that your ears cannot give you the answer, look at how the spectral balance of the two different tracks pan out. This will hopefully point you towards adding more bass, removing some mids or taming the high-end.

However, one should always keep in mind that trusting visual aids when making auditory art can be strongly misleading, and that your ears is the best guide. Nonetheless, they might also need some help to get started on where to go.

