A reflexive analysis of an original composition for Mellotron using transcriptions of the MKII rhythms and fills presets as a compositional tool

by

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Abstract

My dissertation is an investigation of the rhythm and fills presets on the Mellotron MKII (1964) through a series of compositions. All the sounds used in these compositions are Mellotron sounds from the MKII, which were edited and arranged using a digital audio workstation (DAW). In this study I dissect the instrument, and outline every aspect of the rhythms and fills presets. In the process, I develop an expanded model of performance practice on the instrument, presenting new playing and compositional possibilities. These are made possible through comprehensively documented analysis of the instrument's sample set and the tempo, key and pitch permutations achievable through its on-board modulation controls. The Mellotron is significant because it was among the first samplers in history, and quickly became an iconic sound, woven into the cultural fabric of 1960s British pop. The Mellotron was used on The Beatles' 'Strawberry Fields Forever', Led Zeppelin's 'Kashmir', David Bowie's 'Space Oddity', and The Rolling Stones' '2000 Light Years From Home', to name a few. While the Mellotron is featured on these famous songs, it has never been used as a solo instrument for a long form composition, nor have its samples ever been transcribed. The study takes a reflexive approach, using journals compiled through the composition process to support the development of new Mellotron techniques and compositions. The compositions presented in this study establish and demonstrate the Mellotron's capability for extended solo work. The new techniques presented here make the Mellotron more practical for improvisation, composition and performance in new musical contexts. Additionally, the research expands scholarly/educational literature on electromechanical keyboards, providing in-depth technical, historical and musical data on the Mellotron.

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Introduction

Background

The Mellotron is a keyboard-based instrument from the early 1960's that plays samples of various instruments or full rhythm sections when a key is triggered, producing a variety of orchestral sounds. This project focuses on the MKII model of the Mellotron, which is short for "mark two", indicating that it was the second version of the instrument to be released.

The MKII was the most commonly used Mellotron on famous recordings. Released in 1964, this model was used on the most famous recordings that feature the Mellotron including The Beatles' 'Strawberry Fields Forever', David Bowie's 'Space Oddity', and The Rolling Stones' '2000 Light Years From Home'. The MKII was also a household possession of Princess Margaret, L. Ron Hubbard, all four Beatles (McCartney had two), and Peter Sellers, who is quoted as saying, "If you wanted the sound of marching feet in size ten boots accompanied by Chopin and a portrait of Salvador Dali shaving under water while whistling 'The Blue Bells of Scotland' this was the machine you had to have" (Thompson 1999).

On the MKII there are 15 presets, each of which is a style of music/dance. On each of these presets, there are 17 keys that trigger rhythm sections, and 17 keys that trigger riffs. To clarify, each rhythm section key initiates an 8 second recording of a 2-5-piece rhythm section, playing a fragment of a song in a specific style. When I refer to a riff section key, I am talking about a key that triggers an 8-second recording of a soloist or small ensemble playing a sequence of lead, melodic musical phrases, in a particular style.

The instrument is designed to be played with the left hand triggering new rhythm section keys as the chords change in a song, and the right hand selects riffs from the top 17 keys, each of which is a distinct melody being played by a soloist or small ensemble. One of the challenges of playing this instrument is that the keys do not associate with the

respective samples. For instance, if you were to play an A on the keyboard, there is no correlation between that A and the resulting sample that is triggered. The Mellotron had an elaborate system that brought some logic to the layout of the samples with regard to the keyboard, but it is cryptic and has nothing to do with the traditional relationship between the keyboard and music theory.

Even Sir Paul McCartney, who is unquestionably the most famous musician associated with the Mellotron, does not have a system established for how to use the rhythm and fills presets on the MKII. As he noted in his interview with Mark Radcliffe in 2006: "It's the kind of thing you can use as a color on a record…This is very useful for mad sounds (starts playing) you know you hit anything and you can get a silly groove going (plays again)…and I don't actually know what's on here, you know I can just hit one of these buttons, now I don't know what groove this will be (plays another sample)..It's a world of possibilities that makes making a record more fun." (Radcliffe 2006, 24:50)

I hypothesize that the sample sets on the Mellotron MKII are used for composition less frequently due to their abstract organization and counter-intuitive layout, and that the development of a composition method for the instrument will make them more accessible and practical for composition.

For this project, I am proposing a popular ethnography, focusing on historically informed performance practices associated with a sample playback emulation of a vintage tone generator that culminates in short musical arrangements. The study utilizes a reflexive approach as it explains the process of experimental composition using the Mellotron, and analyzes this process in order to identify new techniques for the instrument.

The Mellotron has been used regularly for over 50 years in popular music, yet no literature has been published explaining the cryptic architecture of the music theory within the machine. No literature has been published that documents the performance or compositional techniques of the Mellotron, and therefore its potential has, to this point, remained stagnant and limited to trial and error methods. This topic is therefore an

important and necessary field of investigation because of the historical relevance of the Mellotron, and the lack of research done to date on the instrument.

Rationale

From a compositional standpoint, as far as can be ascertained no one has ever released or published a composition exclusively using the rhythm and fills sample sets, so the compositional concept is the first of its kind. The data sets collected over the course of this project are also the first of their kind, being the first transcriptions of any Mellotron samples, and the first instances of tempos being charted. The rationale for selecting the Mellotron as opposed to another instrument focuses on both its cultural significance as the first sampler, and its cryptic, undocumented layout. In the modern age with sampling being such a relevant practice in contemporary music, this documentation of the Mellotron samples holds particular historical weight. The Mellotron is essentially the first sampler that was released to a widespread audience, and now, half a century later, this is the first study to analyze the performances within the instrument and apply them to new performance practice and composition techniques. This study is relevant and necessary in the academic community because it functions to establish a starting point for analyzing and interpreting the underlying music theory of the Mellotron samples, while also enacting an instance of the composition process using exclusively this unique instrument. The original MKII was marketed as being accessible to non-musicians because it was so easy to play. This system of performance included playing just two notes at once, an octave apart, to create the sound of a big band. This project is relevant because it is the first formal study intended to expand on this elementary technique from 1964. Additionally, the original instrument, which has been discontinued and is very rare, has been released as a digital keyboard and is undergoing a resurgence of popularity, which adds to the relevance of this area of study.

Research objectives

One of my goals in this project is to take the mystery out of the machine. I aim to uncover and explain how these presets work from a variety of angles. My hypothesis is: compositions, improvisations, recordings, and performances with the MKII could be executed more thoughtfully and creatively if one was to completely understand the music theory within the presets and riffs. The outcome of the following objectives will answer this hypothesis by deciphering and explaining the music theory, and presenting original compositions, written with this new information.

In this project I will transcribe all of the presets, and then experiment with and explore these presets by systematically writing compositions with them and taking a reflexive approach, analyzing the process in a daily journal. My other central objective is to bridge the historical divide between the instrument's original use and its potential for contemporary use both theoretically and practically by composing an original piece with the Mellotron.

As an additional research objective, my experience of learning to compose with the Mellotron MKII will be documented in this thesis. The original research that I am presenting is equally 1) a presentation of the compositions, which are stylistic, unique and relevant to contemporary music, and 2) an in-depth analysis of the instrument as a composition tool from the perspective of the composer. This analysis will include new data about the samples within the machine, and an analysis of this data's relationship to the composer. One of the central objectives of this thesis is to present new composition techniques for the Mellotron.

Research question

In the following chapters I will attempt to answer the following research question: *What compositional and performance techniques can be developed on the MKII to expand and enhance its typical use, reinterpreting the instrument's original social role to function in a contemporary social and stylistic environment?*

Additionally, I will consider the following secondary questions:

How has the Mellotron MKII been used compositionally in popular music, and how has its use evolved since its release in 1964?

How can the MKII's potential be expanded with additional data about the samples and the on-board effects?

What does an artistically and conceptually fulfilling composition, using exclusively the MKII rhythm and fills presets sound like? Why is it relevant?

The nature of this project is reflexive, and constant reference will be made to the process itself, its limitations and context, and the insights gathered from observation and reflection. I compiled an extensive journal throughout the composition process, and its analysis is one of the central sources of data.

Outline of chapters

The project begins by presenting the literature review and theoretical framework. Chapter 2 follows, providing a history of the Mellotron. Chapter 3 presents an overview of the technical and conceptual methodology with regard to the composition process. Chapter 4 analyses the compositions, describing the writing process and evolution of the piece as well as a technical explanation of the recording process. Chapter 5 presents an array of new Mellotron techniques, abstracted from the analysis of the compositions

enacted in Chapter 4. Chapter 6 will consider the conceptual and creative implications of the original composition, reflect on the process and justify the relevance of this project and its composition in the context of current academic research and contemporary musical practice.

Chapter 1: Literature review and theoretical framework

In this chapter I will start by reviewing the field of reflexivity and artistic research, explaining the philosophical structure of the argument and then discussing a number of examples of projects that apply this theory in ways similar to how they are applied in this thesis. After establishing the theoretical framework for my argument, I will evaluate the existing research that has been done on the Mellotron. A very small number of academic publications on the Mellotron exist. In addition to consulting these sources, I conducted a far more extensive search, including everything that could be found on the topic across several media platforms, including: journal articles, books, DVDs, podcasts, webpages, internet video and live performance.

Reflexivity

To explain my academic approach for this project, I will first reiterate the first half of my primary research question: *What compositional and performance techniques can be developed on the MKII to expand and enhance its typical use?* I hypothesized that the most effective way to answer this question is by constructing a study that collects data about the instrument, and then uses the data to influence composition. Data collection and analysis alone would give insight about the architecture of the instrument, but not necessarily about compositional and performance techniques. For this reason, a central part of my research methodology is composition. I kept a reflexive journal through the process of composition, and consider it an additional data set. The subsequent process of analysis of the composition led to the identification of new and relevant Mellotron techniques. Coessens, Crispin and Douglas (2009: 24-25) support the need for similar artistic research in describing the process of the artist/artistic researcher:

> However, besides the artwork and pedagogical tactics, this artist articulates a 'second' manifestation that is separate from the discrete artwork. His or her research questions and trajectories take form in a conscious and reflective way, resulting in another output. Often, as in

> ‘conventional’ research, these trajectories start with research questions, arising from an artistic problem, an artistic-related philosophical question, or a science-related problem in the art practice. The second manifestation of creative thinking, first considered as a tool for, and reflection on, the artist’s own artwork, can then become a shared tool for others, helping them to understand and learn about this specific artistic practice.

This excerpt relates to the direction I followed in my own project. I began composing with the Mellotron before realizing that there are only limited approaches to it. This limitation led to the idea of clarifying the mysteries of the machine by collecting the missing data (tempos, transcriptions, etc.) for the instrument: which then naturally led to experimentation with the application of this new data via composition. At this point I decided that through the process of composition I could uncover new techniques with the new data. Reflexivity uses careful self-reflection and analysis as the principal methodology. It insists upon being hyper-aware of the social, historical and theoretical context of the project, and the relationship between the researcher and the research.

> The concepts of reflexivity may be a way of bringing qualitative methods to account for themselves in a way that goes some way to satisfy the demands of scientific method. This is generally a matter of questioning how the processes of research and analysis have an effect on research outcomes. This whole process of self-examination has become known as ‘reflexivity’.
>
> (May 1998, Pg. 22)

A significant part of my data collection occurred through journaling during the composition process. Therefore, my project uses a reflexive approach. During this process of journaling, I retained awareness of how the process was affecting my research outcomes. For instance, I began to notice that the process of journaling while simultaneously composing was interfering with the creative process, so I amended my methodology partway through, and switched to recording verbal audio descriptions at regular intervals, rather than typing. This lowered the impact on the creative process and improved my research outcomes.

For another example, when I first began experimenting with composing with the rhythm and fills presets, I openly mixed multiple presets and found that the resulting compositions were too similar to one another and sounded similar to traditional pieces that I had composed in the past with real, non-sampled orchestral instruments. For example, I would layer the strings into sections as pads, and the horns into sections as a rhythmic foundation, just as I would if I were writing for a chamber orchestra. Aware that I was trying to identify and utilize the essence of each preset, I changed the methodology to require myself a minimum of three compositions with each preset by itself before moving on to blending them together. This change came as a result of starting my experimentation, reflecting on the results and process, and identifying the ways in which my methodology was creating a barrier to my creative and practical goals.

A similar result occurred when I began mixing the presets for the first time, after having written three compositions with each individually. I found that I was naturally inclined toward layering the presets and various orchestral instruments in ways that would make sense for a traditional orchestra, such as layering string or horn samples in harmony to make sections, and then writing with those sections. Though this became one of my techniques, I was aware that this intuition should be challenged so as to open up new creative opportunities. Consequently I shifted focus to manipulation of rhythm and timbre when my compositions started to become too traditional. The ebb and flow of this inner dialogue, pushing me away from my creative comfort zone and toward creative discovery, is an example of the functionality of artistic research. My awareness that I am the subject and the object of this project pushed me in the direction of the creative and practical goals, and away from simply writing what was easiest or most obvious with the sample sets. A constant reminder of what I was hoping to achieve from the composition process, namely the invention of new techniques and the composition of a postmodern-, hip-hop- and film-influenced original piece, kept me from defaulting to writing in the style of the preset I was working on. This was another relationship that I was aware of throughout my process: it is more difficult to write, for example, a non-Bolero-sounding piece with a Bolero preset, but the reflexive nature of my methodology intervened and self-corrected the issues, always reverting to the goals set forth by my research questions.

The philosophical principles underlying reflexivity go back to ancient Greece. In *Nicomachean Ethics*, Aristotle distinguished between three types of knowledge: Episteme, Phronesis and Techne. Episteme is scientific facts and theoretical knowledge; Phronesis is practical wisdom and knowledge of other human beings, used as a basis for ethics and political decisions. "Techne is translated as either craft or art" (Parry 2014). Reflexive artistic research falls into the Techne branch of knowledge, and is an old concept that is making its resurgence in contemporary academia.

> These Greek conceptions of knowledge – theoretical, practical and productive – were embedded in their social ways of life. On the basis of these different social and epistemic stratifications, the Greeks developed different epistemological paradigms: the one grounded in normative conceptions of knowledge and subjectivity, the other linked to dynamic and transformative processes, contingent on situation and purpose, with no well-defined boundaries between subject and object.
>
> (Coessens, Crispin and Douglas 2009, Pg. 79)

This excerpt refers to Aristotle's idea of productive knowledge: how to make things, or create. Coessens, Crispin and Douglas argue that the first type of knowledge, Episteme, was centred on universality and objectivity, and therefore became a foundation for all knowledge. In contrast, techne was classified over time as being potentially subjective, lacking the concrete nature of Episteme. As a result, the intellectual community demoted this aspect of Aristotle's knowledge over time, but it has since made a resurgence in contemporary academia. The following quote theorizes the downfall of techne:

> Intellectual society was interested in knowledge, abstract and deductive, as well as in ethical reflection, but not in the processes of making and creating, inductive and contingent. Economic society was interested in the techniques, the technology and skills inherent in the concept of *techne*, but without reflecting on the kind of knowledge it represented. The new divide in academia was that between theoretical and practical skills...The notion of *techne* thus lost its inventive, creative, contingent aspect, through commodification and the product-directed process of modernity, abetted by a loss of interest in it by the gatekeepers of the knowledge communities.
>
> (Pg. 80)

This project is based around techne, and productive knowledge; in other words, the content of this thesis relies upon the creation of both new techniques and an original composition. Additionally, the epistemological paradigms that I have chosen to embrace for the methodology of this project rely on Aristotle's conception of techne, or knowledge based on creation, and consequently embrace the idea that choices can be contingent upon situation and purpose. This paradigm only works if the researcher is openly reflexive in their methodology, and can remain critical and objective about their role in the work, and the resulting effect of being both subject and object. If the academic paradigm used for this project was contingent upon perfect, unwavering objectivity, composition or creation of any art form could never be the subject of study, for it is inherently subjective. Artistic research gives researchers the opportunity to execute and analyze the creative process as a subject of research, while embracing Aristotle's techne, but only in partnership with the self-awareness provided by reflexivity.

One of the central conflicts in artistic research is in the nature of art as it contrasts with academia. Academia relies on the formation of, and adherence to, disciplines and methodologies, while art cannot be contained in such a specific way.

> Without speculating on what exactly 'art' is, it may be sufficient…to state two of these values that we believe underpin most of today's art education: 1. Art is self-determined and suffers when it is told what to do. 2. Art challenges existing forms of practice.
>
> (Schwab and Borgdorff 2012, Pg. 13)

These realities encourage a paradigm shift from the academic community, to embrace art in its nature, and to consider reflexivity as a sound basis for making critical judgments about artistic research. The artistic element of my project is the original composition, which is intended to be a reinterpretation of the Mellotron in a contemporary context. In order to include this aspect of my project, artistic research was necessary as a theoretical foundation because it allows me to be both the subject and the object of the research. As a result of this theoretical position, I was able to creatively reinterpret the role of the

instrument, while reflecting on its original social role and the influence of my musical taste and preferences on the outcome.

The journaling aspect of this project functions primarily as a methodology for how the new techniques were discovered, and secondarily, as an example of how they can be applied. The reflexive journaling does not contribute to the validity of the musical composition per se, but it makes its ambitions as a piece of art more approachable and reveals the self-reflexive position that underlies its creation. My project contains a clear structure for the data acquisition and composition process, designed with my research question in mind. It also acknowledges the blind spots that result from a reflexive project, and embraces them openly. In reviewing the literature, I found relevant texts that discuss and debate the methodological standards of artistic research. I used these texts to guide the development of my methodology, and will review them in the following section.

In my review of the literature I found a limited number of books and studies in which composers had kept daily journals of their composition process, which I have referenced in the following section. This functioned as their research data, which was then analyzed and compiled into their thesis. One particularly interesting example was NYU alumnus Dr. Timothy U. Newman's doctoral dissertation *The Creative Process of Music Composition: A Qualitative Self-Study*. This study specifically resonated with me because it solely analyzed the creative process, rather than using the process as one aspect of the study. In other words, the focus is on the creative process, rather than analyzing the creative process to validate the art, or as a means of making a philosophical point. My project uses journals of the composition process in conjunction with new data, aiming at revealing techniques for the Mellotron. In this way, my project is different from Newman's because my reflexive approach to composition functions in two ways: first, to provide a methodology for how the data (the new techniques) was discovered, and second, to provide an application of that data in an applied context that also functions as a piece of art, which reinterprets the role of the Mellotron in a contemporary context.

Generally, there are few projects that focus on the processes of well-known composers from a first person perspective.

> Furthermore, the composers rarely discuss detailed examples from their own specific processes – preferred methods of working, specific problems found, solved, or struggled with, personal difficulties, or any sort of transparency into their exact procedures or details of their processes.
>
> (Newman 2008, Pg. 24).

In the search for new techniques for an instrument, both the process of composition, and reflection on that process are ideal methodologies for discovering new information. This is specifically true with an instrument like the Mellotron, which, as I have previously established, has no existing literature on techniques, or on composition for that matter. In contrast, if one were to theorize about new composition techniques on the piano, it would be reasonable to start by reviewing the vast literature on piano composition, and piano techniques, which would provide a theoretical framework for the topic. The history of composition and technique on the piano could then potentially lead to some ideas or insights about new approaches without experimentation or practice. Unfortunately, in the case of the Mellotron the lack of existing data makes the reflexive, experimental approach the most practical choice. Additionally, I found that most of my new techniques were developed as a result of some happy accident while experimenting, rather than formed from a calculated theoretical idea. For example, in the initial stages of my research, I found myself scrolling through the various presets on the Mellotron, and the individual keys in each set, browsing through the tones. In the process of this, my focus was drawn to the sequences of tones that I was coincidentally playing, resulting in interesting melodies and rhythms. This became one of my techniques entitled, *building melodic phrases out of sequences of samples,* and resulted from the open methodology associated with my experimentation.

To further grasp traditional methodologies, and the general nature of this type of study, I reviewed several other instances of self-studies in music that focus on the composition

process. These include: Church (1996), Sudnow (1978), and Slodoba (2004). All these studies use journal entries as the primary methodology for artistic research. Newman used audio and video recording alongside other technologies to retain more comprehensive records of the process, which are strategies that I adopted for this project after reading his research.

The insights that came from this literature review helped to contextualize and shape my research design, outlining specific methodologies and standards. In the next segment I will outline my research standards and parameters, and explain the rationale behind the design.

My central references for the theoretical framework of this study are Coessens, Crispin and Douglas (2009), Alvesson and Skoldberg (2009), and Frayling (1993). Each of these books identify and defend standards that should be upheld in the field of artistic research. I will review each thesis and relate them to my own project.

Coessens, Crispin and Douglas offer three modes of testing the outcome of artistic research, judging its " '*artistic content'*, '*technical approach*', and its '*historical value'* – or, to put it another way, its content, its form and its function."

'Artistic content' essentially means that the research will be valuable for the field of art and for artists. My project accomplishes this end in the fact that its goal is to expand the knowledge base, illuminating new dimensions of the Mellotron, new techniques for performance and composition, and revealing details about the composition process.

> '*Technical aspects'* means that there will be a discernible clarity to the research trajectory, concerning sources and material, method and process, as well as to the conditions of the research, implying a concise, understandable and scientifically acceptable formulation, elaboration and expression of its results.
>
> (Coessens, Crispin and Douglas 2009, Pg. 73)

My project was heavily influenced by this category, which led to the highly structured and intentional nature of the composition process, which will be further discussed in Chapter 3. It also encouraged me to focus and regulate my methodology with regard to reflexive journaling, and to add the dimension of data and transcription collection to my project.

'*Historical value'* refers to the context of the research in history, referencing similar projects and relating it to the already existing body of literature. This final category is essentially the literature review, and led to extensive research on the topics of artistic research, reflexivity, postmodernism, and Mellotron history..

In *Research in Art and Design*, Christopher Frayling unpacks his philosophy of artistic research by dividing it into three categories: Research *into* art and design, research *through* art and design, and research *for* art and design. My project falls into all three of these categories to varying degrees, and I will qualify its application to this theory in the following section.

> Research *into* art and design is the most straightforward… and by far the most common: Historical Research, Aesthetic or Perception Research, Research into a variety of theoretical perspectives on art and design – social, economic, political, ethical, cultural, iconographic, technical, material, structural.
>
> (Frayling 1993, Pg. 5)

Taking this element of research into consideration, I knew that I would have to situate my study, and the consequential composition, within an artistic movement, and explain its place in art history. In Chapter 6 I elaborate on the postmodern nature of the composition. I also contextualize the history of the Mellotron and sampling (in Chapter 2), while in Chapter 5 I identify characteristics of the project that are entirely unique.

Research *through* art and design is a category that includes instances of the artistic process or the art itself being the topic of research. This includes:

> Materials research – such as the titanium sputtering or colorization of metals projects…development work – for example, customizing a piece of technology to do something no one had considered before, and communicating the results…and action research – where a research diary tells, in a step-by-step way, of a practical experiment in the studios, and the resulting report aims to contextualize it.
>
> (Frayling 1993)

My thesis can be categorized as research *through* art and design, based on the above description because it uses a research diary to explain the step-by-step process of a specific task. My project also could be considered development work because my data, transcriptions, and techniques have arguably customized the Mellotron to do something it has never done before.

The final category is research *for* art and design, which is aimed at providing insights and tools for art as a practice. "The output generated by the artist in this way, because it arises out of direct practical experience, could be of value for further research for the arts." (Coessens, Crispin and Douglas 2009, Pg. 47) This category of research applies to my project more directly than the other two, given my central research question. Both the pursuit of new techniques and the explanation of the composition process function to inform practicing artists and researchers of the progress that has been made in the field of Mellotron performance and composition. Additionally, the transcriptions of the samples fall into the category of research *for* art. Through these theoretical categories I have been able to focus the progress of my project toward sound practices in the field of artistic research.

The last text that I will expand upon from my literature review is *Reflexive Methodology*, which focuses less on art and music, and more on technical aspects of quality reflexive research.[1] "Reflective research, as we define it, has two basic characteristics: careful interpretation and reflection." (Alvesson and Skoldberg 2009)

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[1] The authors use "reflective" and "reflexive" synonymously in the book, qualifying that reflexive research is a sub category of reflective research.

The authors go on to describe that the first basic characteristic of careful interpretation takes a philosophical stance that "implies that all references – trivial and non-trivial – to empirical data are the *results of interpretation*." This perspective devalues empiricism to some extent and challenges it by introducing the subjective variable of interpretation in knowledge acquisition. Artistic research in general, and specifically my research, seeks to embrace interpretation as a central tenet of its philosophy, remaining open to its fluid nature, and constantly reflecting on how the project interacts with theory and language. The other relevant element in reflexive research is reflection.

> Reflection turns attention 'inwards' towards the person of the researcher, the relevant research community, society as a whole, intellectual and cultural traditions, and the central importance, as well as the problematic nature, of language and narrative (the form of presentation) in the research context.
>
> (Alvesson and Skoldberg 2009)

This parameter made clear the accuracy with which statements need to be made when presenting artistic research. Specifically, it inspired more attention toward acknowledging the limitations and barriers of a study that communicates with reflexive narrative style of language, as was used in my journal entries.

> Thus in reflective empirical research the centre of gravity is shifted from the handling of empirical material towards, as far as possible, a consideration of the perceptual, cognitive, theoretical, linguistic, (inter)textual, political and cultural circumstances that form the backdrop to – as well as impregnate – the interpretations.
>
> (Alvesson and Skoldberg 2009)

This explanation clearly summarizes the framework that I worked within, and the perspective from which I approached my theoretical structure. I acted under the philosophical assumption that all references to empirical data are the result of interpretation. This impacted my research in the sense that it opened up the possibilities for my reinterpretation of the Mellotron in a contemporary context. I chose attributes that

are central to the nature of the instrument, such as cinematic, nostalgic and comedic qualities, based on an interpretation of the ways in which it has been used since its release. I then used those attributes as the foundation for my reinterpretation, insisting that they remain at the centre of the style of composition, with the intention of retaining the nature of the Mellotron. I provide historical examples and rationale for these selections, but these types of choices rely upon a spirit of interpretation, rather than empiricism. Additionally, I kept in mind that the process of reflexive research through journaling has the potential to be problematic, and should therefore be executed thoughtfully and critically. For example, as I was reviewing the journals after the research had been conducted, I first read through them and identified the pieces of the journals that would be included in the thesis. I then went through those selections and analyzed them with a critical eye, focusing on instances of the narrative voice taking away from the content of the research, or perhaps lacking perspective. Embracing the limitations that are inherent in this style of research helped to clearly define the parameters within which I was working, which led to a more focused presentation of the new data.

Mellotron

In the realm of academia, the Mellotron has a very small footprint. The only scholarly article that has been published that centres around the Mellotron is Echeverri (2013). This project is focused on new technologies that automatically identify instruments in songs by gathering data from the audio information and identifying patterns and trends to detect the presence of specific instruments. Echeverri's project used the Mellotron as the instrument that challenged and tested the accuracy of the new technologies. The Mellotron, by its nature, sounds like other instruments, so in this context it functions to either successfully or unsuccessfully disguise itself as various orchestral instruments in the ears of the new technologies. This study focused on the audio attributes that are specific to the Mellotron, and therefore distinguish it from organic orchestral instruments.

In addition to the above-noted academic journal, there are two books and one feature-length documentary that have been published on the topic of the Mellotron, all of which

have been referenced regularly throughout this project and are noted below. In addition to these published sources, below I have provided the most relevant databases, articles, podcasts, and general Internet resources on the subject.

There are a variety of Internet video resources on the Mellotron. GForce Software (2011) provides historical insight into the Mellotron's role in Great Britain. Zeca Louro (2011) includes a demonstration by Paul McCartney playing a few of the rhythm and fills presets and describing their seemingly random nature. McCartney's approach to the instrument is symptomatic of the approach that this project aims to rectify. Additionally British Pathe (2014) features the original 1965 television advertisement for the Mellotron with examples of it being played by Geoff Unwin and an explanation for how it works. Reversengr (2010) provides an interview with Mike Pinder in which he describes the instrument and how it works. Robert Webb (2012) features a similar demonstration from the keyboard player of King Crimson. Sutterjack (2009) is another interview with Mike Pinder that discusses his band The Moody Blues and the role of the Mellotron in their success. Grant and Kirkscey (2016) provide a video of a live Mellotron duet performance.

In addition to Internet video resources, I found a handful of databases that were useful in my collection of historical and practical information on the Mellotron. Mellotron.com is the central resource that includes a thorough history of the instrument, descriptions of the various models, and is the primary retailer of Mellotrons. PlanetMellotron.com focuses on songs that feature the instrument, and functions as the most comprehensive database of this nature. MikePinder.com offers the artist's narrative explanation of his experiences with the Mellotron.

There were also a number of podcasts that provided information for this study including Radcliffe (2006) *Sampledelica! History of the Mellotron*, which is a BBC podcast that explores the history of the machine. Also Janak (2013) *Bringing the Mellotron into the 21st Century* provided essential information about the Mellotron as it relates to modern electronic music. Finally, Amy and Chris (2016) *The Ancient Sampler: History and*

Evolution of the Mellotron offers an additional take on the history of sampling, and the Mellotron's place in that history.

In the process of conducting research about the Mellotron I searched the following databases: UNISA Library, Google Scholar, Microsoft Academic, PsycINFO, iSEEK, WorldCat, and Education Resources Information Centre. Most of the leads in my research came from references in the books and DVDs. I also found that the few webpages that reference the Mellotron online provide links to similar sites. At this point I can confidently say that I have found almost every reference to the Mellotron in existence, and have a comprehensive understanding of the extent to which it has been studied and documented.

Concluding remarks

I began this chapter with a review of literature on the topic of reflexivity. This overview of reflexivity functions to validate the theoretical position from which I analyzed my compositional process, grounding the methodology of the research in existing theories. The primary research question for this study asks what compositional and performance techniques can be developed on the MKII to expand and enhance its typical use. Through a reflexive process of journaling I was able to document the process of composing the pieces included in this study, to then later analyze them. If my composition methodology had not been grounded in reflexivity theory, and artistic research, the resulting data from analysis would not be relevant or sound. The composition was written with a stylistic and aesthetic goal, and also with the intention of experimentation leading to the discovery of new techniques. Reflexivity theory provided a means of seeking out this new data and these new techniques by way of compositional experimentation.

Greek epistemology, as explained by *The Artistic Turn,* and in *Reflexive Methodology* provided me with a clear model for enacting artistic research. After establishing the reflexive nature of my methodology, I continue the process of answering my research

question by addressing the literature that currently exists on the Mellotron as a compositional tool.

This literature on the Mellotron is limited to one academic study in which the instrument plays a supportive role, and is not in itself the topic of study. Provided additionally is a list of resources on the Mellotron across several media, compiling the most relevant documentation of the instrument. This lack of existing literature, and the lack of diverse compositional use of the Mellotron up until this point supports the relevance of the original composition presented in this study, as well as its presentation of new data.

In the next chapter I give a historical contextualization of the Mellotron, reviewing the history and nature of the instrument, sampling, and the performances used in this project. I explain the technical operation of the instrument, and the interaction of its interface design with concepts of music theory.

Chapter 2: Historical contextualization of the Mellotron

Introduction

Given the somewhat unique and niche nature of the Mellotron, there is not a wealth of research or literature on the topic. My aim in this chapter is to first give a technical explanation of how the machine works. I will then briefly review its history and cultural significance, pointing out the ways in which the Mellotron is traditionally used. After that, I will review relevant instances of the Mellotron MKII rhythm and fills presets being used in ways that relate to my compositional approach. I will present an explanation for the music theory layout of the samples, including scans that offer instructions for use from the MKII's original songbook.

Mellotron concept overview

The Mellotron is a vintage sampler from the 1960's that triggers eight-second playback from three-eighth inch tapes as keys on its keyboard are played. There are a variety of tapes, and most are recordings of orchestral instruments. In addition to these samples of individual notes, Mellotron (the company) released a limited number of tapes that feature a rhythm section in the lower two octaves of the keyboard and a variety of lead instrument riffs in the upper two octaves. For instance, the 'Dixieland/Trombone' set of tapes features drums, bass, and guitar in the rhythm section playing a walking bass line groove, while the top of the keyboard triggers trombone riffs in the same tempo, corresponding to the rhythm section.

These rhythm and fills tapes were designed with a simple system for execution based on octaves. If you play a low A in the rhythm section at the same time as an A in the riff section, the notes will correspond tonally and rhythmically. This makes it possible for a player with no piano experience to modulate through different keys while triggering the

appropriate accompaniment for each one. Initially this big band keyboard was designed for novelty living room use and dance accompaniment in social clubs, but later became a distinct sound in pop music and film scores.

Sampling practice prior to the Mellotron

The Chamberlin was invented in 1946, and released in 1949. During this time, the invention and popularization of magnetic tape was leading to the practice of sampling being used in a variety of ways. The Chamberlin is an electromechanical keyboard that triggers prerecorded tape to recreate orchestral instruments and rhythm sections. This instrument is conceptually identical to the Mellotron, but features a different physical design, and different recordings.

In the realm of academia/classical composition, French composer Pierre Schaeffer was using magnetic tape as an instrument in 1948, sampling and playing back sequences of recorded sounds (often manipulated by the tape) as a musical composition. This led to the establishment of "musique concrète", a style of music and composition that emphasized sounds as the starting point of the composition process, rather than beginning with music theory and notation. According to *Oxford Music Online, it is:*

> A kind of electroacoustic music which uses natural sounds, not electronically generated tones, as raw material. The recordings-of machinery, running water, musical instruments, or whatever- are transformed by electronic means and joined to form a composition. Pierre Schaeffer coined the term in 1948 to describe his first electronic studies.
>
> (Latham 2016)

Schaeffer used magnetic tape-recorders and physically manipulated their mechanisms to produce various effects, making him a central precursor to the techniques and sound design that would eventually be made popular by the Chamberlin and the Mellotron.

In addition to musique concrète, film was incorporating sequences of sound effects and music, which is also a relevant precursor to sampling. Once again, the dawn of magnetic tape inspired the beginning of this type of composition.

> During the 1940s and 1950s, the type of sound design practiced by US studio-era films continued to dominate, with technological developments such as the introduction of magnetic tape (for sound recording and editing) … The development of small, portable sound recorders in the late 1950s was crucial to the development of documentary film, with the recording of on-location sound an important driver of the *cinema verite* movement in France and of *direct cinema* in the US and Canada.
>
> (Kuhn and Westwell 2012, Pg. 377)

Film sound design and musique concrète introduced sequences of recorded sound as compositions, which was the beginning of the musical style of sampling. The Chamberlin was not the first instance of sampling, but it was the first machine designed to playback various prerecorded tape loops together, in other words the first sampler.

Mellotron historical review

The Mellotron is often thought of as the first sampler in history, but in fact Harry Chamberlin originally conceptualized and designed the first keyboard sampler known as "The Chamberlin" in 1949. In the 2010 Mellotron documentary *Mellodrama*, producer Jon Brion breaks down Harry Chamberlin's motivation and thought process.

> He said, I've got this idea, I need musicians who can play across the whole range of their instrument, and hold a note for a long time with very good pitch. Who are the best musicians? And the guy at the music union said, 'The Lawrence Welk orchestra of course,' and that's who is on this thing. Now he was obviously a fan of big band music because the style, saxophones, trumpets and trombones are all classic, late 30's early 40's big band.
>
> (Dilworth 2010)

Chamberlin began selling them to the public in 1960 with the help of salesman Bill Fransen (Awde 2008, p. 44). My various sources differ slightly on their telling of the following chapter of the Mellotron story. Some portray it from Fransen's side, describing Chamberlin's lack of business savvy, and others portray Fransen as a thief. In essence,

"Bill 'appropriated' two of Harry's Model 600 MusicMasters and took them to England to try to find someone with the engineering and manufacturing talents to bring this idea to fruition." (Samagaio 2001, p. 3).

In England Bill Fransen went into business with Les Bradley who ran a British engineering firm. They partnered with magician David Nixon and entrepreneur/big bandleader Eric Robinson to record the sounds and market the Mellotron in the UK (Awde 2008, p. 46). The origin of the name is revealed in an interview conducted by Nick Awde with John Bradley and Martin Smith who states, "As far as I can glean, it was Bill [Fransen] that came up with the name Mellotron…We always used to say that the name came from 'mellifluous'." (Awde 2008, p. 45).

Eric Robinson organized and facilitated the Mellotron recording sessions. These sessions were attended by England's finest orchestral session players, and often took place at odd off hours at London's IBC Recording Studios (Awde 2008, p. 70). These recording sessions and players have been of particular interest to me during the composition process of this project. The reason they are of interest is because they are the origin of the sounds. There is an ever-present humanistic element in the performances on the Mellotron samples, and these are the humans who made them. I wonder whether the late-night sessions affected their performances, or whether the nature of the studio had any influence on them. Being a record producer/engineer myself, I know that there are multitudes of studio variables that affect performance, and I am sure that the context for the recordings influenced the sounds. Unfortunately, the historical record only provides a few glimpses into the details of these sessions. Among these glimpses are a few names that are mentioned by Awde in his interview with Geoff Unwin (who was one of the piano players on the sessions).

> Arthur Wilkinson began his arranging and composing career in the RAF…Trombonist George Chisholm, who recorded for the Mellotron tapes, and alto saxophonist Cliff Townshend, father of the Who's Pete Townshend, were regular performers in the band.
>
> (Awde 2008)

Unwin (born in 1936) is the only noted player from this account that is still alive. For the single-note lead tones on the Mellotron, studio musicians would have to play each of the 35 notes on the keyboard with their respective instrument as in-tune as possible.

> Human nature being what it is, there are legendary quirks in the master tapes from the early sessions…You can even spot little bursts of applause or other ambience on some of the tapes, including Bill Fransen's 'yeah!' at the end of the MKII Dixieland rhythm track.
>
> (Awde 2008)

These ambient noises and quirks ended up adding wonderful character to the composition. They were especially noticeable at times when I was manipulating the gain structure or over-compressing the samples.

Geoff Unwin was a piano player/session musician who played on the Mellotron tapes and was the face of the Mellotron at the time of its release, playing it in the 1965 video advertisement. Unwin recalls of the sessions:

> When they were doing the master tapes for the Mellotron, a lot of the musicians who came in didn't know what they were doing when they were recording. They didn't quite understand it and just took the money. Some of them did, however. The trombone riffs on the Mellotron were played by top session player George Chisholm, and there was a violinist who used to do a lot of sessions for us called David McCallum…McCallum was the concertmaster violinist of the Royal Philharmonic Orchestra.
>
> (Awde 2008, pg. 70)

When they were initially released, Mellotrons were extremely expensive. Mark Radcliffe notes this in his BBC podcast *History of the Mellotron*:

> In 1964, a brand new Mellotron would have set you back 1,000 guineas [1,050 pounds] (Barrow, 2013), and bear in mind that at the time the average house price was just under three and a half thousand pounds. So they became hugely expensive home entertainment systems, exclusively available to the rich and famous. Buyers included, and what a band lineup this would have been: Peter Sellers, King Hussein of Jordan, Scientology founder L. Ron Hubbard and even her royal highness, Princess Margaret.
>
> (Radcliffe 2006)

Any Mellotron historian has to wonder what motivated the manufacturers to build such expensive instruments. One of the early intentions for the Mellotron was as an instrument for a social club or bar, the logic being that although it was a significant expense up front, it would replace the costs of paying a full band each night. Considering that all the preset rhythm and fills styles are popular forms of ballroom dance from this era, it makes sense that the Mellotron could provide new and exciting accompaniment for dancing occasions.

IBC Studios recording engineer Brian Carroll confirms this: "When I joined IBC, the Mellotron was a big bulk of a machine that was mainly marketed as an instrument for a cocktail lounge." (Awde 2008, pg. 67). Mike Pinder adds to this insight:

> Most of them were bought by social clubs, traditionally every club would have a piano but this was very appealing because they could have this whole band sound, and entertain themselves.
>
> (Dilworth 2010)

Several models of the Mellotron and Chamberlin were released over the course of the next decade. Mellotron became the more recognizable household name after several noteworthy pop and progressive musicians/bands began using the instrument in their recordings during the late 1960's and 1970's, such as The Beatles, Led Zeppelin, The Rolling Stones and David Bowie (Planetmellotron.com).

Over the following 40 years the Mellotron made a handful of small comebacks, resurfacing for brief moments in popular music but always remaining an eccentric, unique instrument. The Mellotron was used in the 1980's by XTC, and Orchestral Maneuvers in the Dark, among other bands. In the 1990's the Mellotron was featured on Radiohead's *Ok Computer* album, and most notably on Oasis' hit song "Wonderwall". In the 2000's and 2010's major acts have performed and recorded with the digital Mellotron including Foo Fighters, Red Hot Chili Peppers, and The Smashing Pumpkins. The constant resurgence of the Mellotron sound across several decades confirms its place in the cultural fabric of popular music.

Technical operation of the Mellotron

There is a strip of magnetic tape connected to a mechanism that can be activated by pressing a key on the Mellotron. When a key is pressed, mechanisms inside the instrument press the tape against a playback head to play the sample. Once the key is released, a spring returns the tape to its original position.

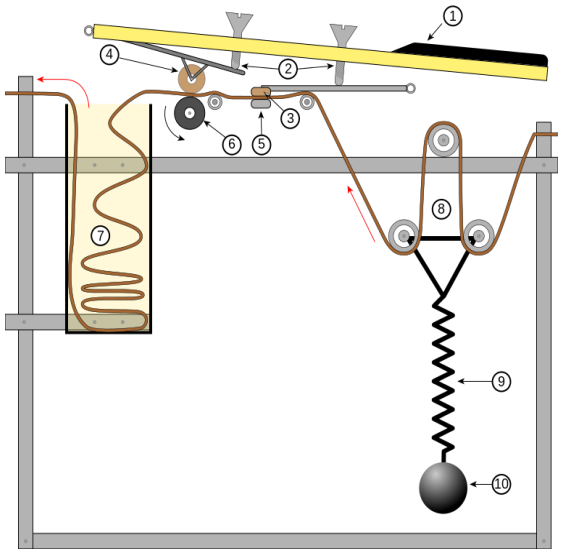


Figure 2.1: Tape-playing mechanism in the Mellotron. (Awde 2008: Pg. 17)

> The internal operations of a Mellotron. Pressing a key (1), causes two screws (2) to connect a pressure pad (3) with the tape head (5), and the pinch wheel (4) with the continuously rotating capstan (6). Tape is pulled by the capstan at a gradual speed controlled by a tension spring (8 - 10) and stored temporarily in a storage bin (7) until the key is released.

The content of the tapes are 8-second recordings of various studio musicians either performing in small ensembles or individually. The insight behind the decision to make the tapes specifically 8-seconds can be traced back to Harry Chamberlin, whose son Richard was interviewed as saying,

> When you push down on a key, it only lasts for eight seconds. Our instruments all lasted for eight seconds because anybody who blows an instrument, if they're lucky to blow it over eight seconds, they're pretty good because otherwise they turn red.
>
> (Dilworth 2010)

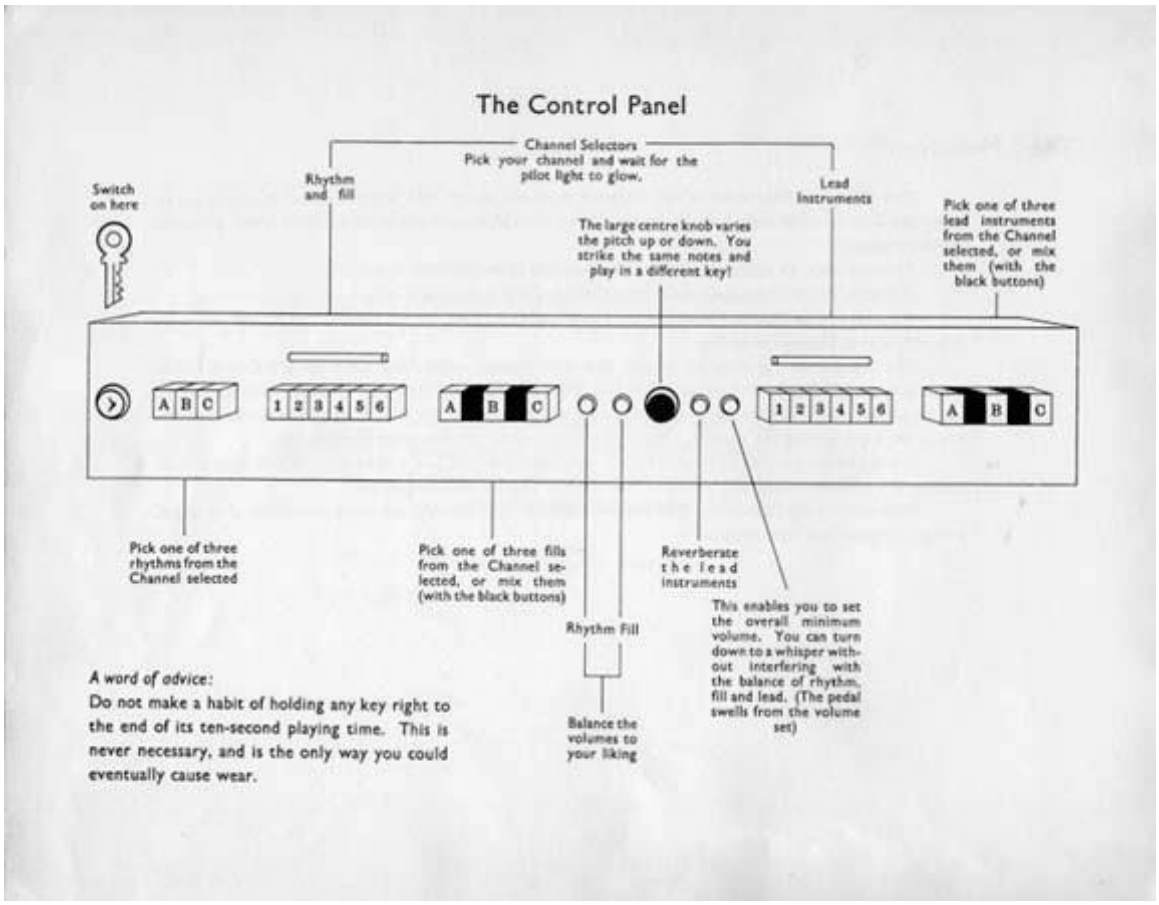


Figure 2.2 Mellotron MKII control panel (Kenwood 2010)

In addition to the electromechanical aspects of the machine, I would like to review the functions of the MKII. An explanation for the control panel from the MKII manual is provided below in figure 2.2. Unfortunately, this is the only image of its kind available, and the resolution is imperfect, so I will explain the functions. The MKII is split into 2 separate keyboards, as shown below in figure 2.3. The keyboard on the right represents lead instruments, which play different tones, but the samples are not riffs or rhythm sections, but rather single notes. The idea is that an advanced player could trigger the rhythm sections and riffs with their left hand, and then perform a solo with their right hand, playing the keyboard like a piano. In figure 2.2, on the far right there are channels

one through six to select from, and within each channel there are three tone options, A, B, or C, which can be selected separately or blended using the black buttons. This gives the performer 18 different lead tones to choose from. Next to the lead instrument channels are two buttons, one of which adds reverb to the lead instrument tone, and the other controls the volume of the lead tone so the player can mix it with the rhythm and fills appropriately.

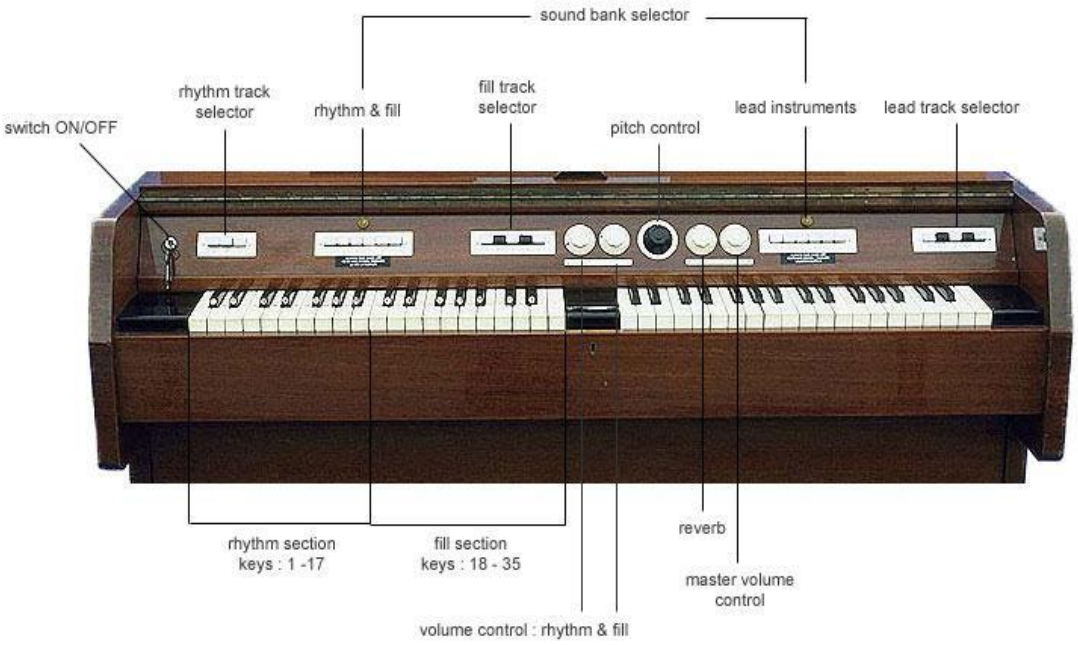


Figure 2.3:Mellotron MKII overview (Candor Chasma 2014)

Directly in the centre of the control panel on figure 2.2 is a big black knob that controls the pitch, offering the option to shift pitch within the range of a perfect fifth in either direction. On the left half of the control panel is a similar arrangement as the lead tones. There are six channels, each of which provides the option of three different rhythms that can be selected with the A, B, or C buttons on the far left. To the right of the six channels there is another set of A, B, and C buttons with black blending buttons between them for the riffs. There are 18 rhythm and fill presets available, and at any given time on a single channel, a user can toggle between three rhythm sections at a time, and blend three riff sections at a time. The buttons to the left of the big black knob allow the user to mix the volume of the rhythms with the fills to achieve a balance.

Rationale for selecting the MKII:

The MKII model is understood by keyboard historians to be the most sought after and culturally significant of all the Mellotrons. Samagaio refers to the Mellotron Mark II as the "so called 'King'of Mellotrons...It was the first totally successful Mellotron design, and was used on huge numbers of classic late '60s/early '70s tracks." (2001, P.18)

Some argue that the use of tube preamps in the MKII is the reason for its popularity. Most importantly for my selection process, the MKII is the specific model of Mellotron that is played on almost all my favorite recordings. I find the timbre, warmth, and musical character of the recordings inherently captivating, and am attracted to the instrument by way of my interest in the styles of music in the sample sets. As part of my research process I listened to each sample on the other Mellotron models, but the recordings and performances on the MKII remained the most compelling to me.

Historical significance of the MKII samples

This set of samples was the first instance of the sampler in popular culture. I specify, "in popular culture", because the concept for the sampler was designed before the Mellotron, by Harry Chamberlin. Chamberlin's instrument technically has the first set of samples in history, but this set did not reach popular culture. Regardless of this technicality, Mellotron was the pioneer of modern-day sampling because they brought the technology and the samples into the public eye, and influenced the sound of popular music across several decades.

Sampling has evolved to occupy an almost omnipresent state in contemporary recording studios, being central to multiple dimensions of workflow in the production process. Contemporary producers often build rhythm sections out of individually sampled drums, and sampled drumbeats or loops. Another common practice in contemporary music production is isolating vocal hooks, lead melodic lines, or sometimes entire sections of older songs, and sampling them in a new context, either rhythmically, stylistically or otherwise. Given the importance of sampling in contemporary record production, the

performances and sounds recorded on those original 8-second Mellotron tape loops carry great cultural value and weight. Below is a complete list of the rhythm and fills samples on the Mellotron MKII.

The following section presents a list of the complete MKII rhythm and fills presets.

MKII rhythm and fills (complete, 18 sounds)

Bossa Nova/Moving Strings Lo
Viennese Waltz/Accordion Chords
Slow Waltz/Guitar Chords
Rumba/Guitar
Cuban/Piano Chords
Accordion Bass Chords/Accordion High Chords
Dixieland/Trombone
Slow Foxtrot/Organ
Quickstep/Swinging Saxes
Church Organ R/F (Single Notes)/Church Organ R/F (Single Notes)
Cha Cha/Swinging Flutes 1
Moving Bass+Piano/Moving Strings Hi
Reverberated Organ (Single Notes)/Reverberated Organ (Single Notes)
Bolero/Brass Harmony
Tango/Piano Moving Chords
Jazz Foxtrot/Blues Beat in F
Samba /Tempo 6/8 in F
Fast Jazz Bass/Twist in C
(Resch 2014)

Relevant uses of the MKII rhythm and fills presets in popular song

The following section is an overview of the instances of Mellotron use in popular music that are similar enough to the composition I created that they can be considered forerunners of the style. The MKII rhythm and fills presets are much less common to

hear on progressive rock/sixties pop recordings than the string pads and flutes, but they have been used on a number of significant records and film scores since their release.

Among the most notable is the introduction to the Beatles song “The Continuing Story of Bungalow Bill” which features a distinct classical guitar line that is sampled rather than performed on the guitar. That song also features the MKII’s mandolin and trombone presets as colors at different points in the song. The Kinks used the Rock Guitar and Swinging Flutes fill section on their song “Phenomenal Cat”.

George Harrison recorded the rhythm and fills presets in *Wonderwall Music* which is the soundtrack to the 1968 film *Wonderwall*. Of all the recordings I found of the rhythm and fills, this instance of the use was the most relevant to my project. This is because it is among the only instances of the Mellotron being used in this specific way. In recordings such as “The Continuing Story of Bungalow Bill”, the rhythm and fills sample sounds exactly like recorded guitar rather than Mellotron, whereas in the soundtrack to *Wonderwall*, George Harrison uses the samples in a way that makes it clear that they are samples. He achieves this by looping phrases and using pitch shift functions to emphasize the samples rather than to disguise them. In”Greasy Legs”, Harrison uses multiple low accordion drone notes from the MKII as the intro to the song. He then holds out a single drone note for the remainder of the song, on top of which he plays sparse single note melodies using the celeste and piano samples alongside a wandering flute melody. This composition is primarily made of Mellotron attributes, which makes it a noteworthy reference.

Also on this same George Harrison soundtrack is “Drilling a Home”. Inglis (2010: p. 17) talks about the vibe of "Drilling a Home", stating, "its jangle piano instantly recreates the mood of a crowded saloon in a frontier town, or a Laurel and Hardy or Keystone Cops pursuit.”

On “Drilling a Home” the rhythm section is comprised of a series of samples from the Dixieland/Trombone set on the MKII. This rhythm section is comprised of drums, upright bass, and subtle horn riffs. In the first segment of the song, the loop repeats while live upright piano is being played on top of the mix. For the second section the loop is

sped up slightly with the same piano accompaniment and the novel addition of thunder sounds. Toward the end, the sample is sped up even more and the pianist plays faster accompaniment yet while the rainstorm sound effects gradually increase in volume. For the final melody of the song, the piano turnaround [2]and the Mellotron loop are repeated abrasively as if a vinyl record were skipping. This loop is gradually faded out to end the song. This use of tempo manipulation across the duration of a song taught me a useful technique that I replicated in my own composition. Both the MKII and the digital Mellotron have pitch control knobs, which manipulate tape playback speed and allow the player to shift time and pitch in real time while performing.

Stylistically it is necessary to reference the song "Heigh Ho" by Tom Waits & the Seven Dwarfs. This song was not recorded using specifically a MKII, but uses looped Optigan[3] rhythm section samples as the principal rhythm section. There are sporadic sound effects placed over the loop as well as a lead harmonica track. This composition is aligned with my creative vision for using a tape-based/-inspired keyboard sampler to build a rhythm section, which is a standard practice in genres such as hip-hop. This same use of Optigan as the rhythm section is used in the song "Clint Eastwood" by the Gorillaz, which was number 57 of Billboard's top 100 songs of 2001.

Another relevant use of the rhythm and fills is in quirky independent film scores. Most notably composer/producer Jon Brion used various MKII and Chamberlin rhythm and fills tapes to compile his scores for *Magnolia* (date), *Boogie Nights* (date) and *I Heart Huckabees* (date).

In an interview with Nick Awde, Geoff Unwin talks about using the Mellotron in unconventional ways that are relevant to my project.

> Yeah I know them all backwards. In fact I'm probably the only person in the world who could play Dave Brubeck's 'Take Five' (1959) using

---

[2] "In jazz, a turnaround is a passage at the end of a section which leads to the next section. This next section is most often the repetition of the previous section or the entire piece or song." (Randel 2002, Pg. 693)

[3] "The Optigan (a portmanteau of Optican Organ) is an electronic keyboard instrument designed for the consumer market. The name stems from the instrument's reliance on pre-recorded optical soundtracks to reproduce sound." (Brend 2005, pg. 104)

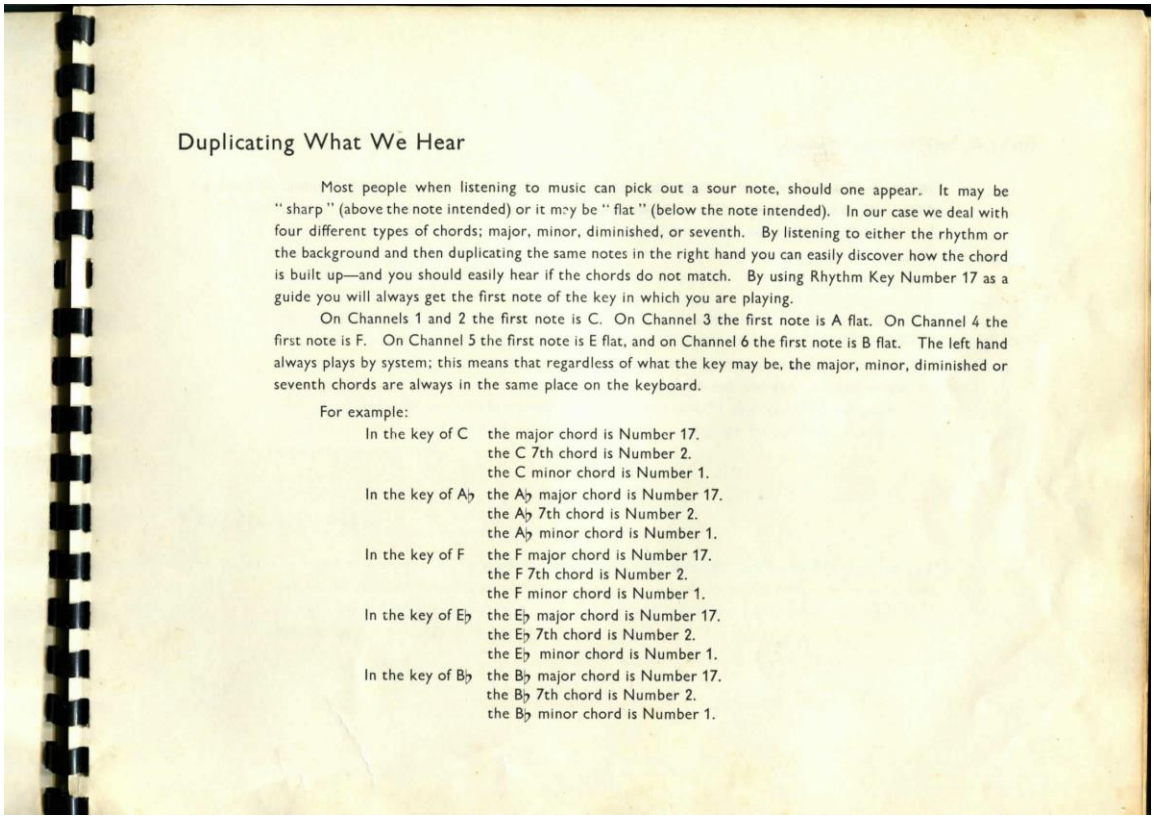
> the Mellotron rhythm tapes. The song is five beats in the bar, who would be interested in that? But I made it appear five beats in the bar by using three-four time, releasing keys at the right moment and 'walking' along the keys to make it sound like 'Take Five' in perfect time.
>
> (Awde 2008, pg. 72).

This is the earliest suggestion of compiling fragments of samples and performing them to create new rhythms and time signatures.

Understanding Mellotron music theory

The first step in understanding the architecture behind the music theory of the rhythm and fills presets is interpreting the limited information that was provided with the instrument. The examples below are scans from the original MKII songbook, provided to me personally by Markus Resch. I have scans of all the pages of the songbook that refer to the architecture and use of the instrument, but do not have the entire book, nor do I know how extensive the book is. The first of the three scans explains that regardless of what set you are using, key 17 will be the root or tonic of the key. The language used implies that this explanation was written for non-musically trained players to understand. It then goes on to state that the major, minor, diminished and 7^{th} chords are always in the same place on the keyboard regardless of what set the user is on.

The user manual fails to tell us that the chords, as their distance relates to the tonic, also do not change on the keyboard regardless of set. For instance, the IV chord is always on F, and the vi chord is always on B ♭ . The following scan gives us an example of this by laying out the keyboard in C major. By thinking of chord progressions in terms of numbers (which many do), the system is quite easy to comprehend.



Duplicating What We Hear

Most people when listening to music can pick out a sour note, should one appear. It may be "sharp" (above the note intended) or it may be "flat" (below the note intended). In our case we deal with four different types of chords; major, minor, diminished, or seventh. By listening to either the rhythm or the background and then duplicating the same notes in the right hand you can easily discover how the chord is built up—and you should easily hear if the chords do not match. By using Rhythm Key Number 17 as a guide you will always get the first note of the key in which you are playing.

On Channels 1 and 2 the first note is C. On Channel 3 the first note is A flat. On Channel 4 the first note is F. On Channel 5 the first note is E flat, and on Channel 6 the first note is B flat. The left hand always plays by system; this means that regardless of what the key may be, the major, minor, diminished or seventh chords are always in the same place on the keyboard.

For example:

In the key of C	the major chord is Number 17. the C 7th chord is Number 2. the C minor chord is Number 1.
In the key of A♭	the A♭ major chord is Number 17. the A♭ 7th chord is Number 2. the A♭ minor chord is Number 1.
In the key of F	the F major chord is Number 17. the F 7th chord is Number 2. the F minor chord is Number 1.
In the key of E♭	the E♭ major chord is Number 17. the E♭ 7th chord is Number 2. the E♭ minor chord is Number 1.
In the key of B♭	the B♭ major chord is Number 17. the B♭ 7th chord is Number 2. the B♭ minor chord is Number 1.

Figure 2.4: MKII manual “duplicating what we hear” (Resch 2014)

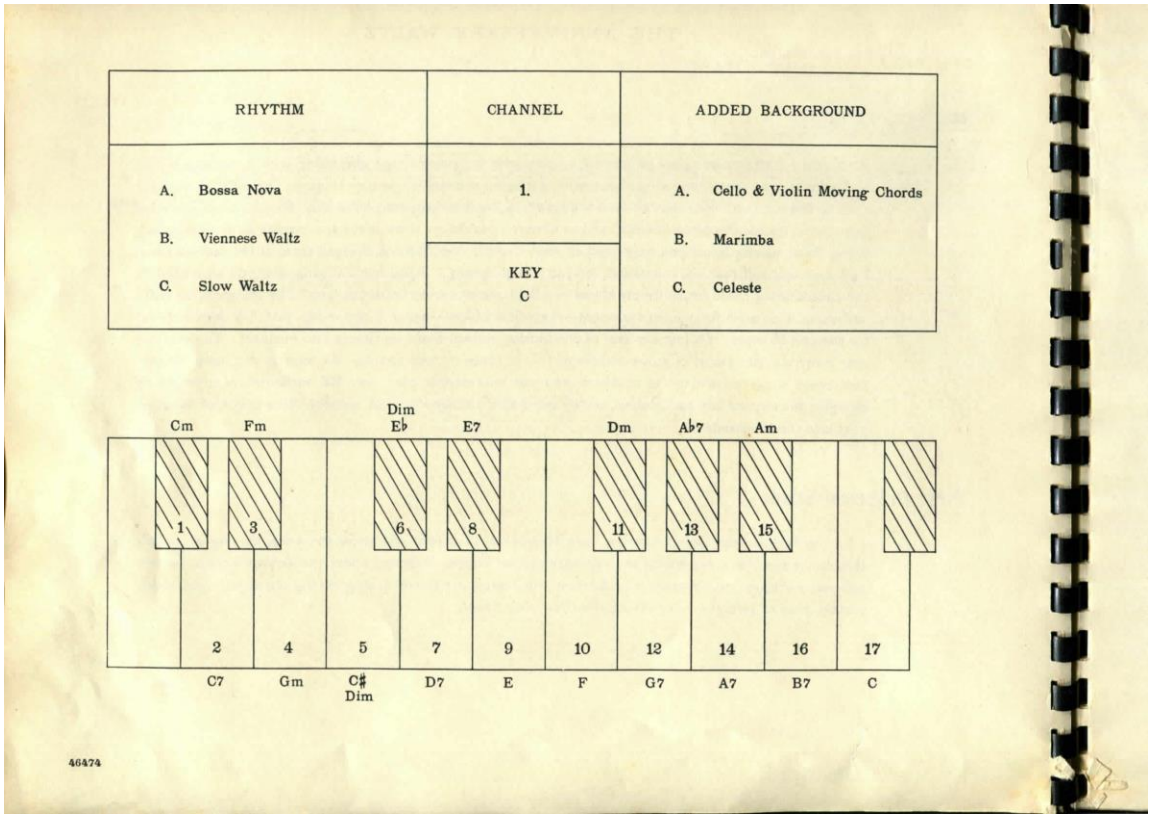


Figure 2.5: MKII manual chord layout (Resch 2014)

During my analysis of this system, I wondered what logic went into selecting these specific degrees of the scale to include on the sampler. My conclusions were only speculative, but I hypothesized that the chords selected were among the most commonly used in popular music at the time. One mystery with regard to this assumption is the missing minor three chord from this sequence. From my research of the styles, listening to and analyzing a number of songs, I found that the minor three chord was used more commonly than many of the other less common chords that ended up on the Mellotron. This conclusion contradicted my initial hypothesis about the selection process for the chords. There are 12 notes in the chromatic scale, each of which could be a major, minor, diminished or seventh chord, which leaves 48 chords from which to select 17 samples.

There are 5 different channels on the MKII, each of which is in a different key and features three rhythm sections and three lead voices. Also included in this 50-year-old songbook are songs written on sheet music specifically for Mellotron performance. The

third scan below is an example of this and instructs the player to whistle or sing the tune, and cues the Mellotron changes where necessary.

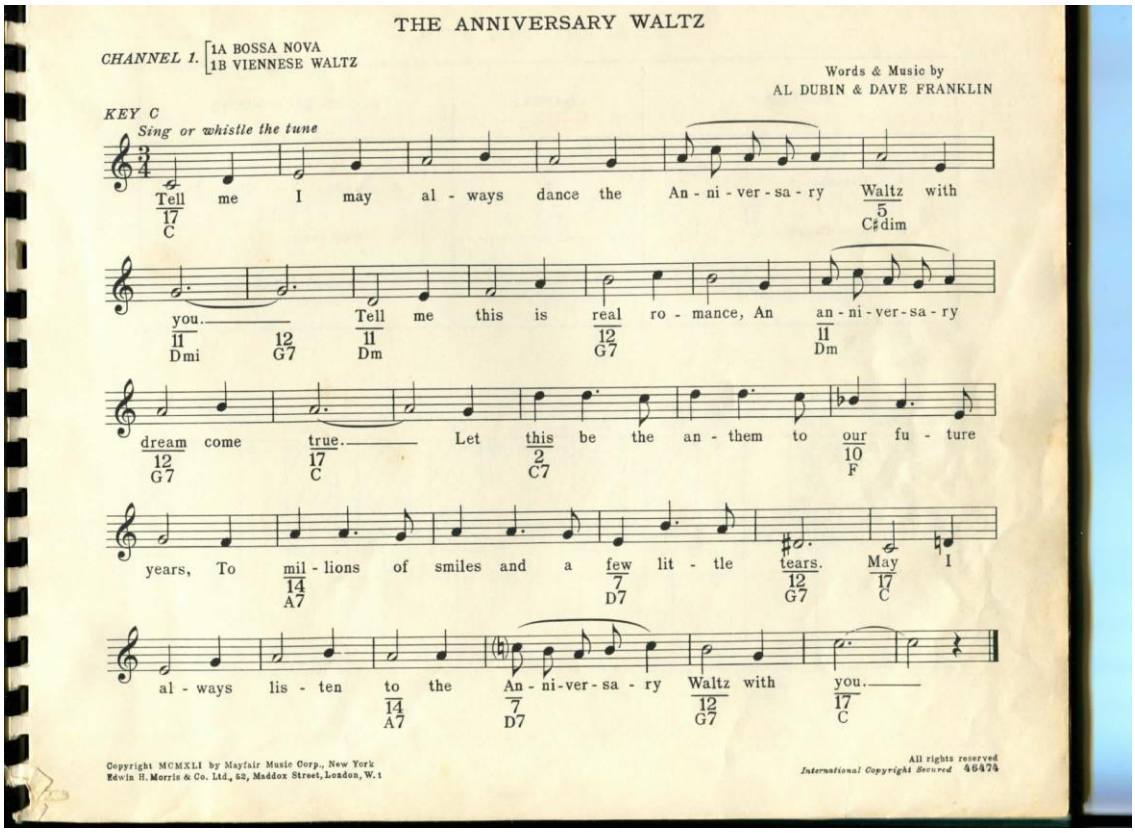


Figure 2.6: MKII manual songbook sample (Resch 2014)

The next challenge in understanding the underlying music theory is to figure out what the lead instruments are playing. Even after thorough research, I found no evidence that anyone had ever transcribed the lead riffs or rhythm sections for the instrument. Additionally, there are no MIDI capabilities with the M4000 or other contemporary Mellotron sample banks for these sets. As part of my research I transcribed all the lead instrument riffs. I decided not to transcribe the rhythm sections because, after transcribing a few I found them to be almost identical in terms of the rhythms and interval movements from sample to sample. Within a set, the drum or bass pattern rarely changes, and generally each sample plays the same groove with the same

instrumentation, just in a different key. Transcriptions of all the lead instrument riffs are shown in Appendix A. Figure 2.7 shows an example of one of my riff section transcriptions.

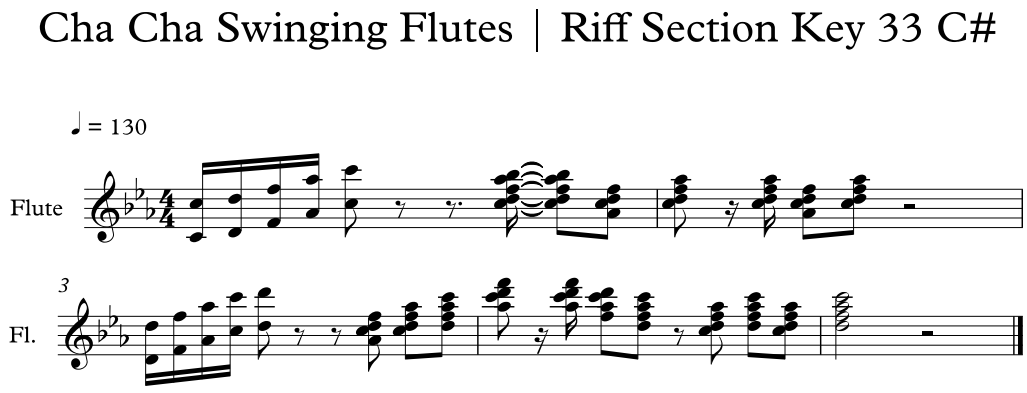


Figure 2.7: Transcription example cha cha 33

Additionally, I designed a data sheet for each set that charts the spectrum of key transposition as the pitch bend function is engaged to different extents, shown in Appendix B.

During my composition process I researched the history of each of the styles of Ballroom dance that were selected as presets. The process of this research included using sources such as Grove Music Online, and databases including Google Scholar, Microsoft Academic Search, iSEEK and WorldCat for basic historical background information, which led to additional research about significant musicians or groups from each style. After establishing a general idea of the prominent artists of each style, I systematically

listened to several of the most popular compositions from each artist[4], analyzing the instrumentation, arrangement, production, rhythms, and the melodic and harmonic patterns. The goal of the first phase of my composition process was to get to know the samples and try to understand what they are trying to emulate or do. It is clear that the samples were meant as dance accompaniment, and as a composer it would be negligent to ignore the diverse origins of these different styles of world music. The process of composing included reflections on these notes about each style of music that I was expanding on, and application of those patterns to what was being written. For instance, I calculated the average tempo of the songs in each genre, and then used that as a starting point for my tempo for the piece. Additionally, I found that some of the styles featured recordings that balanced the rhythm section volume louder in the production than the melodic instruments, so I used this insight in the mixing phase of my first round of compositions. It is worth noting that my attempts to emulate each style are imperfect, and therefore a limitation of this phase of the project, because I only have a limited experience and amount of information with each style. My goal was to approximate the general trends in each style, and use them as the framework for the compositions, rather than trying to create a perfectly accurate representation of the style and era.

Concluding remarks

My primary research question asks what compositional and performance techniques can be developed on the MKII to expand and enhance its use. In order to expand the use of the MKII, I must first establish how the instrument is traditionally used. This chapter reviews the basic techniques used to date, as well as the original social role and function of the MKII at the time of its release, which was as a dance hall instrument intended to be used like an elaborate home organ. The chapter establishes that the instrument is relevant

[4] For example, in researching the twist, I referenced Oxford Music Online, which led me to several significant songs in the style. "The twist was banned in dance halls when it was introduced; it was danced to the song of the same name, written and first recorded by Hank Ballard in the late 1950s... More than two dozen songs written for the twist reached the charts thereafter (e.g., "Twist and Shout" recorded by the Isley Brothers and by the Beatles; Sam Cooke's "Twistin' the Night Away")." (Norton 2011)

to the cultural fabric of music history by listing the significant instances of it being used in popular music. The study then goes on to describe the limited instances in which musicians used the rhythm and fills presets on the Mellotron in unconventional ways. The limited nature of its use in these ways supports the relevance of my experimentation and research in the field.

The chapter goes on to explain the similarities and differences between the original and the contemporary digital Mellotron, and maps out the musical architecture of the instrument by explaining the relationship between the keys on the instrument, and the corresponding chords that they trigger. This is a fundamental part of my argument, as it identifies the music theory data that is available to a Mellotron player, and more importantly, the missing data that this study provides, including tempo and key charts and transcriptions. My study argues that the cryptic nature of the music theory behind the Mellotron is the reason that its use has been limited up until this point, and the presentation of this data is the primary content of my thesis. This chapter focuses primarily on answering my second research sub-question: *How has the Mellotron MKII been used compositionally in popular music, and how has its use evolved since its release in 1964?*

In the following chapter I explain the methodology for my project, and the application of this instrument to contemporary composition. I also map out the new data that I have accumulated on the instrument and apply this new data to the composition process, which will eventually lead to analysis and new Mellotron performance and composition techniques.

Chapter 3: Methodology

In this chapter I review all the equipment used to process, record and arrange the samples, followed by an explanation of the differences between the original MKII and the contemporary digital Mellotron used in this research. I review the data collected in this project, including transcriptions of all the samples, tempo charts, and timbre descriptions. Finally, I explain the logic and structure underlying the methodology of the composition process including the various stages/categories of compositional direction, and the rationale for the final arrangement of the composition. This chapter will also review the process of journaling that took place to document the composition's creation and the origin of the new techniques.

Technical methodology/ data collection

Explanation of equipment

Pro Tools

I used multi-track digital recording to capture and sequence the composition. My digital Mellotron has a quarter inch audio master output, which was sent into my digital audio workstation (Pro Tools), and edited there. No MIDI was used in the process. I did occasionally use digital effects in Pro Tools to expand my sonic potential, and will elaborate on which plug-ins were used and why in Section … below. Figure 3.1 demonstrates an instance of my visual format in Pro Tools, often cutting up fragments of the samples that were recorded and rearranging them. I am using a Universal Audio Apollo interface to connect the Mellotron to Pro Tools by way of a balanced quarter inch input.

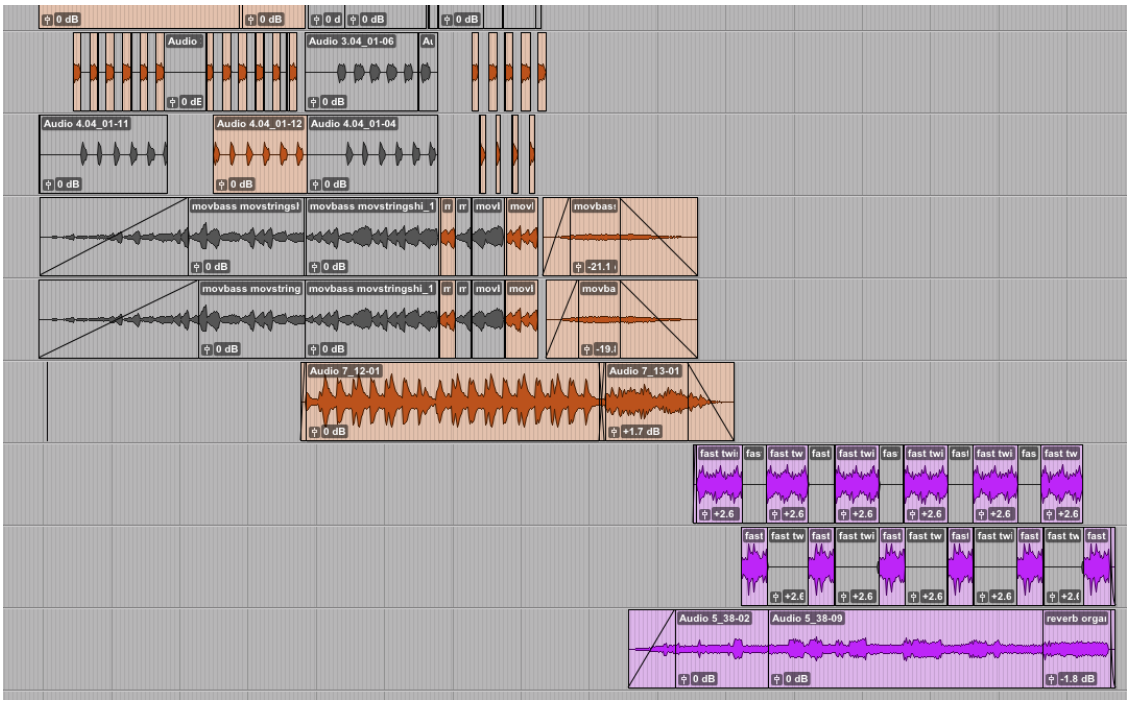


Figure 3.1: Pro Tools screenshot example

Contemporary vs. vintage Mellotron

I do not own a MKII Mellotron as they are among the rarest and most expensive keyboards in existence. I do own an M4000 digital Mellotron, which I used throughout the project for my composing and transcribing. Markus Resch is the current owner of the Mellotron name and all the original master tapes for all models. He designed the new M4000D digital Mellotron with 24 bit samples, using all the original tapes and key response that replicate the original machine's signature feel, which is a delayed touch response due to the original design of the tape dropping mechanism. Based on standards set by the International Committee of Museums and Collections of Instruments and Music, the M4000 is classified as, "544 Digital samplers and sampling synthesizers" (Hornbostel Sachs 2011).

Before describing the data collection process in detail, I will give an overview of the basic functions of both the MKII and my contemporary M4000, identifying their relative characteristics.

Below are pictures of both instruments: First the 1964 MKII, followed by the M4000D:

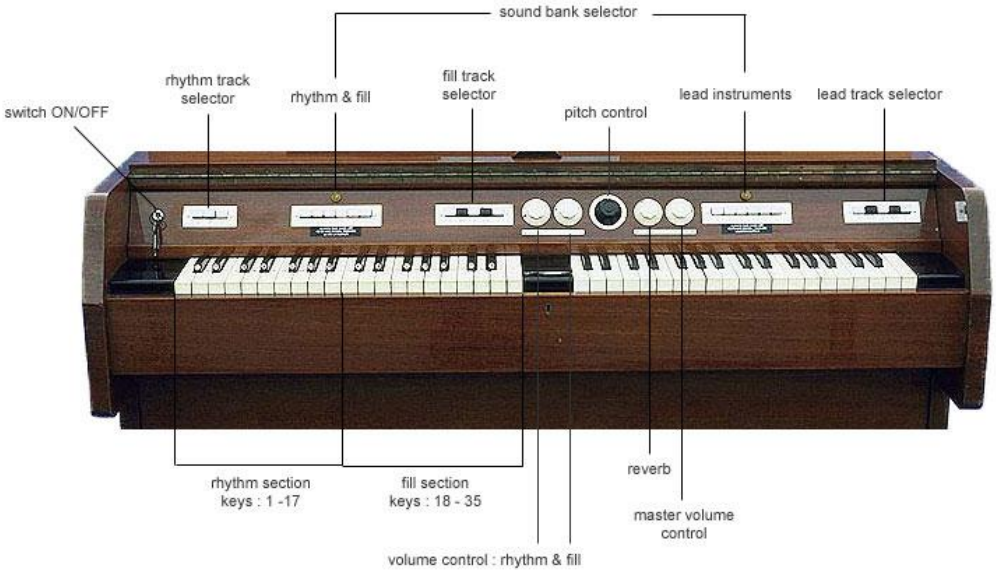


Figure 3.2: Mellotron MKII (Candor Chasma 2014)

Figure 3.3: Mellotron M4000 screen (Resch 2014)

Figure 3.4: Mellotron M4000 keyboard (Resch 2014)

The only functional difference between the two machines is that the MKII has a secondary keyboard for lead instruments, a reverb filter and an additional volume control for blending the rhythm and fills with the lead instrument. All four of these features can be duplicated with multi-track recording in Pro Tools (my digital audio workstation of choice). Also, the contemporary M4000 has a tone knob that the MKII does not. The idea behind the additional keyboard on the original MKII was that a player could play octaves with the left hand to trigger both the rhythm and fills sections simultaneously, leaving the right hand free to play a third part, using the additional keyboard essentially as a sonically versatile piano or organ.

I will now review and explain the various functions of the contemporary M4000 Mellotron. "The sounds are taken from the original first-generation tape library giving

the same sound quality as the original Mellotrons in the 60s and 70s. It has our very advanced and in-house developed streaming technology for uncompressed 24 bit audio reproduction…Three gold plated balanced XLR outputs, all other connectors are gold plated for maximum reliability. Dimensions 859x501x135 mm, weight 17.5 kg." (Resch 2014).

The Select A/B knobs on the M4000 allow the user to cycle through multiple sounds on a digital screen. This contemporary Mellotron has the option of using different sounds from various versions of the Mellotron (as you can see the M400 in Figure 3.3), but I exclusively used MKII samples. The A/B Mix knob allows the user to blend two different presets if necessary, which was an essential technique during my composition process.

The volume is a master volume for the instrument. The tone knob determines the brightness of the tone by controlling a low-pass filter. This is a helpful tool, but did not exist on the original MKII. I decided to use it (though infrequently) in the composition because it does exist on all the contemporary digital Mellotrons, and therefore is available and relevant to the audience that this study is intended for. In most instances, I set the tone to a point that bypasses the low-pass filter and kept it there.

The pitch shift knob on the M4000 is situated by default on the line. It can be turned counter-clockwise toward the (-) by degrees of 10 cents at a time, all the way down to -700 cents, or a perfect fifth below. Additionally, any given tone can be pitch shifted up the same amount. These functions are made more interesting by the 'High/Low' switch on the M4000, which allows you to shift samples down an octave when switched to 'low'.

For the sake of clarity, I have developed a system for communicating the status of the high/low switch and pitch wheel. Inside parentheses I first clarify the status of the switch being high or low, followed by a backslash and specification of the pitch wheel modification using the +/- sign, and numbers ranging from 0 to 700. An example of this

is: (high/-630), which means that the switch is set to high, and the pitch wheel has been shifted counter-clockwise, down 630 cents. For clarification, there is not a perceptible timbral difference between, for instance, low/+700 and high/-500: these settings cause the same sample to be triggered. The first example, low/+700 plays an octave below the original sample, shifted up a perfect fifth, whereas the second example plays the original sample shifted down a perfect fourth, both resulting in the same pitch and therefore the same sample.

With these additional tools, the limitations of the instrument are overcome by way of the ability to change any individual sample into any key or tempo that you would like via a combination of the high/low switch and the pitch wheel. The pitch shift feature existed on the original MKII, allowing the user to modulate the pitch either up or down a perfect fifth. However, the ability to additionally shift the tones down an octave was not available on the MKII, but I decided to use the additional feature from the digital Mellotron in my project. The reason behind this is that I suspect that contemporary Mellotron users will most likely be using a digital Mellotron for their composition process, and the addition of this variable therefore seemed practical. Furthermore, it was common for MKII users to manually modify the pitch by physically adding pressure to the spinning mechanism that reads the tape loops, as a vinyl-scratching DJ would to a turntable, resulting in drastically changed tones and pitches. The addition of the octave switch mitigates for the inaccessibility of this feature in the digital Mellotron.

The other interesting dimension of this is that as you pitch shift the samples, they become more and more warped and distorted, and their timbre changes. As a result of this, there are some beautiful new tones that one can find, and some interesting opportunities with tempo. At a glance, these diverse variations in pitch and timbre per sample would seem to be too complex to use as a practical tool in a calculated way. After mapping out all the data, I found that my composition process has been more thoughtful and focused as a result of understanding the music theory that underlies the Mellotron. I will elaborate on this in my “Techniques” chapter.

Transcription

Before composing anything with the Mellotron, I transcribed all the presets. In the rhythm section, rhythms, intervals, and melodic phrasing are all almost identical, but the root note changes depending on which of the 17 keys is triggered. In lieu of this similarity, I decided not to transcribe the rhythm sections note-for-note. Instead I mapped out all the keys (tonalities) and identified the type of rhythm that is being played. For practical purposes, such as writing, recording, performing, etc., I found that note-for-note transcription of the rhythm sections was unnecessary and redundant. I initially transcribed the rhythm section of a few sample sets, but while I was composing with my transcriptions I found myself ignoring the note-for-note transcriptions and instead referring only to the key centre.

After making this decision, I went through all 15 sets and transcribed every riff, consisting of 15 sets × 17 keys per set for a total of 255 transcriptions of 8-second samples. After finishing my transcriptions I also hired a professional transcriber to double-check my work. All my transcriptions are located in Appendix A.

These transcriptions are labeled with the title of their set, the riff section key number, and the piano note. The key number system starts at key 1 on the lowest possible note on the keyboard, which is an F, and spans up to key 37, which is the highest key on the keyboard and also an F. Throughout the project I refer to these key numbers to clarify my processes.

Key centres

My methodology for identifying the key-centre of each sample started by establishing the tonic of the set, and then identifying how that tonic changed as the pitch shifted in increments of 100 cents. Essentially, I mapped out every possible key that every sample could be played in. One thing that was helpful in this process was the original manual/documentation that came with the Mellotron MKII, which was scanned for me by Markus Resch, as seen in Figure 2.4 above. These helped give insight as to the

relationship between the keyboard and the chord changes, and helped me understand that key 17 is always the key centre on a rhythm and fills sample set.

Once I had established the key centre in a given set, I turned the pitch wheel up 100 cents and checked that the key centre had risen by one semitone, as expected. These results were not surprising, but the documentation of this information proved to be very useful as I used it as a quick reference regularly during my composition process.

One difference between my M4000 and the original MKII (as observed from the songbook scans) is the key layout. On the M4000 there are 37 keys, while the MKII has 35. The M4000 includes an additional two keys at the far left of the keyboard, starting on F, whereas the MKII starts on G. The two additional samples on the M4000 play a B ♭ m (key2/G ♭ 1) key centre, and a B ♭ (key 3/G1), as it relates to the example in the songbook above. When I say key centre I mean that the rhythm section samples play arrangements based on the B ♭ m and B ♭ chords. This is a logical addition, as it adds new key centres to the palette. I had hypothesized that these samples were the same as those on Key 1 and 2, but pitched down because they sounded musically identical and integrity was lower-fidelity as if they had undergone pitch modification. I looked into this, but Resch informed me that these extra keys were occupied by samples of original master recordings that were not on the original Mellotron.

Tempos

The first step in collecting tempo data for these sets was to establish the tempo of the set with no pitch modification. The next step was to chart the variation of new tempos as the pitch is shifted in increments of 100 cents. Upon analysis of my data I concluded that the increase in tempo as the pitch is shifted is dynamic, rather than constant or exponential. As a result of this, there is not an exponential equation or graph that maps out the relationship between the tempo and the pitch. The tempo does move generally in similar increments as the pitch is increased, but in the case of each sample set, it varies regularly in the extent to which it changes.

There are a few possible limitations to this data that might explain the inconsistency in tempo. One of which is that pitch shift knob is turned and corresponds with a number on the digital screen that says 0, or +100, etc. In most cases it is easy to turn the pitch shift knob enough to have it settle on exactly on the semitone mark (+100, +200, +300, etc.), but occasionally, the knob refuses to stop on the exact mark, instead settling on +90, or +110, for instance. In these peculiar cases, I tested and recorded the tempo of each of these settings (+90 and +110) and used the average of the two as my figure.

Another limitation of the study presents itself by way of my method of calculating the tempo, using tap tempo metronomes. I listened to the sample, and tapped along with the beat, and the computer program processed the clicks and presented the average tempo over time. To assure accuracy I insisted on performing a minimum of forty sample taps for the program to average out per tempo, and then checked my work by listening to the playback of the metronome layered over the sample. Regardless of the tactics I used to assure accuracy during this phase of research, there is always the possibility that my tempos may be slightly askew, as they were calculated in this way.

Timbres

I went through all variations of pitch for each sample and listened to the timbre and tempo at every pitch-shift point, taking descriptive notes about what the tones sound like. I tried to be as thorough and objective in this process as possible, occasionally writing short paragraphs describing a sound I was hearing. In other cases, I would note when samples had been pitch shifted so extremely that it sounded abrasive and unpleasant.

One might assume that a performer could pitch shift any two samples until the speed is matching, but the key relationship will not match, which is why the data sheets are relevant and necessary. These relationships between the Mellotron's samples have not been documented until this study. In essence, the data sheets form a bridge between the Mellotron and the DAW editing software. They demonstrate the potential for new possibilities, and the DAW software enacts this potential. The technical details of the instruments used in this project, and the data collection process, have now been

established. In the following section I will introduce the conceptual design and architecture behind the composition process.

Composition methodology

Thematic and artistic concept

The first step in establishing my creative vision and decision-making process was to create a theme, and an aesthetic goal. In the process of establishing this, I referred back to my research question, focusing on *reinterpreting the instrument's original social role to function in a contemporary social and stylistic environment.* The following explanation will explain the creative direction for the original composition, and analyze the outcomes of the various creative decisions along the way as they relate to the reinterpretation of the Mellotron's role and function.

I decided on 'sounding simultaneously old and new' as a creative direction for the composition in this study. In terms of their "typical" usage, the Mellotron samples sound undeniably nostalgic and evocative of their era. Conversely, with contemporary digital editing, plug-ins and signal chain hardware, any sound can be transformed into a contemporary tone, so I wanted to find a balance between the two. I carefully selected the attributes from both old and new music that I considered would contribute to a compelling and exciting original composition.

In the following explanation and throughout this study I use the term "old". In this context, this term is to be interpreted as it relates to popular music, in which pre-1965 is indeed old. The term is used primarily as a conceptual descriptor, intended to help focus the creative direction of the project.

I knew that I could control some differences between the old and new Mellotron models. For instance, as noted earlier, I embraced the newly added 'tone' knob on the M4000 despite its difference from the MKII. Additionally, I wanted to establish attributes that were outside of my control, to further understand the nature of the project.

I first established which attributes of the Mellotron samples are inherently evocative of their era. All the performances in this sample bank took place before 1965. This means that all the gear was from that era as well. When working with recordings of performances that happened 50 years previously, everything about them is reminiscent of that era. The popular songs that featured these samples, over the course of music history, are mostly from at least 40 years ago, and so the reuse of these samples enhances their classic quality in a different way. Additionally, the genres that were chosen for these sample banks are styles of Ballroom dance that were popular between the 1930's and the 1960's, which also contributes to the samples' vintage quality.

After establishing and defining the elements of the Mellotron samples that were inherently old, or reminiscent of their era, I reflected on the aspects of my composition and recording process that were inherently new and contemporary. First, I have access to a variety of harmonic enhancement effects, both in hardware and software form, so the composition will inevitably occupy a wider range of the sonic spectrum. These Mellotron samples do not feature extreme low end or high end compared to contemporary music, but I can tastefully add those frequencies with effects. Another thing that is inherently new about this composition process is that the audio is being recorded into a digital audio workstation (Pro Tools), and manipulated and sometimes arranged there. In this sense I will be sampling the samples as a phase of editing, which is distinctly different from the original intended use of the Mellotron as a home entertainment instrument. This also validates the practice of sampling, and is an example of using the concept in a contemporary way. The chronological distance between my project and the release of the MKII is a factor that needs to be acknowledged. 50 years of popular music has been presented to the world since the machine was released, and my perspective of music as a composer in 2016 is much different from that of a composer in the 1960's. The implication of this is that a composer in 2016 has been exposed to a vast palette of changing genres and styles and trends in music that did not exist in the 1960's. Consequently, any contemporary composer must factor in the influence of music history on the composition itself. Lastly, I was pursuing this composition while simultaneously

searching for new techniques, so the nature of this composition process coinciding with experimentation has undoubtedly influenced the outcome of the work.

With a clear idea of the aspects of these samples that were inherently old and new, I then selected attributes from each category/era that I felt contributed to the goal of creating a compelling and exciting piece. I was also aware of aspects of each category that were contingent upon the cooperation of the other, for instance, if a sample is too distorted it can take from the compelling nature of the original sound, or if one of the samples sounds too generic it can take from the contemporary feel of the piece.

This thought experiment resulted in a focused, creative direction. I began with a general, conceptual goal, which is to make the composition sound old and new simultaneously. I addressed the influences and aspects of the project that are inherently new and old, and strategically selected the ones that I thought would contribute to a compelling and exciting original work. I referred to this direction constantly during my composition process, and it informed many decisions that I made.

Preface to methodology

When I refer to presets or sets, I am referring to one of the 15 stylistically unique sample banks that are included on the MKII. Each individual set has a name, which is a style of dance like Cha Cha, or Waltz, and has 17 rhythm section samples and 17 lead riff samples, all of which are eight seconds in duration. In lieu of this complex pallette, I decided to add limitation and direction to my creative process by identifying stylistic goals, and writing toward those goals.

Initially, I pursued three different styles of composition, which I will describe in the following section, based on my aesthetic and stylistic goals for the final pieces. I started writing separate pieces in these three styles with each individual preset, and progressively began blending sets as I became more acquainted with the materials. After this first phase of writing I had 45 original musical vignettes, 3 styles in each of the 15 presets. This process then led to the composition of longer scale pieces, specifically three different, eight- to twelve-minute compositions. I had originally intended for these to be

my final thesis submissions, but instead resampled and rearranged them in a new sequence to create my final composition. This composition process included many phases of writing and reworking, which I will describe in depth in the following section.

Returning chronologically to the beginning of the project, my first phase of categories focused on three aspects of the Mellotron presets that I sought to explore:

1. Style and Genre
2. Tonality and Harmony
3. Rhythm, Tempo and Timbre

I used these three categories to build my research structure so that I would be prepared for my final composition. I will give a general overview of each category and explain the approach.

Style and Genre

Of the three categories, I always started with the style/genre composition, which was an attempt at composing in the original style of the sample. I selected the term style because it represents collections of attributes in common, and in music this helps to organize types of music. Grove Music Online defines style as:

> A term denoting manner of discourse, mode of expression; more particularly the manner in which a work of art is executed. In the discussion of music, which is orientated towards relationships rather than meanings, the term raises special difficulties; it may be used to denote music characteristic of an individual composer, of a period, of a geographical area or centre, or of a society or social function… a style may be seen as a synthesis of other styles.
>
> (Pascall 2016)

I selected the term genre to accompany style in the description of this category because it is a more macro word for a similar concept. Grove Music Online defines genre as:

> A class, type or category, sanctioned by convention. Since conventional definitions derive (inductively) from concrete particulars, such as musical works or musical practices, and are therefore subject to change,

> a genre is probably closer to an 'ideal type' (in Max Weber's sense) than to a Platonic 'ideal form'…Genres are based on the principle of repetition. They codify past repetitions and they invite future repetitions.
>
> (Samson 2016)

Both genre and style refer to patterns, groupings, and categorization. For this set of compositions, I used 15 different dance types, each of which originated from a specific type of world music and region of the world. The word style seemed more appropriate to describe groups of dances like "cha cha" and "bolero" because they are not typically considered genres of music. But additionally, I decided to add the word genre because each of the above noted styles of music have some relationship to a genre. Also, in the case of the waltz, there are specific instances that could be considered genres, such as The Viennese Waltz. Using both style and genre to describe this category of composition encompasses both the micro and macro perspective of these dances. Together these two words inquire as to the specific musical patterns as well as the historical contextualization of the dances.

Before beginning my composition process, I would first do historical research to understand the genre, so that I could be more true to the style as I was writing. My research regimen included listening to dozens of popular recordings in each style, and analyzing the chord progressions and melodies. This helped me grasp the songwriting style that accompanied these various styles of music, and consequently influenced my choices. Once I understood the basic nature of the genre, I would write a short piece in that style.

My original intention for the style and genre long-scale composition was to create a piece that moves gracefully between different genres of music. Given the nature of the presets, as designed to be accompaniment for ballroom dance parties, I set out to write a piece that used the MKII in its state of nature. Just as Picasso mastered realism before conquering more experimental genres of painting, I thought it was strategic to get acquainted with the original intended use of the presets as one of my stylistic categories.

Tonality and harmony

For tonality and harmony, I planned on focusing my creative energies on the exploration of different harmonic textures and colors through creative use of the samples. I also aimed to experiment with tonality by layering and building new and unusual harmonic patterns with riffs and rhythm sections that were in different keys. My understanding of the term harmony is the same as Grove Music Online, which defines it as:

> The combining of notes simultaneously, to produce chords, and successively, to produce chord progressions. The term is used descriptively to denote notes and chords so combined, and also prescriptively to denote a system of structural principles governing their combination. In the latter sense, harmony has its own body of theoretical literature.
>
> (Dahlhaus 2016)

My understanding of the term tonality also aligns with Grove Music Online's definition, stating that tonality is:

> A term first used by Choron in 1810 to describe the arrangement of the dominant and subdominant above and below the tonic and thus to differentiate the harmonic organization of modern music (*tonalité modern*) from that of earlier music (*tonalité antique*). One of the main conceptual categories in Western musical thought, the term most often refers to the orientation of melodies and harmonies toward a referential (or tonic) pitch class. In the broadest possible sense, however, it refers to systematic arrangements of pitch phenomena and relations between them.
>
> (Hyer 2016)

For this type of composition my principal focus was to explore the harmonic variations achieved by combining different tones and timbres, affected by speed variations in pitch. The most obvious application of this concept is in the string arrangements in "Romantic Strings". In this example, the melodic string samples are pitch shifted to varying degrees and then layered to create an unusual harmonic texture. With regard to tonality, I would like to point to the fact that "The Champagne of Instruments (Intermission 2)" and "Slacks and Cadillacs (Intermission 3)" are the exact same sample played in different keys and at different speeds. The latter example ("Slacks and Cadillacs") functions as an elaboration of the first idea, with violins arranged and performed over the rhythm section

sample. This concept of featuring two identical samples that sound quite different from one another through pitch shifting arose out of a search for musical ideas within the realm of tonality.

Rhythm, tempo and timbre

For rhythm, tempo and timbre, I wanted to explore the use of the MKII in composing with a focus on rhythms, polyrhythms, and tempo shifts. I also wanted to use this category to experiment with the wide variety of timbres available on the instrument. I understand the term tempo to refer to the pace or speed at which a piece of music is performed, while timbre refers to the aesthetic quality of the tone, or the color of the tone. Rhythm has a slightly more ambiguous definition, but is a concept that is generally understood by most people. Grove Music Online defines rhythm as, "Generically, a 'movement marked by the regulated succession of strong or weak elements'. (*Oxford English Dictionary*). In etymological discussion of the term there is a tension between rhythm as continuously 'flowing' and rhythm as periodically punctuated movement." (London 2016)

For this category I decided to use the pitch shifting options on the Mellotron to modify the tones within the instrument, exploring various unconventional timbres. Additionally, knowing that each preset is associated with a specific dance and consequently plays a traditional rhythm, I wanted to experiment with pitch shifting and overlapping samples to uncover new rhythms, styles, and sonic landscapes.

Composition experimentation and journaling

Throughout this process of composing, I kept a detailed journal mapping out every chord progression and explanations of how I came upon each sound, riff, etc. I charted my creative process and explained how I came to make different decisions. I was reflective about what I was trying to achieve in relation to decisions being made, and how my constraints were chosen and why. Additionally, I was always aware and reflective about the nature of the process and how that influences the outcome. I ended my journaling with around 30,000 words worth of enthusiastic insights about the Mellotron MKII.

My methodology for journaling included various types of documentation along my process of composition. The central form of documentation was recording audio narrative about my process as I was writing. I tape recorded myself verbally explaining the steps I was taking as I tried different things, and then transcribed the tape recordings into written text at the end of each composition session. I decided on this method because I thought that real time typewritten journaling would take too long and consequently interrupt or disturb the creative process.

Additionally, I took screen shots of all my Pro Tools sessions regularly, every hour or so, to document the visual evolution of the various sessions. This functioned in situations where I came across a particular sound, but then changed it and later wanted to recreate it. I also used the method of regularly saving the Pro Tools sessions as copies of the original, which resulted in multiple preserved versions of each session at varying points in time, in case I wanted to retrace my steps and recreate something from any point in the process.

While exploring the various sounds, tones, and timbres, I had hoped to finish the project with a glossary or library of sounds that the instrument can make. This verbal and visual methodology allowed me to document a wider variety of sounds than those that ended up in my final composition. This expanded library of sounds aided in the development of my Mellotron techniques. For example, there were sounds that were used early in the composition process that I wanted to document, but the compositions themselves did not make the cut, so I referenced the journal during the time that these sounds were created and used it like a cookbook for tones, reminding myself of the signal chain (both pre and post the Mellotron), pitch shifting, blending of tones, etc. This process allowed me to be open and creative during the composition process, but also retain all the insights worth keeping for the development of the techniques.

I also did journal entries before and after starting each of the composition sessions. The entries before the session included reflections on research or data that I had discovered that might be relevant and useful for the upcoming composition, and general re-centreing

of the creative vision of the respective piece. I mapped out goals for the composition and a hypothesis for what I was hoping to achieve. Additionally, I stated aspects of the composition that I was going to intentionally leave undefined so as to not predetermine the outcome. For example, if I were composing a piece in the tonality and harmony category with a brass section, I might preface the composition by hypothesizing about which samples might sound good together, or inquire about the outcome of pitch shifting the brass to different extents. I would also reiterate in the journal that although I have these assumptions about the best application of the sample set, I would not restrict myself to experimentation with only a few samples, or techniques.

After each composition process I reflected on what worked and what did not. I recorded general insights and observations about the specific set, the category of composition, and new techniques or sounds that were discovered. I added notes about how this new composition fits into the existing compositions, and how it changes the collection as a whole, if at all. Additionally, I made observations after each composition about how my process may have been influenced by the context and the methodology itself, for better or for worse. This led to an evolution of the process as I made minor changes to my methodology along the way. This is a good example of reflexivity, as the process of reflection is not merely passive, but instead actively influences and changes the nature of the creative process itself.

One example of the evolving methodology is early in the process I switched from typewritten journal entries to audio-recorded ones because I observed that the method was inhibiting my creative process. Another example is the above noted method of making assumptions and hypotheses before composing, but then brainstorming ways in which these assumptions might predetermine the results. Above I noted an example of this in predetermining the application of brass instruments. This refers to the piece “Horn Parade”, which features samples of trombone riffs. Before composing anything I had the idea of using multiple layers of the trombone riffs at different pitch shift points to stack harmonies and build a trombone section. This ended up working well, but after analyzing the composition process I realized that this initial idea had limited my exposure to the

samples through experimentation. This was early in the overall composition process, and after this observation I began writing down my initial ideas, and then allowing myself to explore a variety of approaches and techniques with each sample set before settling on one idea or concept. This methodology allowed me to try all the ideas that I had conceptualized before actually physically playing the Mellotron, but also stopped these ideas from negatively impacting the experimental creative process.

The result of these journaling methodologies is a thoroughly documented process of openly searching for new sounds, rhythms and techniques. At the end of my composition process, when I began compiling and analyzing my data, the journal entries were essential for recalling the process that led to any given result.

Additional composition experimentation – combining presets

After writing and recording 3 compositions for each preset, a total of 45 compositions, I moved on to the next phase of my project. The next phase involved incorporating multiple sets into the composition process, for instance, recording the Cha Cha and the Waltz on top of each other. I wanted to have this intermediate phase that restricted me to mixing only two sets, before opening myself up to composing with the possibility of all 15 at once. In this phase I wrote slightly longer, more thoughtful pieces and decided that I would write and record 6 in total. I ended up following several tangents during this process and wrote 10 compositions instead of 6. At this point in the project I felt the creativity open up as I was no longer collecting data or analyzing the sets. I was so familiar with them by this point that the writing process was much less intellectual and more emotional and intuitive. I would consistently pull up all my data before composing and then allow myself to ignore it and explore before returning to it to check my work. I thought of my data as a reference manual, and constantly reflected on the impact it had on my creative process.

For example, in the beginning of the composition process I would hear dissonances and then pull up the data sheets to calculate the pitches and make sure that everything harmonically added up to verify the source of the dissonance. After a while I realized

that these dissonances were in fact part of what I was hoping to achieve, especially in my tonality and harmony compositions. As a result, I did not stop using the data sheets to check my dissonances, but instead I began to embrace the dissonances. The data sheets allowed me to put a name to these strange harmonies that I was creating, rather than my initial approach, which used the data to confine the harmonic elements to conventional chords and arrangements.

Another example of reflexivity impacting my workflow is evident in the creation of the "Cha Cha Champion" piece. Initially I studied several chord progressions and tempos of various popular songs[5] in the style of the Cha Cha, and had a sense for a traditional chord progression in the style. At this point I mapped out the duration of each sample, and the position of the pitch wheel, and essentially wrote the entire composition without playing it to hear what it sounded like. Once I played through the composition, I realized that the process included no experimentation, and was purely theoretical. This led to me to reconsider my approach, as the nature of my project is discovering new sounds and ideas through experimentation, and I stopped using the data sheets as a compositional tool until after I had spent enough time experimenting.

After these 10 compositions were written, recorded, and documented in the journal, I set sights on my final composition. I had intentionally not been too specific about the nature of the final composition until this phase, because I suspected that my inspiration would change, as I understood more and more about the instrument. I maintained my three categories, but further developed my concept of each before starting the composition process.

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[5]According to Oxford Music Online, "Enrique Jorrin Composed the first cha cha cha titled "La Enganadora," in 1951." (Garcia 2013) This was a starting point for understanding the dance and style, which was followed by referencing Tito Puente's "Four Beat Cha Cha", and Sam Cooke's "Everybody Loves to Cha Cha Cha". Both of these titles are referenced by Oxford Music Online as having impacted the style of cha cha cha music.

Composing style and genre

I found that for the style/genre category, all 15 presets were genres associated with ballroom dances. This was a popular activity and a huge part of popular culture entertainment at the time. I decided that my final composition in this category would be a medley of all 15 dances gracefully transitioning into one another. My thought process was that if I were a Mellotron user in 1964, and hosting a living room dance party, I could play this composition and my friends could enjoy all the various styles of dance. To extend my ambitions on the concept of this composition I decided to write it in such a way that it could be performed live by one person on a Mellotron. This drastically changed the way I wrote and recorded it, and proved to be an interesting challenge.

For this composition I did not use any of the less conventional functions of the instrument like pitch shift and the 'high/low' switch because my goal was to have these styles be as natural and authentic as possible. Reviewing my historical research of each sample helped me execute this as well. I ended up using a few of my initial recordings in the final piece because I was inspired by what I had previously developed. I wrote and arranged around those and eventually built a 12-minute dance ballad featuring all 15 styles.

Composing tonality and harmony

For the second final composition I continued my focus on tonality and harmony, but decided it was important to reflect on what the Mellotron does best. In my thought process I decided that in 1964 its main use was dance accompaniment, but shortly thereafter pop and rock bands began using it as a source of strange color in their songs (Space Oddity, Strawberry Fields Forever). I thought about building a rock/pop song and using the Mellotron samples in it, but after some experimentation with a live rock band playing to the samples, and the samples being played to a live rock band, I decided that it took from the focused nature of the project. I wanted every note in the composition to have come from one of these 15 sample banks. Having ruled out that direction, I thought again about the nature of the instrument and its strengths.

The other place where the Mellotron excels is in commercial and film music. Everything on the Mellotron sounds nostalgic and familiar, likely because the sounds and samples have been used in thousands of TV shows and films over the years; and have thus become part of the cultural fabric. I decided to focus this second composition on the goal of developing a cinematic soundscape, along with the theoretical goal of continued exploration of tonality and harmony. This was challenging at first, but eventually became intuitive and fun. The result is an 11-minute composition that sounds like it could be the score for an old movie reel.

Composing rhythm, tempo and timbre

My final category of composition is rhythm, tempo and timbre. The nature of the material I intended to use convinced me that a postmodern approach would be effective in this instance. During the composition process I found that there were a number of short pieces that I wrote that sounded like contemporary hip-hop songs referencing and sampling old styles of music, especially Motown and soul. I set out to write a piece that sounds like a contemporary hip-hop song because of the cultural significance of sampling in contemporary music. Sampling is the most common technique used in contemporary popular music, so I decided to use the Mellotron in the same way a DJ, or a producer, would: by warping sounds, slowing things down, speeding things up, cutting and chopping samples to create new rhythms and grooves, etc. I initially focused on trying to make the samples sound like Motown and soul because I seemed to have drifted naturally in that direction in early phases of the project. The result of this vision is a 9-minute, simultaneously contemporary and vintage sounding composition that really pushes the limits of the instrument and explores some strange and interesting musical terrain.

Pre-final compositions

After these final compositions were completed, my advisor and I reflected on the work and decided that the more experimental direction should be pursued further. The Ballroom composition had served a functional purpose in the process of getting to know the instrument and the samples, but lacked the originality necessary for this level of composition in 2016. In response I composed another 10-minute composition that

focused on developing the techniques and styles that were present in the Rhythm, Tempo and Timbre piece. In an attempt to make these pieces more unique I decided to add an additional dimension to the signal chain by using hardware pedals between the Mellotron and Pro Tools. This resulted in tone shaping and enhancement, used to bring the Mellotron sounds closer to my aesthetic goal. For example, the use of reverb pedals lengthened and changed the essential nature of the tones' decays. The use of overdrive pedals added distorted harmonics to tones, coloring them in different ways. Tremolo pedals changed rhythms; equalization pedals manipulated the attack and release of the tones, and emphasized certain frequencies. These are a few among a wide variation of pedals used to manipulate the Mellotron tones.

At this point the Ballroom piece was cut, and this new 10-minute composition sounded more developed than the previous pieces. This made it challenging to categorize the three compositions that were considered for final submission, so I considered an alternate approach.

Final composition

I decided to take all the audio that I had from the extended compositions I had written (Ballroom, Tonality, Rhythm, Rhythm 2), and rearrange them into one 30-minute piece. It was helpful at this point that each of the long scale (10-minute, final draft) compositions were collections of 1 to 3 minute musical vignettes.

I isolated each vignette and sequenced them thoughtfully to comprise my final composition. The fragmented form of the final piece is intentional and preferable because it further places the composition in the postmodern idiom. The eclectic, sporadic nature of the piece is a response to the nature of the material (the samples), and places it in a new context. In my research of the origins of these samples, all the genres from which they came primarily featured songs that were between 3 and 6 minutes in length, obviously with a few exceptions. These 1 to 3 minute fragments are distinctly different in how they build, how they are designed, etc. from longer compositions.

The constant change from one fragment to the next encourages the listener to be ready for a genre change at any moment while maintaining the thread of continuity of it sounding like the Mellotron. The result of this is an attachment to the "Mellotron-ness" of the composition; the listener identifies patterns and similarities in the constantly changing musical landscape, which end up becoming the attributes about the piece that make it a Mellotron composition in my specific style. If the musical statements were longer and more established, the listener might fall into conventional assumptions about the nature of the sample, for instance, "this sounds like an old ballroom dance song", or "this reminds me of the "cha cha". The function of the form is to use the sonic character of the Mellotron that makes it sound nostalgic, and then to obscure the specific style or genre behind it by re-contextualizing the tones and performances.

The composition also works on two levels, both as a purely aesthetic creation, and also as a tool in support of my research, which serves as a demonstrational, practical model upon which I base my research into extended Mellotron technique.

This final composition checks all my boxes with regard to my aesthetic and stylistic goals. It has moments of sounding like cinema, hip-hop, ballroom, Motown, lounge, and world music to name a few. It achieves its goals of being experimental with regard to unique rhythms and harmonic textures, while it also maintains a flow and a narrative from start to end. My main goal was for the composition to be exciting and compelling, which is accomplished in the final piece. Below is a graphic of my digital audio session, which shows a few of the short pieces, isolated as individual tracks on the far right. It shows the single audio file of the entire piece, as well as another concept I tried and decided against which was to break the large-scale piece into three acts.

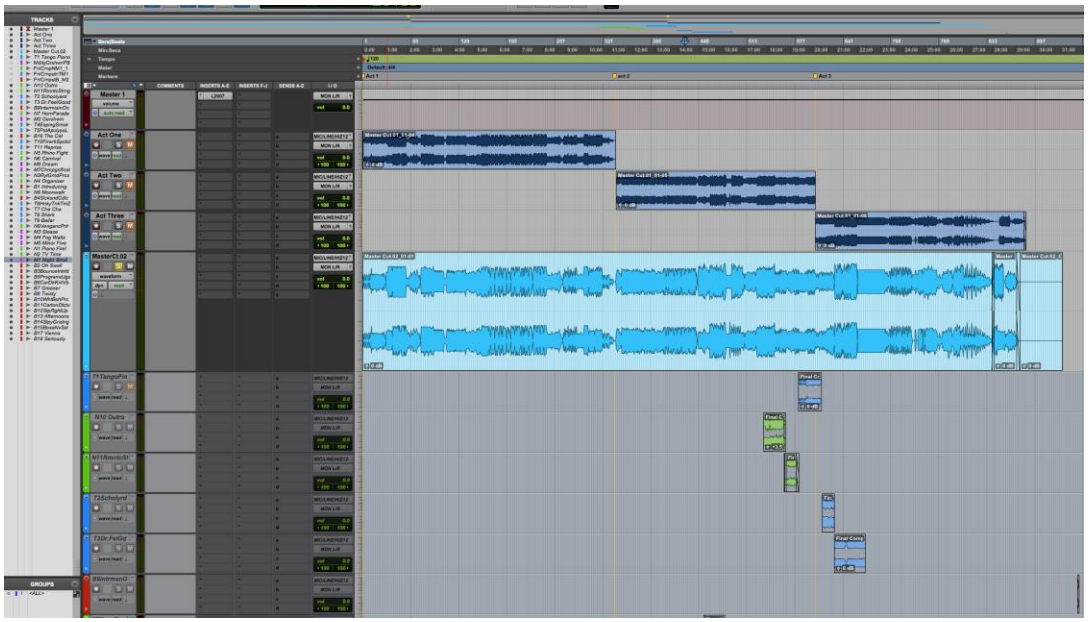

Figure 3.5: Pro Tools screenshot example

One of the inspirations for this final "resampling" of everything was late Hip-Hop pioneer J Dilla who released his groundbreaking instrumental album *Donuts* in 2006. This album features 31 very short tracks (1-3 minutes) and was comprised entirely of samples from old soul vinyl records. The album is designed to be listened to in sequence but tracks can be played individually as well. The album features abrupt scene changes and odd time signatures from multiple layers of samples. After thinking about just how similar this was to my project, I decided to use the track-listing format as a reference for designing my own. The track-listing format on this album includes 31 individual tracks, each with their own name. My presentation of the audio includes one file with the entire suite on it, as well as each of the 34 tracks/vignettes individually named and isolated. Graphics of the Pro Tools sessions for each of these individual tracks are shown in Appendix C.

Concluding remarks

As part of answering my primary research question, it is necessary to establish the nature of the data that exists on the Mellotron, which the previous chapter accomplished, and also to describe the new data that this study presents, which has been the focus of this

chapter. Most importantly, this chapter explains the methodology behind the new data, reinforcing its validity by explaining the ways in which it was collected.

The chapter continues by presenting the composition methodology. This includes the parameters and limitations used during the composition process, and the sequence and various stages of writing the composition. This methodology introduces the new context in which the Mellotron is being reinterpreted, addressing the second half of my primary research question. It grounds the creative direction in contemporary music styles, and uses postmodernism as a theoretical foundation for the composition. This is significant to the process because these creative goals and directions surely influenced the techniques that were developed in this study. Additionally, it reinforces the relevance of the new composition in a contemporary context. The composition methodology mapped out in this chapter reinforces artistic research and the reflexive approach as it evolved and changed over the course of the compositional process. Specifically, the scope of the compositions was wide and experimental to begin with, and gained focus as more data was collected. Additionally, the element of starting with a simple palette and eventually working with a more complex palette as the compositions evolved reinforces the influence of the reflexive approach in this study.

In the following chapter I analyze the individual sections of the accompanying composition individually, and describe the processes that led to their creation.

Chapter 4: Analysis of compositions

The following portion of this project will explain how each individual musical idea was created, and the tools that were used in the process. I will start from the beginning of the piece and organize the tracks by number and name from one to thirty-four. My methodology for this process includes reference to my reflexive journal, which was being actively written during the process of these compositions, and my Pro Tools sessions. These sessions contain the visual explanation for all the slicing of audio, and plug-ins applied to the tracks. They also provide the opportunity to isolate individual samples and parts to identify their attributes more clearly.

I will establish whether there are samples overlapping other samples, and how the volumes are balanced. The function of this chapter is to provide an informative narrative about the creative decisions that were made, and the logic behind the sequencing of each individual composition.

For the first entry I will include data about the chord progressions and harmonic breakdown, and screen shots of the transcriptions and Pro Tools session. In explanations of the rest of the pieces, I may include only the elements that are relevant to the narrative explanation of the composition process. A comprehensive database of all transcriptions can be found in Appendix A. Appendix C provides screenshots of the Pro Tools sessions for each piece.

1. Tango Piano

This musical idea was developed around the piano riffs in the ‘Tango/Piano Chord Moving” preset. As noted in my reflexive journal:

I started off with dramatic chords as an intro. I was intentionally sequencing the phrases to sound legato to emphasize the human feeling of the piano performances. Everything in this recording is played with the Mellotron set to (high/-700).

Section	**Time**	**Chord**	**Key number**	**Key note**	**Beats**	**Measures**
Intro	0:00	C	24	E2	8	2
	0:06	E7	28	A ♭ 3	8	2
	0:13	C	24	E2	8	2
	0:17	E7	28	A ♭ 3	8	2
Part A	0:25	A ♭	32	C3	4	1
	0:27	Fm	30	B ♭ 3	4	1
	0:30	A ♭	32	C3	4	1
	0:33	Fm	30	B ♭ 3	4	1
	0:36	E ♭ 7	27	G3	2	½
	0:38	D ♭	25	F3	4	1
	0:42	E ♭ 7	27	G3	2	½
	0:44	D ♭	25	F3	4	1
	0:50	A ♭	32	C3	16	4

Table 1: Tango piano chord progression

My transcriptions were useful in keeping all this harmonic information together, specifically the chord progression as the sequence of samples evolved in its final form. The first step in this composition was establishing the tonic of the set, which is E♭. I then

used my original MKII songbook scans as a harmonic map, and I built my chord progression.

A system developed from the experience of writing this composition that included using my ear at first to find a progression that suited the preset, followed by experimentation with duration of each chord. I triggered the first chord for one beat, and transitioned to the next chord, then tried to hold the first chord for two beats, four beats, eight beats, etc. I paired this process with observations of the relevant transcriptions to have a theoretical explanation for the harmonic movements.

In some cases, the transcriptions would lead to different choices, for instance in Part A (0:25) when the drums enter. For this part I used the transcriptions and an acoustic piano to write the parts using sight-reading experimentation. This section deals exclusively with acoustic piano so I printed out all the transcriptions and experimented with piecing them together by playing a few measures of one sample and transitioning into the next, testing multiple variations of sample length duration.

The transcriptions below are a good example of this composition process. I started with measure one of the Key 32 sample, played it on the acoustic piano, and then transitioned into the first measure of each of the other samples to see which one created the aesthetic effect that I was working toward. I ended up selecting the sequence below, alternating between measure one of each sample because the leading voice movement transitioned effectively between these two chords.

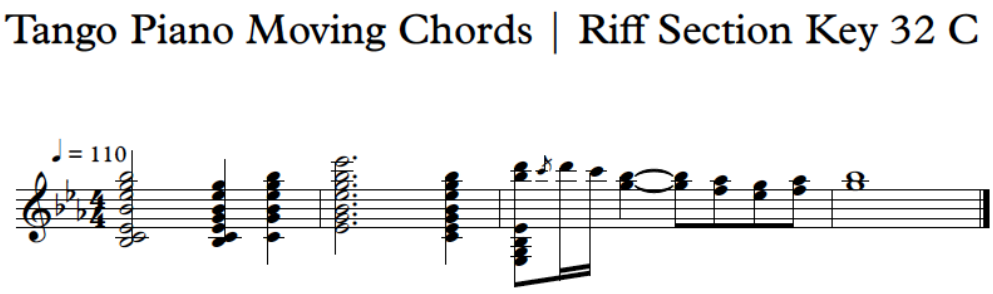

Figure 4.1: Transcription tango 32

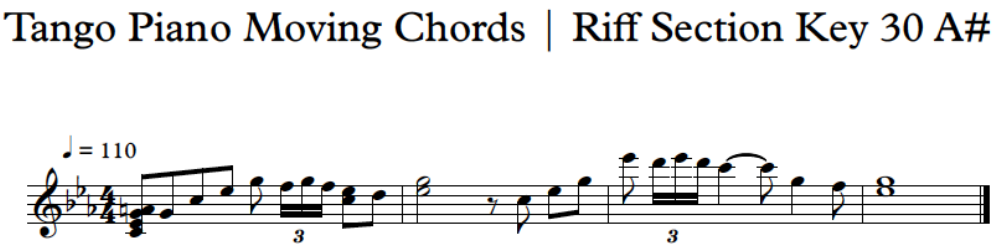

Figure 4.2: Transcription tango 30

One technical reminder about these transcriptions in Figure 4.2 is that they are notated a perfect fifth above where the actual pitch sits in the mix, due to the -700 cent shift that was done on the pitch wheel. The chord progressions from the journal listed above in Table 4.1 are the transposed versions of these transcriptions (post pitch shift), in other words they are the chords that the listener hears in this piece.

Once I had established the piano parts and recorded them, I decided to add a simple rhythm section. I pitch shifted down the rhythm section to -700 and played key 20, which was an A ♭ , the tonic of the key after being shifted down a fifth from E ♭ , where it was originally. I found that there was a really pleasant attack when I played a single

beat with key 20, so I decided to take two passes recording on the track. I played simple quarter note hits for the initial part, in an attempt to solidify a rhythmic backbone for the song. I decided to do this because I had played the piano parts so rubato, and out of time earlier that I thought it would be a fun challenge to split the difference intuitively and try to keep a steady quarter note pattern moving underneath the melody. Listening back, the quarter note stabs sound more like electric guitar stabs that have a lot of reverb on them.

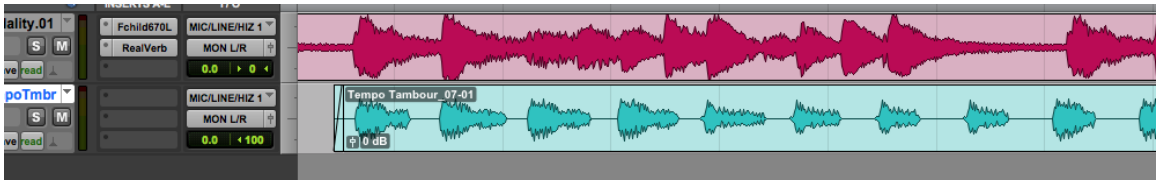

Figure 4.3: Pro Tools screenshot “Tango”

Above is an image of the Pro Tools session used to edit the piece. The top waveform is the piano recording, and the bottom one is the rhythm track. As evident from the Inserts display, there is a compressor plug-in on the piano to brighten it up, and a reverb plug in to make it sound dreamier. The quarter note hits are not processed with postproduction effects as they already sound like they have room reverb on the sample recordings and have the appropriate amount of punchiness and attack.

2. Outro

This piece started with the drum loop. I was looking through the sample sets in search of a drum loop that sounded anthemic. I ended up selecting the Bossa Nova/Moving Strings Hi preset because I was captivated by the relationship between the slowed down shaker and the rhythmic figure of the bass guitar when I pitched the entire Mellotron down an octave with the High/Low switch. Even after pitch shifting down an octave, the loop seemed to be too fast, so I used the pitch wheel to fine-tune the tempo. I ended up settling on (low/-180) pitch shift because the instruments seemed to settle in to a groove at this point.

Once I had established the loop, I began modifying the tone with my hardware pedal chain. I used a Poly Octave Generator (POG) pedal to duplicate the audio an octave below. I also used a delay pedal to create the rhythmic echo trailing off of beat three, or the snare hit. Finally, I used the overdrive from the Color Box pedal, which has Lundahl Transformers and emulates a direct input signal being overdriven into a vintage Neve Console. This added pleasant warmth and crunch to the tone.

The next step in designing this scene was adding the tonal instruments. I decided to use the Moving Bass/Moving Strings Hi rhythm section samples to overlap with the anthemic drumbeat. This sample features a piano chord played on beat one, an upright bass playing a I-V walking progression, and a subdued jazz drum part playing kick, snare, and splashy ride cymbal. I wanted to use this sample mainly for the piano chord on beat one, but also wanted to tune the tempo in such a way that it overlapped with the anthemic drums and enhanced them. After experimenting I decided that the ideal setting was (High/-700) so that the pitch shifted distortion matched aesthetically with the drum loop. The Bossa Nova sample is originally 96 bpm, but was pitched down an octave so the tempo dropped to 90 bpm before being pitch shifted down (low/-180) to 82 bpm. The Moving Bass/Moving Strings Hi sample is originally 124 bpm, and my data sheet informed me that if I pitch shifted this set down a perfect fifth, it would result in an 82 bpm tempo, the same tempo as the other sample. Essentially I established a tempo/timbre for the initial part, and then matched the tone/timbre with a different sample, followed by fine-tuning the subsequent sample's tempo to the initial one.

Once this musical bed had been established, I realized that I had perhaps over mixed the parts and they were starting to sound conventional. To counteract this, I put a short delay on the piano hits (Moving Bass/Moving Strings Hi preset). This made the tempo seem to speed up momentarily but ended up sounding very musical, especially because it allowed me to create a dramatic pause at the end of each measure as the drum loop was resetting. In the first four measures of this part (before the drop out) I embellished these rhythmic peculiarities and for the following section chopped the samples in a more consistent way so that the organ part could be the central focus. In the example below, the top track is

the drum loop, and the second from the top is the sample I am referring to. It's clear that the performance of the part emphasized the above noted pauses at the end of the measures, which works because of the added tension from the delay plug in that was being monitored as the performance was happening.

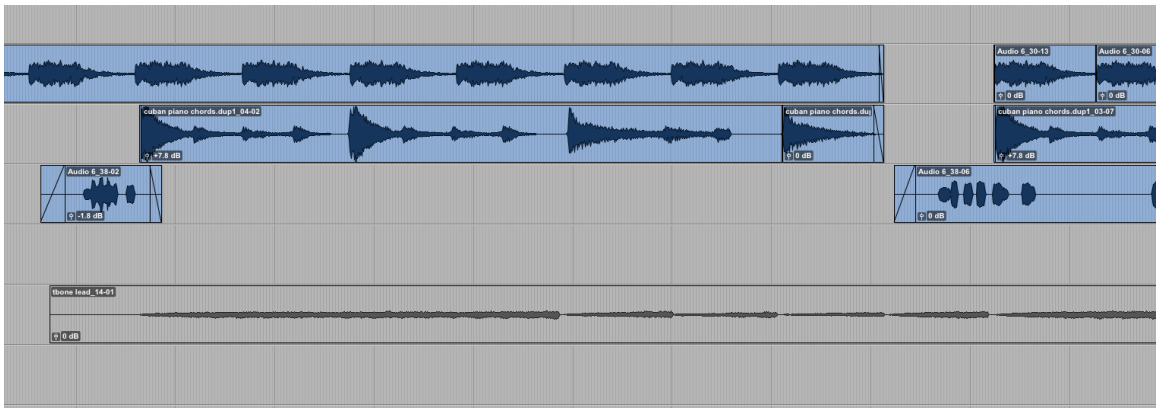

Figure 4.4: Pro Tools screenshot "Outro"

In the following part, on the second waveform from the top the strange rhythms become strictly regulated and conventional through sampling. This was done with the intention of having the rhythm section settle into a hypnotic groove, allowing attention to transition to the organ solo.

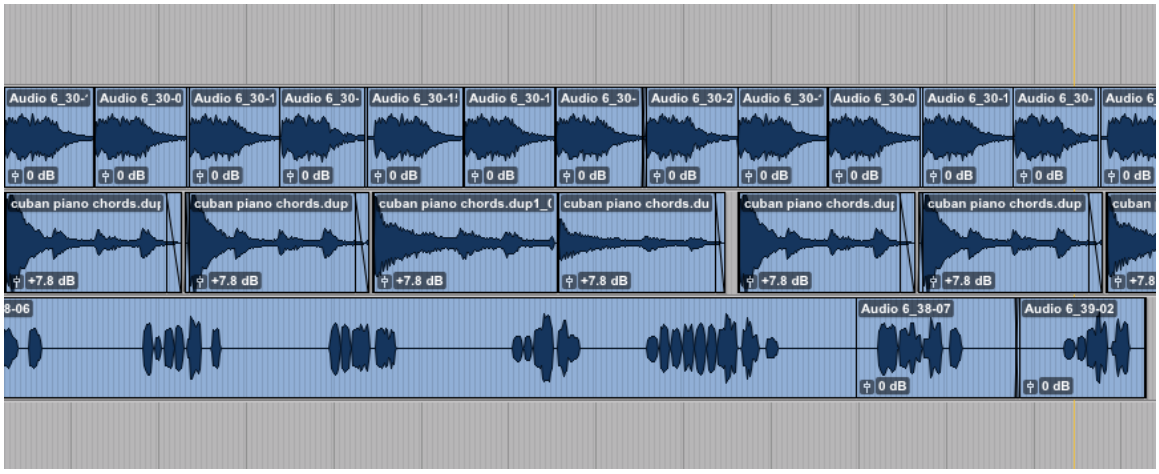

Figure 4.5: Pro Tools screenshot "Outro" 2

After designing this scene, I added solo organ on its normal setting (high/0) to build melodic themes for the piece. I added compression to make it sit atop the mix, and reverb and delay to help it blend into the already dark, distorted sonic landscape. Initially I wrote a transitional riff, introducing the tonal rhythm section, followed by a repeating theme in the following section. To finish the piece I played an organ solo through the ending and then sustained the final note of the solo with the intention of having the tone persist into the entrance of the string ensemble for the next piece.

3. Romantic Strings

This section was more experimental than calculated. I started this piece by opening the Moving Bass/Moving Strings Hi setting and pitch shifting the entire sample set down an octave to (low/0). This gave the small string ensemble a particularly haunting texture and mood. I then looked at my data and found that this set is in the key of F, and experimented with layering the same sample set over itself multiple times in multiple variations. I knew that there would be some possibility of building harmonies if I stuck to the high/low switch and pitch shifting entire up or down a perfect fifth.

I was specifically looking for samples that did not have too much movement, so I consulted the transcriptions to identify the few string ensemble samples that moved the least. I played a repeating pattern for the initial string bed that transitioned between two samples. This created a mid-range string harmony that I then put through a harmonic enhancer called ‘Crystallizer’, which is essentially a reverb/delay plug-in.

After I accomplished this, I set out to find a drone note that could play something that sounded solemn to bring some weight to the composition. I ended up finding key E2, which slowly alternates between the root note and up to a perfect fourth above the root.

With the tone pitch shifted down this sounded like the darkest version of 'Taps'[6] that I had ever heard.

After these two voices were established, I wanted to bring some light back into the composition so I found a more consonant, optimistic sample and layered in two performances of this with no pitch shifting. This blending of moods created the depth and complexity that I was working to achieve in this composition.

After having recorded two tracks pitch shifted down, and two that had unchanged pitch, I decided to try to add additional voices that had been pitch shifted up. I used the same set on (high/+700) and played G3 for half notes. This effect sounded like cinematic strings recorded in the 1930s or 1940s, in other words, it made the recordings sound even older than they are. The sped-up pitch created a wonderful nostalgic voice for the strings. In the transcription below, the phrase I am referring to includes the first two chords, which play for 6 beats total at the original tempo of 120 bpm. After being pitch shifted up (high/+700) the sample tempo changes to 185 bpm, and this two-chord phrase starts and finishes in 2 beats of the composition's tempo.

One of the challenges of this project has been keeping track of the varying pitches and tempos of samples, so I have found a consistent, objective system for referring to that which I am explaining. My data sheets provide a lot of support in keeping the parts organized, and the tempos/keys in order.

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[6] "Taps: a signal by bugle or drum, sounded at night as an order to extinguish all lights, and sometimes performed as a postlude to a military funeral." (Taps. n.d. Dictionary.com)

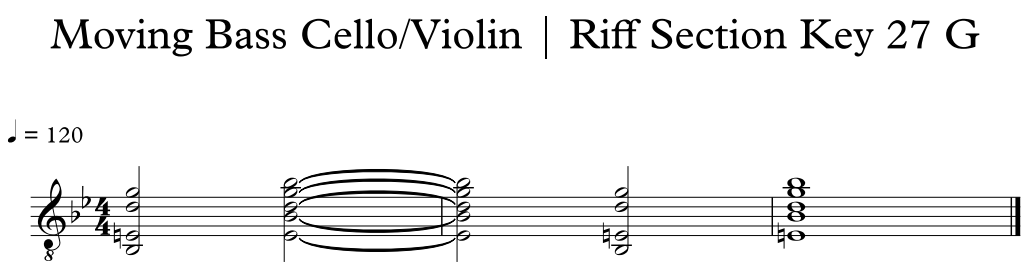

Figure 4.6: Transcription moving bass cello 27

This composition sounds like a large string ensemble, but it is in fact 6 samples of the same strings pitch shifted in three different ways and layered on top of one another. Plugins including reverb and delay were helpful in blending the voices. To add depth to the mix I added an automatic panning scheme to the low voice that plays taps, so it feels like that player is pacing back and forth across the stage. This added some subconscious tension and introspection to the narrative of the composition.

4. Schoolyard

This was one of the earlier compositions in the process. On the Samba 6/8 Tempo in F preset I found by way of trial and error these very punchy rhythmic fragments when the machine was set to (low/0). Specifically, I found the F♯3, and F3 keys captivating because they had strong orchestral hits on beat 2. I sequenced these two samples together to create a drum loop in which those orchestral hits functioned as snare hits on beats 2 and 4. This sequence had great vibe and swing to it, but I wanted to add some unique elements to make it sound sampled and to push my creative boundaries.

After studying the nature of the samples I was using in their entirety, I realized that the F♯3 sample emphasized rhythmic accents every dotted quarter note, and the F3 sample had a clear off beat emphasis. This is entirely different from the rhythm that I was building by sequencing the parts so I experimented with letting the samples play out longer every sixteen measures as a turnaround. The result of this is a turnaround that

feels out of time and unsettling for a moment, but eventually snaps back into the initial rhythm. I made the decision about when to end the turnaround based on when it felt like it had finished its offbeat phrase. I used this technique as opposed to counting in fours with the original groove, and the result is an extra measure of two beats in the turnaround before the main part resets.

There was no postproduction rhythmic chopping for this track; instead it was a rehearsed and executed performance, as demonstrated in the unedited example below. In audio editing software, clips/regions can be joined together, so a single clip is not always a reliable indicator of a single take, but in this instance the track is in its original form. The feeling of performing this part added to the nature of the recording. This quickly became one of my principal techniques in Mellotron composition.

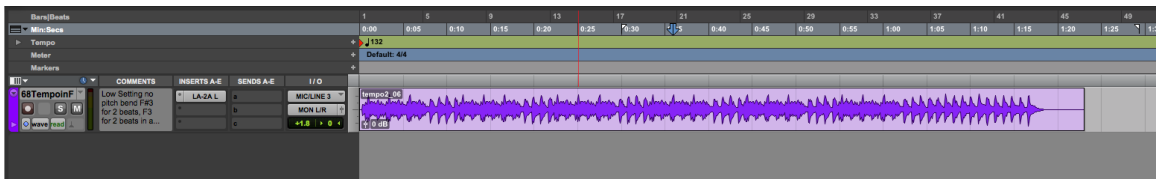

Figure 4.7: Pro Tools screenshot “Schoolyard”

After I had recorded the basic rhythmic tracks, I wanted to add some colors at the transitions to give the composition more energy so I settled on using the Bolero/Brass horn pads. Initially I played the samples to sound like sustaining horn pads, and then pitch shifted them up (high/+700) with the transition to sweep the listener into the next section. This worked well, and the timbre of the horns seemed to blend naturally with the rhythm section that had been established. Additionally, I found myself hearing orchestral horn swells before recording them, and in a sense was emulating a part that I imagined a horn player would come up with, but dramatizing it with the sped up swell/pitch shift. I used the transcriptions to identify which sample would have the appropriate notes for the horn swells. This composition only consists of these two elements.

5. Dr. Feel Good

This piece came together in a very similar way to the last one (*Schoolyard).* I found that Key 1 on the Rhumba/Guitar set sounded like a Motown recording when played on (high/-700). This was the basic feel for the piece, but I then added another note to the loop to give it some shape. I ended up playing two and a half beats of Key 1 followed by a beat and a half of Key 7, which features a piano hit followed by a slow rolling arpeggio, resetting the loop gracefully. This was another composition that I learned and practiced and then performed in one take, rather than chopping it up in Pro Tools.

Next, I wanted to emphasize the 'and' of beat three, so I tracked a single note of the upright bass from the Viennese Waltz preset, pitched down (high/-700). This filled out the groove nicely, but I decided to have this element come in and out of the loop to build dynamics and narrative into the piece.

Halfway through the composition, everything drops out and a nylon guitar sample from the Rhumba/Guitar set plays by itself. I thought this would be a nice interlude that functions to make the listener think that the piece is ending, but then surprises them when the original sample returns. Upon return I decided to add a lead organ part that plays a memorable thematic melody. The organ melody mixed with the loop creates a distinct and uplifting musical landscape.

6. A Word from Our Sponsors (Intermission 1)

This is a short 5-second transition that is simply playing Key 1 on the Moving Bass/Moving Strings Hi set. The tonal settings on this are (high/-100). Aside from the pitch shift, this is just a glimpse of a stock Mellotron sample. I pitch shifted it down to make it sound slightly darker and more warped.

7. Horn Parade

This piece followed similar logic to the Romantic Strings piece. I wanted to further explore the possibilities of creating full sections of instruments out of a single set pitched up and down and multi tracked multiple times. I started out by building the groove out of alternating between Key 1 and Key 13 on the Samba/68 Tempo in F sample set with the Mellotron switch set to (low/0). I went into this composition hoping to find inspiration to write an up-tempo song, so I searched for rhythmic loops with this in mind. Once I found the rhythmic figure and tempo that I was looking for, I enhanced the tone by sending the signal through the Color Box (Neve Console) for added overdrive, and sending it through the Poly Octave Generator. On the POG I mixed in a little bit of +1 octave above the original signal, and a lot of +2 octaves above the signal. This made the punches sound more round and tonal like a bass guitar than their original tone, which sounded primarily like a percussive snare rim shot. Every four measures I added another sample for a moment to create a turnaround, and reset the loop.

After the rhythm section was established and sounding right I started layering trombones over the top. I used the Dixieland/Trombone preset to build a horn riff to match the energy of the drums. This was executed by playing B3 for a half note and then playing staccato notes on E2 and F♯3, followed by B3 for another half note. Finally, the resolution of the phrase consists of staccato notes on E2 and G3 this time. This created a great tonal and rhythmic baseline for the horn arrangement. To help visualize the process, see the example below, and imagine just playing the first note of each transcription.

Dixieland Trombone | Riff Section Key 31 B

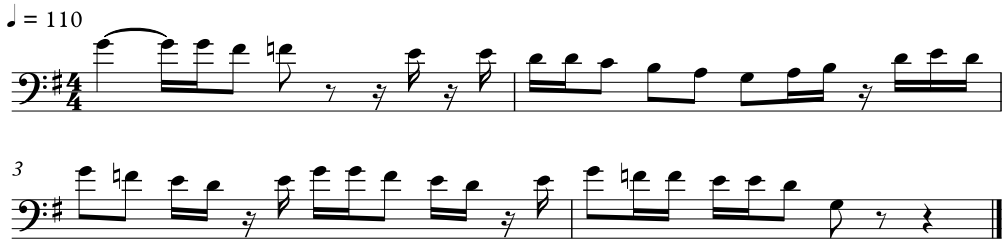

Figure 4.8: Transcription dixieland 31

Dixieland Trombone | Riff Section Key 24 E

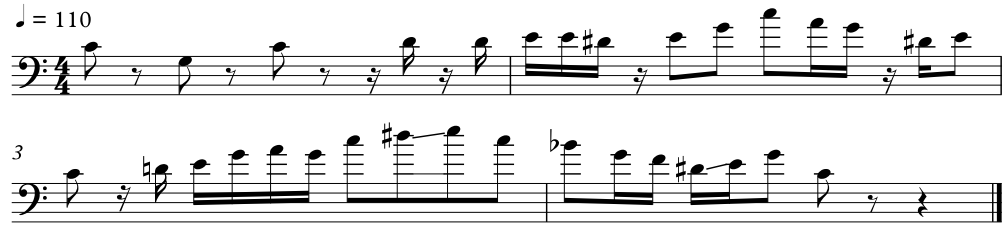

Figure 4.9: Transcription dixieland 24

Dixieland Trombone | Riff Section Key 26 F#

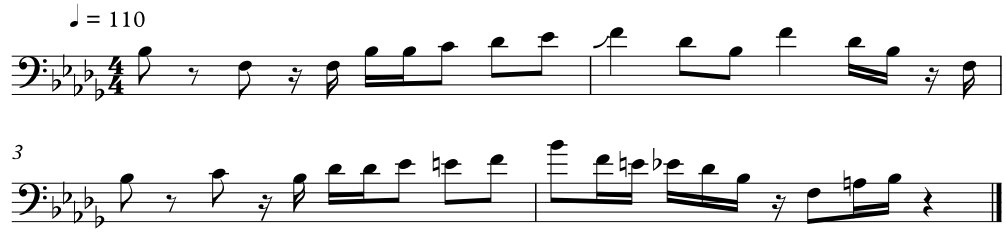

Figure 4.10: Transcription dixieland 26

Dixieland Trombone | Riff Section Key 31 B

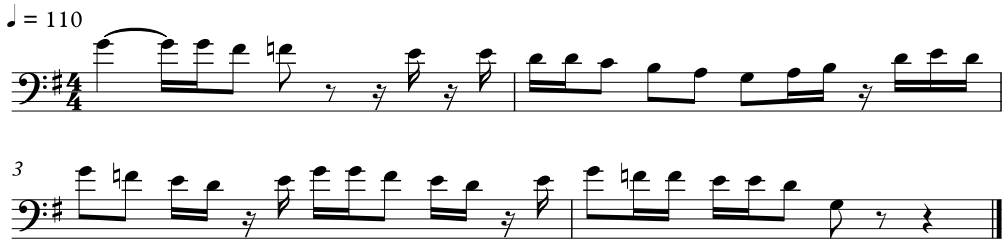

Figure 4.11:Transcription dixieland 31

Dixieland Trombone | Riff Section Key 24 E

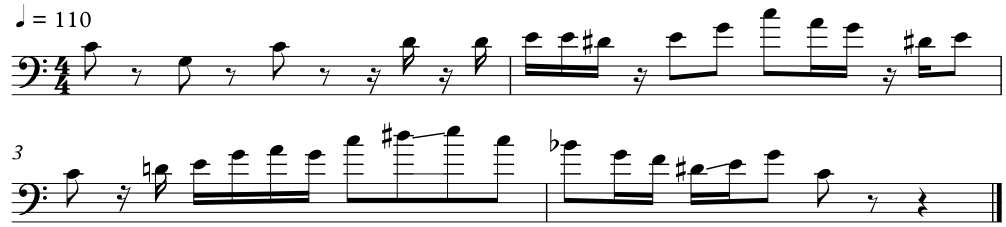

Figure 4.12: Transcription dixieland 24

Dixieland Trombone | Riff Section Key 27 G

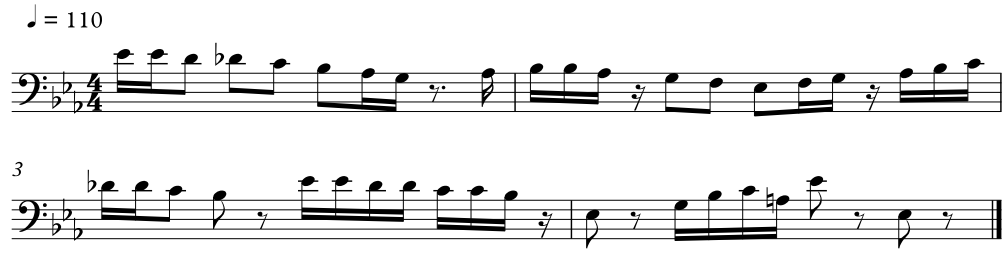

Figure 4.13: Transcription dixieland 27

At this point I decided to experiment with harmonizing using the pitch wheel because I was now working with single note melodies, as opposed to the messier string ensembles with harmonies already established in the samples. I pitch shifted the samples down (high/-700) to create a perfect fifth harmony below the main melody. For the sake of building a dynamic arrangement, I added these after 12 measures of the initial melody.

After an additional 8 measures I decided to add a horn in normal pitch doing a fanfare riff that functions as a counter rhythm and melody to the established theme. This functions to add energy to the piece. I used the same phrase as beat one of the main riff (as you can see below), but held the sample longer to utilize the 2 additional notes. I pitch shifted this sample up (high/+400) to make it faster and higher energy, and repeated this three-note phrase over the mix.

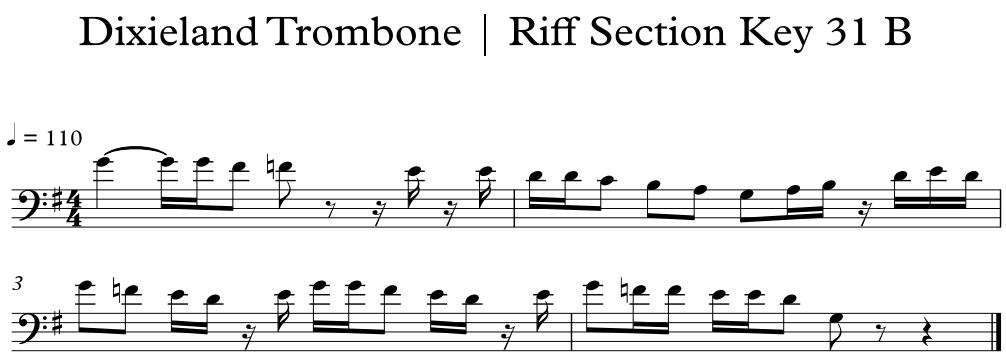

Figure 4.14: Transcription dixieland 31

For the last 8 measures I wanted to add two more parts that worked together so that there would be a total of four different rhythmic figures being played at once. At this point I had used the same phrase and sample to make two distinctly different parts, so I decided to use it a third time as a long sustain note (B3), and set the pitch to (low/+510). I tuned this by ear, turning the pitch wheel until the sustained note sat harmonically with the existing horn section.

Once these long sustain notes were in place, I added quarter note punches using Key 37 as a rhythmic setup for the long notes. These notes were also on the low setting, but also needed to be pitched up (low/+700) all the way in order to play in tune. I double tracked both of these horn parts, which means I performed/recorded them twice, the same way on top of one another. This adds girth and texture to the tone of the horn section. The arrangement of these two horn voices was very particular as well. The punches foreshadow their entrance three measures early, and the horn swells drop out for one measure to build tension for their final phrase.

Below is an image of the arrangement from my Pro Tools session. Once again, I chose to perform these parts rather than chop them up in postproduction. I found that this approach produces more humanistic performances and compositions. The drums on the other hand are looped, and the contrast of these two approaches is a part of what makes this song captivating and engaging.

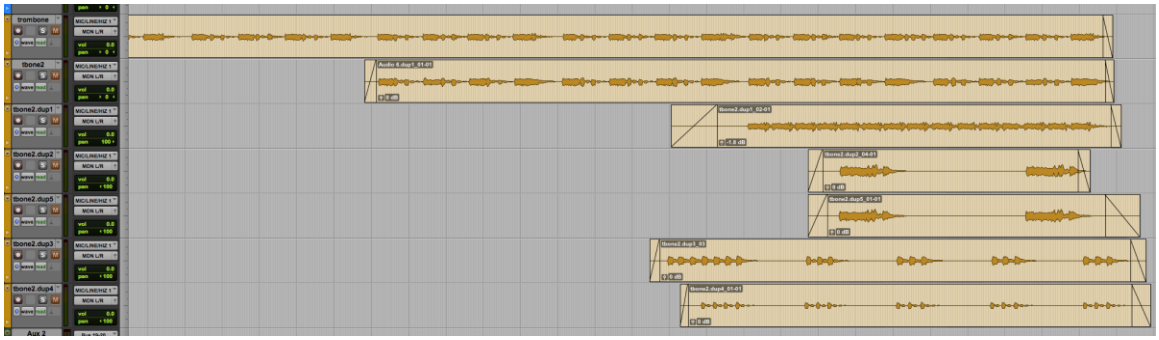

Figure 4.15: Pro Tools screenshot “Horn Parade”

8. Gershwin

Gershwin was inspired by the piano performances on the Tango/Piano Chord Moving preset. Listening through the set, I found several beautiful samples playing grandiose, rubato, mostly ascending piano parts. This was another example of using the transcriptions and an acoustic piano to arrange the sequence of samples.

I decided that the tango piano is one of the most captivating cinematic sounds on the instrument, but the rhythmic accompaniment was not as good to me, so wrote a section with just the pianos. First I listened to the different tones at various tempos and found one that sounded right, it was (high/-300) on the pitch wheel, which means that everything will be shifted down three half steps. I listened to the rhythm section shift slower and slower until I made an objective decision that it was too slow to do the piano phrases justice, at which point I ruled out anything slower, and decided that I had from (high/0) to (high/-300) to work with. I decided that (high/-300) was ideal because after hearing it, the faster speeds all seemed rushed and frantic.

Certain phrases sounded like Gershwin's Rhapsody in Blue, so I worked with that in mind as I played over the transcriptions on the acoustic piano, looking for the perfect sequence of melodies. The resulting chord progression came from these experiments.

Section	**Time**	**Chord**	**Key number**	**Key note**	**Beats**	**Measures**
Part A	0:00	F7	22	D2	16	4
	0:10	B ♭ 7	27	G3	16	4
	0:21	F7	22	D2	16	4
	0:31	G7	23	E ♭ 2	16	4
	0:41	B ♭ 7	27	G3	16	4
	0:52	Fm	26	B ♭ 3	16	4
	1:02	A ♭ m	34	E ♭ 3	16	4
Part B	1:14	E ♭	32	C3	8	2
	1:20	F7	22	D2	16	4
	1:30	B ♭ 7	27	G3	16	4

	1:40	F7	22	D2	16	4
	1:50	G7	23	E ♭ 2	16	4

Table 2: “Gershwin” chord progression

This progression and piano performance sits very nicely by itself and works in all the categories that have been mentioned as creative directions for this composition. The transcriptions helped me figure out which phrases would work well together. The data helped me get the keys to coordinate. This composition was also learned on the Mellotron and played in one take to add an additional element of performance to the sound.

I recall that the strings that I added toward the end of the composition were next to impossible to get in tune because of the conflicting nature of the (-300) pitch shift I had made to the piano, as it contrasted with the tonal centre in which the strings sat naturally.

9. Espionage Smack

This piece started with a sequence of two keys being triggered back and forth in sequence on the Samba/ 6/8 Tempo in F preset. When this preset is on the low setting, it has a handful of samples that feature a dramatic, horn-centric orchestral hit. This is one of my favorite tones on the Mellotron. For this composition, I aimed to use these orchestral hits as the central element of the arrangement.

After establishing the groove, I doubled the rhythmic transition parts of the sample with midrange organ tones to fill out the sonic spectrum. I also pitch bended the ends of the organ fills (from 0 down to -700) to make it sound different from a conventional organ.

The final addition was the Moving Bass/Moving Strings Hi sample set. I added thin, high string melodies toward the end of the piece to round out the arrangement. These are looped samples that are played in fragment to build the phrase.

10. Post Apocalypse Liberace

On this song I was feeling especially experimental and decided to layer as many distinct sounds into one arrangement as possible. I started out writing a minor chord loop with the Rhumba/Guitar, finishing each section with a turnaround phrase. I added the same guitar strums over the top, but pitch shifted them up a perfect fifth (high/+700) and panned the two tracks to either side. This created some rhythmic conflict, but because they occupied such different places in the mix it worked.

Next I added the drum loop, which is Key 1 on the Bossa Nova/Moving Strings Lo preset, set to (low/0). In the original sample, the loudest instrument in the mix is the shaker, and its timbre after being pitch shifted was especially gritty and appropriate for this dark piece. In addition to hearing the shaker in the mix, you can hear the guitar tone from the sample, which sounds like a synth hit. The mixture of these elements made this song feel like the score to a dystopian film.

I then added the Reverberated Organ playing a single low note, pitched down an octave to (low/0). I faded in the pad in Pro Tools because I found it was hard to execute it musically on the Mellotron itself. This reverb organ enters in toward the end of the piece to give it an ominous feeling. I also added a low string loop from Bossa Nova/Moving Strings Lo, which added texture and glued together the parts.

After I had this arc for the piece I started to color it melodically. I added flutes in an attempt to balance out the dark tones of the existing composition. I also added a piano loop from the Cuban/ Piano Chords preset playing accents on beat two.

Once the ominous low bass notes were placed at the end of the piece I wanted the Bossa Nova shaker groove to stop, bringing attention to the transition. I cut out the Bossa Nova drum loop and replaced it with a loop that I made from the Tango/ Piano Moving Chords preset. This looping piano sample is aggressive and elegant while also maintaining a feeling of tension. It was the perfect voice to fill the void as the reverb organ builds. While I was on this setting I decided to foreshadow the tango piano part by adding a few tango piano samples toward the beginning of the song, during the drum loop's turnaround. I pitch bent them up momentarily to make it sound like it was going out of tune in real time.

Lastly, I decided that I wanted to emphasize the dystopian film score direction at the end of this composition with everything falling apart. I played the Cuban/Piano samples chaotically at the end and added some frantic, heavily sped up Tango/
Piano samples to make it sound surreal. Below is a visual image of the arrangement.

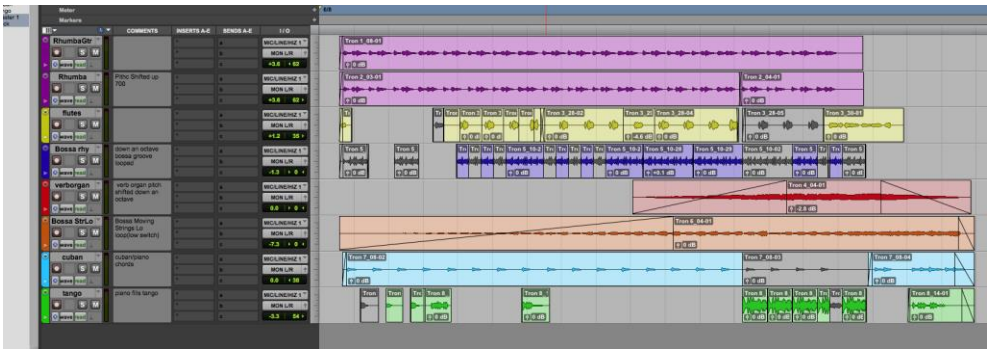

Figure 4.16: Pro Tools screenshot "Post Apocalypse Liberace"

11. The Cat

This is one of the only pieces that was selected for the final composition from the Ballroom composition. I wanted this to be a short intermission that is easy to listen to and soothing. I used the Slow Waltz/ Guitar Setting and constructed a chord progression that sounds mischievous and relaxed. In lieu of these attributes I named the piece 'The

Cat", which seems to suit it. This particular sample set is sparse because the riff section simply plays a strummed guitar chord on beat one and lets it ring out for the remainder of the sample. This space to breathe for the listener contributes to the mood and purpose of the part.

12. Firework Spectacle

In this very short interlude I decided to try to make a series of four bar loops using little single note tones from a number of sample sets including the flutes, the reverberated organ, and organ hits being modified by a series of hardware pedals. The Color Box was the most important pedal for shaping these tones. It created the harmonic presence of the low crunchy bass tone on the reverberated organ.

In previous reflections I had noted the oppressive nature of having to keep journals in such detail throughout the composition process. I wrote that it slowed me down and stopped my ideas from completely evolving. To test this theory I tried to compose this piece without journaling to see if the change in my process would have any impact on the compositions. The result was a similar caliber composition to the others that I wrote, and I returned to journaling.

13. Reprise

This is a reprise of tracks 4 (Schoolyard) and 5 (Dr. Feel Good) from earlier in the composition. I made this decision with the intention of having a familiar melody return to mark the end of the first phase of the composition. I repeated Schoolyard in its entirety but only took the second half of Dr. Feel Good, where the organ melody is introduced, so it feels like a different arrangement of the theme. I wanted this Dr. Feel Good organ part to be one of the melodies that the listener walks away with and remembers, which is another motivation for repeating it.

14. Rhino Fight

The primary bass line in this piece is being played with a tone that is half Church Organ R/F and half Accordion Bass/Accordion High. Both tones are set to (low/0). I was playing the church organ part first and came up with the riff, which immediately seemed like a soldier's chant, then doubled it with the accordion to enhance the harmonic character of the tone.

My next step was to add some kind of percussion to follow the theme that I had established, so I used the Jazz Foxtrot/Blues Beat in F preset. I played D3 on the low setting with the pitch shifted up (high/+700) and it created a hollow round tone that I used to accent beats 2 and 4. I then created a counter rhythm with the Dixieland /Trombone preset rhythm section that plays two distorted quarter notes on beats one and two. For the next rhythm section I used the Jazz Foxtrot/Blues Beat in F, but played a more active rhythm.

Finally, I added heavily effected Reverberated Organ, playing a melodic theme over the rhythm section. There is an outro in this song that developed out of experimental chopping of the rhythm section, which can be seen in the example below. I played the drum part longer than the organ riff had been recorded, and then went back and cut out fragments of the performance to create a new rhythm. On top of this new rhythm I recorded guitar strums from the Slow Waltz/Guitar set, on (high/0). I doubled those with piano chords from the Cuban/Piano Chords set and panned them to opposite sides. To round out this final section I tripled the melodic part that the guitar and piano are playing with a small string ensemble via the Moving Bass/Moving String Hi set.

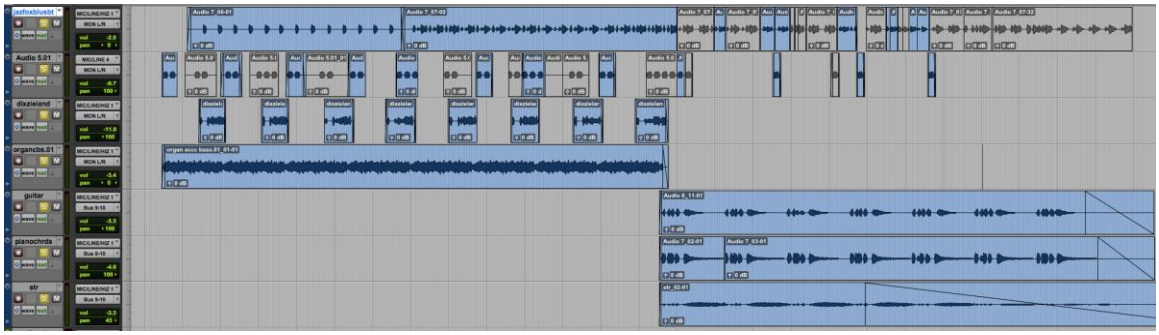

Figure 4.17: Pro Tools screenshot “Rhino Fight”

15. Carnival

This is another one of the samples directly from the Mellotron without being chopped or sequenced. It is Key 1 from the Samba/6/8 Tempo in F set, and is set to (low/0). The result is a comical sounding caricature of a carnival. To make it more interesting and nightmarish I ran it through the delay pedal and the Color Box to distort the slowed down sample. I ran it through a second round of compression with a Fairchild plug-in during postproduction.

16. Dream

This piece is essentially a 4 bar string loop in 6/8 time. I used the transcriptions to find fragments of samples to complete the melodic phrase that I was constructing. I also played some of these samples on the acoustic piano to assist my composition process when I got stuck. Eventually I settled on a loop that was evocative and then used every string/organ/accordion pad available to build a low warm base for the arrangement. I added the horn parts next and wanted them to sound like French horns, so I shaped them in postproduction to be cleaner, brighter and rounder. This was one of my central harmonic experiments: I was curious about the result of piling on multiple tones, moving slowly between two chords. Toward the end of the piece I fade the ominous bass tones out slowly and the mood gets lighter.

For the very end of this piece I featured one of the charming Key 1 samples from the Mellotron. This particular one is from the Church Organ R/F set, and is set to (low/0). I spent a lot of time trying to find the most exciting and engaging tempo for this sample, and settled on the octave below normal because of the distance between the first few notes of the high organ.

17. The Champagne of Instruments (Intermission 2)

This song reappears later in the composition at a faster tempo and under the name, "22. Slacks and Cadillac's". That entry will have an explanation for the original conception of the progression. This version of the song is pitch shifted down (high/-440). As a result of this, the chords listed fall in between traditional keys, so I listed the chords that the tone falls between.

Section	**Time**	**Chord**	**Key number**	**Key note**	**Beats**	**Measures**
Part A	0:00	C-D ♭	20	C2	8	2
	0:10	Dm-E ♭ m	14	G ♭ 2	8	2
	0:20	A-B ♭	18	B ♭ 2	8	2
	0:30	D-E ♭	10	D1	8	2
Part B	0:40	C-D ♭	20	C2	8	2
	0:50	Dm-E ♭ m	14	G ♭ 2	8	2
	1:00	A-B ♭	18	B ♭ 2	8	2
	1:10	D - E ♭	10	D1	8	2
	1:20	C - D ♭	1	F1	16	4

Table 3: "The Champagne of Instruments (Intermission 2)" chord progression

18. Royal Grand Procession

The underlying part of this piece is the Tango/Piano Chords Moving set alternating between A3 and B3 every two beats. This particular part was performed by listening to the phrases rather than to a metronome, which resulted in the tempo being less consistent in a good way. Additionally, I used a fragment of the second chord in each sample as a transition back to the other sample. Below is an example of these two transcriptions.

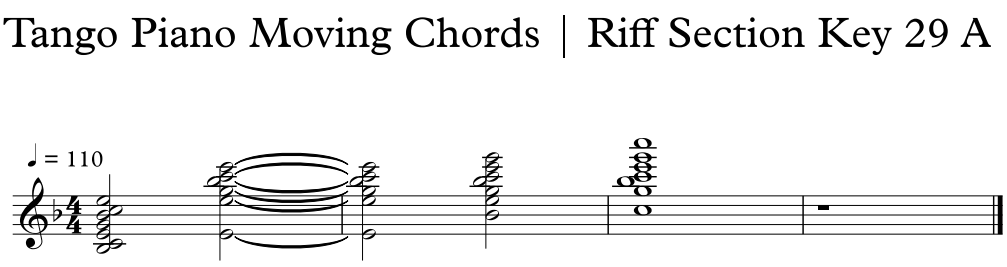

Figure 4.18: Transcription “Tango” 29

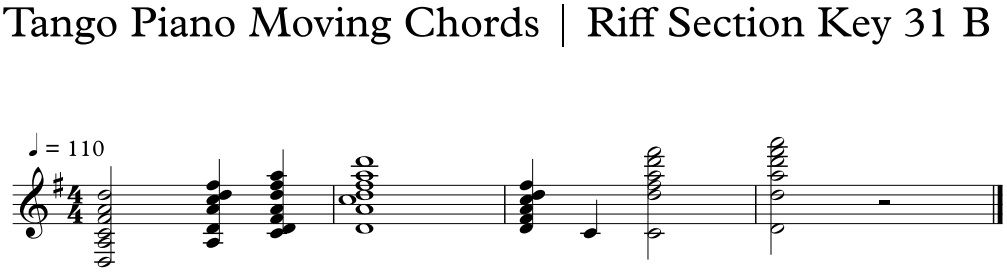

Figure 4.19: Transcription “Tango” 31

Once I had established the main part, I sampled high strings from the Moving Bass/Moving Strings Hi set, all on (high/0). I built a bass drum sound using the Dixieland/Trombone rhythm section tone by playing B1 at (high/-400). This created a gritty, industrial sound that sustained for the perfect length of time. For the snare sound I used the Tango/Piano Moving Chords set and played Bb2 at (high/+390). This sample

had the punch of a snare drum, but also had vibraphones in the background, which brighten up the sound.

At the end I decided to play a random array of samples all at once with both the Tango/Piano Moving Chords set and the Moving Bass/Moving Strings Hi set. Both of these riff sections have very active melodies, and I was hoping to achieve the effect of having it feel like they're swirling around in chaos. The end of this chaos introduces the organ sound in the following piece, The Organizer.

19. The Organizer

This composition was written with the Fast Bass/Twist in C set on (low/0). The technique I used involved sequencing samples in quick succession to execute a long phrase from a series of short fragments. The piece starts out with D ♭ 3 playing two-quarter notes, then D ♭ 3 and A ♭ 3 alternating eighth notes twice, followed by E ♭ 3 playing a whole note.

The piece is introduced with the Reverberated Organ melody that snuck in at the end of the previous piece. The organ is set to (high/0) and plays a thematic melody in the E ♭ major scale.

The piece ends unresolved and the final note is pitch bent.

20. Introducing

This is another transition song, strategically placed to keep the composition from getting too dark or moody. It's Key 1 of the Cha Cha/Swinging Flutes set on high and at normal pitch. This is the entire length of the 8-second clip.

21. Moonwalk

The rhythmic hits that start this piece are from the Fast Bass/Twist in C set on the low setting. I played the E3 key in quarter notes for 6 beats in a row and then held one half note.

The next addition to this arrangement was the guitar chords from the Slow Waltz/Guitar Chords set. I found that they sounded especially eerie and bright on (high/+700). I ran this tone through the Poly Octave Generator pedal, adding an octave below the original tone to give it more presence, and then ran the tone through a delay pedal to get a quick slap-back delay.

In the process of considering other elements that should be added to the mix, I decided that I wanted a counter rhythm that would work with the guitar strums that I had just recorded. I chose the Cuban/Piano Chords set, and kept the rest of the signal chain identical to the Slow Waltz/Guitar Chords recording. This pairing of treatment made it sound like these two instruments came from the same world.

I played another set of piano chords sparsely, and intentionally had them accent different beats at different times of the arrangement. These were from the Cuban/Piano Chords set on (high/0) with no pitch change except for the entrance of the notes, which bends from a perfect fifth below back to normal, into the chord. All the melodic parts are being processed with a Crystallizer plug-in, which has a reverb/delay effect.

22. Slacks and Cadillacs (Intermission 3)

For this composition I listened one by one to the piano accompaniment samples in the rhythm section of Moving Bass/Moving Strings Hi for melodies that could be tied together. I ended up picking a sequence that is quite traditional. The four chord and the five chord have the same run transposed between the two so they sat nicely next to one another, and the minor 6 chord has a mischievous little melody that seemed to flow

perfectly from the tonic. The resulting melody loops twice as long, and during the second time through the progression the strings are added and play in unison for one more cycle.

Section	Time	Chord	Key number	Key note	Beats	Measures
Part A	0:00	F	20	C2	8	2
	0:04	Dm	18	B ♭ 2	8	2
	0:08	B ♭	13	F2	8	2
	0:11	C7	15	G2	8	2
Part B	0:15	F	20/32	C2/C3	8	2
	0:19	Dm	18/28	B ♭ 2/B ♭ 2	8	2
	0:23	B ♭	13/25	F2/F3	8	2
	0:27	C7	15/27	G2/G3	8	2
	0:31	F	1	F1	16	4

Table 4: “Slacks and Cadillacs (Intermission 3)” chord progression

23. Time Zones

For this set I decided to use the 6/8 tempo in F set. I switched the keyboard to the low setting (low/0) and everything started sounding interesting and captivating. There are all kinds of beautiful sounds in this set, at this setting. The off-beat horn hits sound sparkly and lively when they are slowed down. In my experimentation I became captivated with two samples in particular, E7 (key 31 B3) and D7 (key 29 A3). I held each one for two beats and they created a rhythmic loop that had great energy from the horns and a fluid bass line. I then waited until the loop settled in and became predictable and then held down the E7 (key 31 B3) key for 8 beats letting the rhythmic centre of the piece change

to a triplet, waltz feel. This transition in and out of time felt especially exciting. Further into the composition I decided to hold down the D7 (key 29 A3) and the rhythmic centre of the song changed again to a slowed down, offbeat feel. Through the performance I was trying to keep a metronome feel of about 99 bpm in my head so that the avant-garde rhythms could have a thread of continuity.

24. Cha Cha Champion

This composition was designed by first creating a four bar loop with the Cha Cha/Swinging Flutes set. I then sped up the same set to (high/+700) on the high setting and played the same sample on beat one, layered over the existing loop. This created an interesting urgency in the rhythm. Once the rhythmic nature of the piece had been established I went through and played a series of flute riffs on low with no pitch modification. I ended up chopping these up in Pro Tools and arranging them there. The main flute theme that I repeated is the first measure of the transcription below.

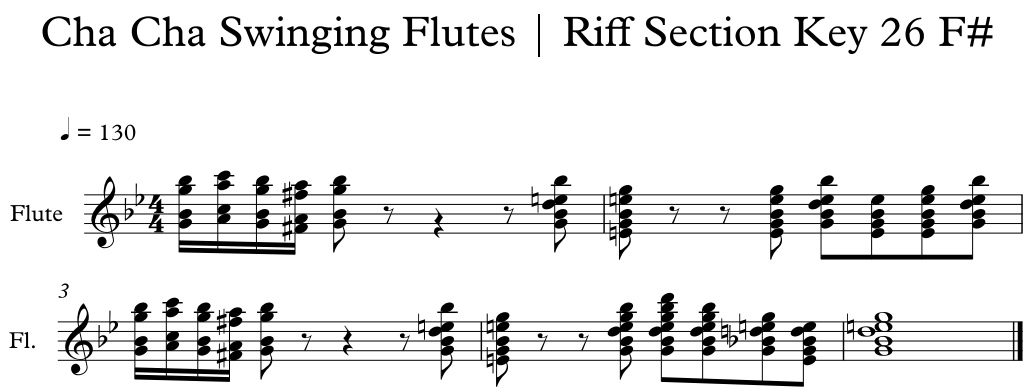

Figure 4.20: Transcription cha cha 26

Half way through the composition I broke the loop and played one single note over and over to change the nature of the part. This ended up creating a nice bed for a creative

bridge. Once the pulse of the new bridge had been established I faded in a new rhythmic figure being played by the faster version of the rhythm section. This brought the song to a new tempo and rhythm. I also faded in an abrasive Reverberated Organ pad during this bridge section to build tension.

The composition transitions from this bridge into a sparse new rhythmic loop, returning to a slower tempo. This loop utilizes the piano glissando on Key 1 of the Cha Cha/Swinging Flutes set.

25. Shark

Exploring the rhythmic aspects of this set I found that B ♭ m (key 35 E ♭ 3) has a really splashy attack and could be used as a rhythmic transition if repeated a few times.

I decided to play four beats of C (key 20/32 C2/C3) followed by a triplet rhythm playing that splashy Bbm (key 35 E ♭ 3), filling up the second measure. I decided to loop this phrase three times before moving to G7 (key 15/27 G2/G3) for 4 beats, and then to F (key 13/25 F2/F3) for 4 beats. I decided to repeat the entire form twice and then end with the Bbm (key 35 E ♭ 3) punches repeating a few extra times. Additionally I pitch shifted the sample down a fifth (high/-700) and then doubled the rhythmic hits on the B ♭ m (key 35 E ♭ 3). This created an interesting harmonic relationship that brought the tone to life.

26. Bailar

This piece is a short interlude that was found when I was experimenting with the Cha Cha/Swinging Flutes set, pitch shifted down to (high/-400). This was a one-take performance and I am essentially toggling back and forth between two sample fragments, and throwing in a third sample occasionally. This was one of the more actively played rhythm sections in the compositions.

27. Vengeance Parlor

This composition started out with single chord hits from the Cuban/Piano Chord set and the Slow Waltz/Guitar Chords set. I blended the A/B Mix so that the performance recorded 50% of each tone. The tone is set to (high/+700) and being played through a delay pedal. This tone is being equalized in Pro Tools to carve out some ugly midrange frequencies, compressed, and is going through a hall reverb plug-in.

The second tone that I added functions as a counter-rhythm to the first. It is the same settings and sample with the addition of the Poly Octave Generator adding an octave below, and the Color Box distorting the tone. The result is a crisp, punchy, distorted tone that sounds contemporary and aggressive.

The last piece of this composition is a single tone being played by the Church Organ set, pitch shifted to (low/0). I added the Color Box and delay pedal to bring warmth and dimension to the tone, and created a gradual fade in Pro Tools starting about half way through the track and climaxing at the ending.

28. Sleaze (Intermission 4)

For this song I began by setting the pitch shift to (low/+640). Essentially this took the original tone and shifted it down an octave and then shifted it up to 60 cents less than a fifth. As a result of this, I have once again notated the two keys that the pitch shifted chords fall between in the table 4.5 below. The result of this is a certain timbre and tempo combination that sounded right for the part. I love the mood of this composition.

Section	Time	Chord	Key number	Key note	Beats	Measures
Part A	0:00	B7-C7	17	A2	8	2
	0:06	Bm-Cm	18	B ♭ 2	8	2
	0:12	Fdim-G ♭ dim	9	D ♭ 1	8	2
	0:18	G ♭ -G	11	E ♭ 1	8	2
Part B	0:24	B7-C7	17	A2	8	2
	0:30	Em-Fm	14	G ♭ 2	8	2
	0:36	Bm-Cm	18	B ♭ 2	8	2
	0:42	G ♭ -G	11	E ♭ 1	8	2
	0:47	B7-C7	1	F1	16	4

Table 5: “Sleaze (Intermission 4)” chord progression

29. Fog Waltz

Figure 4.21: Pro Tools screenshot “Fog Waltz”

For this piece I looked to the Slow Waltz/Guitar set because I knew it contained lots of solemn, slow moments that felt very cinematic to me upon first listen. For this one I recorded the rhythm section with set to (high/0), alternating between Cm (key 4 A ♭ 1) for 12 beats and Fm (key 6 B ♭ 1) for 12 beats.

I then opened a new track and pitch shifted the guitar chords to (low/0) and played the Cm chord (key 33 E ♭ 3) every time the Cm played in the rhythm section. This created a beautiful, dreamy, slowly arpeggiated guitar chord that works great in this arrangement.

In the next segment, I tried to add church organ pads set to (low/0) which follow the root notes by playing 12 beats each. In a continued search for something that works, I tried to blend in the reverberated organ on top pitch shifted to (high/+700), looking for a nice contrast of tones to create a harmonic texture.

To add to this arrangement, I played the first notes of the E3 Cha Cha/Swinging Flutes sample on beats 2 and 3 of each measure and it improved the composition.

I employed a new technique for the addition of lead flute melodies to this piece. I established which tone I wanted in the mix first by listening to the character of the flutes at different speeds, and eventually decided on (high/-700). Once I had established that tone, I listened through all the flute samples over the current mix and found the one that was the best harmonic and stylistic fit. I then played and recorded the entire 8-second sample, duplicated it, and cut up the individual phrases in Pro Tools to build a melody. Below is the transcription of the flutes sample that was recorded and chopped up throughout this piece.

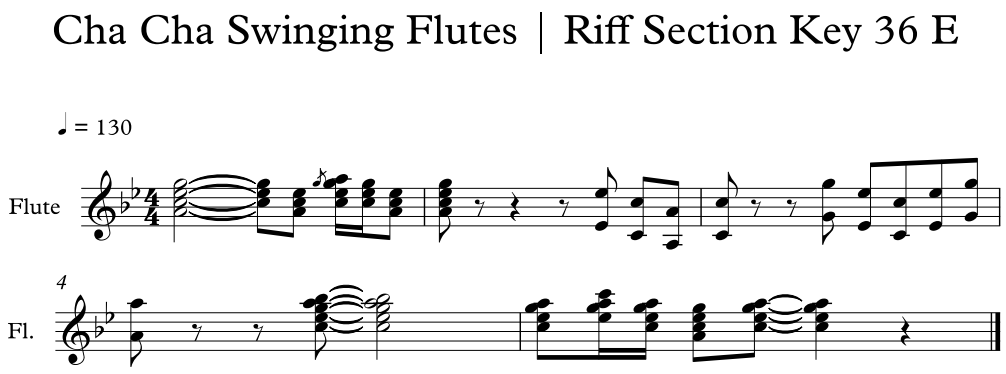

Figure 4.22: Transcription cha cha 36

Next, I decided to reuse a sample/idea from early in the first round of compositions. I took the loop from the Bossa Nova riff section with the high strings and placed that into the piece. I had to do some cutting and nudging for it to make sense, but it fitted very well.

30. Minor Five

I decided to play back and forth between C and Gm on the Cuban/Piano Chords set for the start of this piece. I felt like these chords and tones suited the moment, after the resolution of so much tension from the previous piece. At this point, I am hoping to conceptually bring the listener back in to an intimate space. I chose the sparse Cuban Piano Chords because of their intimate tone.

I also decided to add a single tone from the Church Organ R/F set, on (low/0). I faded this tone in slowly through the beginning of the song using Pro Tools, which you can see in the example below.

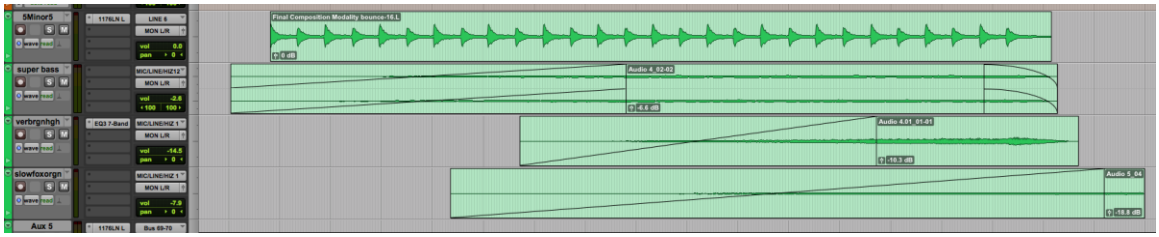

Figure 4.23: Pro Tools screenshot “Minor Five”

I wanted the sonic bed to be more diverse and ominous so I recorded a single tone of the Reverberated Organ playing the highest note possible, pitch shifted to (high/+700). This tone adds a texture but is not abrasive because it is being affected by a reverb plug-in, and is a very low volume in the mix. I repeated this same single note technique with the Slow Foxtrot/Organ set. I faded it in at a slightly steeper rate than the Reverberated Organ. My expressive goal was to create a gradual increase in these organs’ volume and presence, using different starting points and gradients for the fades.

31. Piano Fire!

This main groove is recorded with the Dixieland/Trombones set on (low/0). First I built a rhythm and bass line out of staccato punches, which is a recurring technique that I employ.

The Key sequence is: A1 A1 A1 F2 F2 E ♭ 1 E ♭ 1 E ♭ 1 G ♭ 2 G ♭ 2 (repeat).

On the final phrase I held the E ♭ 1 key and let the sample play out.
The next phase was adding the piano stabs to the tone using the Cuban/Piano Chords set. These piano chords are being heavily processed with the Crystallizer plug-in, which is a reverb/delay effect. This effect can be heard most clearly on the final phrase of each section when the chord rings out.

Toward the end I added a sample from the Moving Bass/Moving Strings Hi set which includes a string loop, another performance of 'Taps' momentarily, and finally the slow pitch shift down into silence. The following are my performance instructions from my journal,

"A3 (3) F3 (2) E3 (3) F3 (2) E3 :II then play taps E3 (1) F3 (1) A3 (2) for a few phrases. Hold A3 let it ring out and pitch shift down about -200 every 4-6 seconds"

I also chose to slowly pitch shift the rhythm section and the piano chords down into silence at the end of this piece. At the same time as everything fades out I decided to record a short sample from the Dixieland/Trombone set to (high/0) of a single trombone lazily playing a melody. This melody is slowly pitch shifting down with everything else and I like to think that it makes the big transition more human. I also automated the panning on the single trombonist to create the effect of him wandering around slowly as everything is being bent out of shape.

32. TV Time

This composition started the way many of them have, with a single tone playing quarter notes, which eventually leads to the note being held and the sample playing out. In this case I was writing with the Fast Bass/Twist in C set on (low/0), playing C♯3 repeatedly.

Once the groove was established I added one counter-rhythm playing E3 with the same set on (low/+210) as the tonal centre and bending the pitch down to (-700) on the last beat.

The last rhythmic addition uses the same set on (low/+700). This combination of elements ended up sounding like an old TV show theme song.

33. Night Stroll

I started this composition off using the Moving Bass/Moving Strings Hi composition that was an extra idea long ago. I pulled up the Pro Tools session and my journal and found that the rhythm section was set to (high/-700). The loop is: B1 for 8 measures, and then A2 for 8 measures.

I rerecorded this idea as an introduction to the piece. In order to record things accurately I used my data sheets, transcriptions, and MKII scans to help identify what notes I was playing. They ended up being Cm (key 7 B1) for 8 measures, and then D7 (key 17 A2) for 8 measures.

But they are both pitched down a fifth, so the chords are actually Fm (key 7 B1) for 8 measures, and G7 (key 17 A2) for 8 measures.

After that I added guitar strums from the Slow Waltz/Guitar Chords set on beat one, transitioning between E ♭ 3 and G3. This effect is being panned to slowly move from left to right as if it is pacing the sonic landscape.

I also tracked the string accompaniment to the Moving Bass/Moving Strings Hi sample that is looped, playing in unison an octave above. As a last texture I followed the chords with accordion pads that occupy a low midrange frequency that seems to hold the arrangement together.

34. Outro Reprise

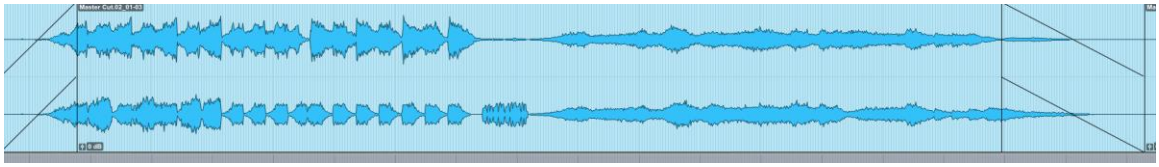

Figure 4.24: Pro Tools screenshot “Outro Reprise”

For this final vignette, I decided to repeat the earlier piece ‘Outro’ in a different arrangement. I wanted this to be the first thematic piece that the listener hears after the slow solo piano intro, and I wanted it to be the final statement as well to create bookends on the composition.

To create this composition I duplicated the last half of the ‘Outro’ piece and reversed it in Pro Tools. The effect of this is an uncertain pulse from the backward drum loop, and fast organ solos moving frantically in reverse. As the listener starts to get acquainted with the pulse/groove of the backward drums, I insert a silence along with our familiar organ melody, which transitions us back in to the original groove and sample (without the reversed effect).

Shortly thereafter the loop ends with everything being pitch shifted down to silence, and the organ riff is sampled multiple times before abruptly transforming into the Romantic Strings piece to finish the song. This was an homage to George Harrison’s use of the MKII at the end of ‘Drilling a Home’. In ‘Drilling a home’, George Harrison takes one of the Dixieland/Trombone preset riffs and abruptly loops it 9 times, making clear that the same recording is being chopped and looped.

Concluding remarks

In this chapter I describe the thought process behind each of the compositions in the study. The function of this chapter in the context of the project is to provide a foundation for how I have expanded the original use of the Mellotron, and applied new techniques to make it relevant in a contemporary context. I provide a detailed explanation for how each piece was written, performed and recorded, so any of the compositions could be recreated with the presented information. This chapter is essentially an organized presentation of my reflexive journal, which is one of the primary data sets for the project. In addition to presenting an explanation for the experimental composition process and the application of the new data sets, this chapter addresses my third sub question, which asks: *What does an artistically and conceptually fulfilling composition using the Mellotron rhythm and fills presets sound like, and why is it relevant?* The relevance of these compositions is contingent upon my choice of academic methodologies, and a focused creative direction, which functions as the thread of continuity between the Mellotron samples and the finished composition. This chapter provides insight into my personality and preferences as a composer, which have shaped the final composition as much as the tools that I used.

In the following chapter I will analyze these processes and methods and categorise them into the most relevant and applicable Mellotron techniques. Future Mellotron performers and composers can universally apply these techniques for use.

Chapter 5: Mellotron technique

A handful of different Mellotron techniques have been documented, and I will begin this chapter by establishing some of those. I will then present some of the new techniques I have developed through my own research process. It is possible that some of my 'new' techniques have in fact been used before in some context, but I have not come across them in my research of the existing pieces performed on the Mellotron. Of the existing techniques, none have ever been categorized by authors; the following techniques have been mentioned in interviews or are my own personal observations of techniques used in popular Mellotron songs. The assembly of this list of both existing and new techniques constitutes new research, formalizing and extending existing knowledge in the field.

Existing techniques

Strange attack

Compared to a piano or organ, the Mellotron has a strange response time after playing a note on the keyboard. There is a split-second delay between when the note is struck and when the sound begins that is caused by the mechanical nature of the machine. Mellotron players have noted that they eventually get used to this discrepancy and develop a technique in anticipating the delay by playing their notes a split-second earlier than they otherwise would. Tony Banks of Genesis has been interviewed on the topic, saying, "And, of course, there were some things you couldn't do with a Mellotron because it didn't have any proper attack, plus you couldn't play fast on it." (Awde 2008, Pg. 216)

8-Second time limit

The most challenging aspect of playing the Mellotron is the finite length of the samples. Every sample expires after 8 seconds, which makes it difficult to build large-scale harmonic beds and string sections. Ironically, this is the most common use of the instrument, so players have had to master various techniques to account for this mechanical quirk.

Additionally, keys on the Mellotron are extremely sensitive to dynamics and respond quickly to added pressure, so bringing new sounds in and out of a mix requires skill and technique. The decay of notes becomes an interesting variable at this point as well. The player has to approximate when the tone will die, and compensate for that loss of sonic space and energy accordingly. In some instances, I found that it can be a guessing game. John Wetton of King Crimson concurs in saying:

> It's an extraordinary instrument and it's not easy to play. It's a bit like playing church organ. You're reading 12, 24, 36 bars ahead. What you have to do is move your inversions all the time to avoid the eight-second 'yellow card', or red card sometimes.
>
> (Awde 2008, Pg. 272-273)

My personal technique to successfully build up big string harmonies was to add a voice every two beats or so, and keep track of the sequence of voices so I would know which one was going to die out next and could time it with the entrance of a new note.

Creating symphonic beds

As mentioned above, the most common application of the Mellotron in popular song is orchestral pads or beds. The texture and tone of the instrument perfectly suit the role, because it does not take up too much sonic (frequency) space, but introduces a potent color to the landscape. The most important technique involved with creating these harmonic musical beds is to keep the voices as spread out as possible. Playing triads on the Mellotron creates an abrasive harmonic texture, while more widely distributed harmonic elements can add to an effective harmony and texture.

Rhythm section chopping

Arguably the most central technique in the compositions is chopping rhythm sections. When a single key can trigger an entire band to play, strategic movement from one key to the next at unconventional times leads to new, unique musical landscapes. It is a

technique taken from DJ/Electronic/Hip-hop music of sampling fragments of songs and creating new rhythms with the fragments.

After acquainting myself with the sets, I quickly started listening to the rhythm section samples from more dimensions. I familiarized myself with the groove of the sample as it was recorded, and brainstormed/experimented with counter-rhythms or rhythmic transitions that had chemistry with the groove. Typically, I would find one or more sequences of rhythm section fragments that worked together, and develop them into themes, or sections of a single composition.

Postproduction

In an interview with Nick Awde, Tony Banks of Genesis talks about an interesting Mellotron signal processing technique:

> For example, we did this very simple trick with the Mellotron which I don't think had been done before. In 'Watcher of the Skies' in particular, we put it directly through one side of the PA system and [sic] while putting it via a CopyCat echo machine through the other side, so you go [sic] this massive stereo effect.
>
> (Awde 2008, pg. 204)

This is an effect that I tried to replicate in Pro Tools using plug-ins. For the Tango/Piano introduction to my final composition I used an echo plug-in and panned the piano to the far right and the echo from the plug-in far left. The Mellotron typically features a single mono audio output, so the resulting stereo image from a single sound was an interesting texture to add to the sonic pallette. The spatial texture seems to wash out of the centre into the left and right side of the stereo spectrum. The movement of the tone from the centre out to the sides is particularly captivating.

Reverb and delay are an essential part of postproduction for my Mellotron compositions, and of most recordings in popular culture of the instrument. Typically, there is a mixture of reverb and delay in the signal chain on the most famous recordings of the Mellotron.

The tones were originally recorded very dry, which can sometimes be used strategically as its own technique, but they sound more surreal and ghostly with a slight echo and reverb.

In addition to reverb and delay I commonly use panning, equalization and compression in my Mellotron signal chain and in Pro Tools. Creative panning can strategically place the tone in the left/right audio spectrum, or make it move. Equalization can clean up abrasive frequencies in the samples, and carve space for multiple samples to fit together. Compression can brighten up dull Mellotron tones, and harness wild dynamic jumps due to the extra-sensitivity of the keyboard mechanism.

Speed variation

Speed variation is another technique that is occasionally used on the Mellotron. A handful of artists have used the pitch bend feature of the Mellotron in a few ways. One way is to change the nature of the pitch by pitch bending up or down (+ or –) 700 cents, or using the high/low switch to control what octave you are playing in. This mostly results in dark ominous tones from pitch shifting down, or bright tones from shifting up. Many progressive rock artists used the string patches as pads, pitch shifted down so they wavered and groaned. One detail worth noting is that if the samples are pitch-shifted the length of the sample changes, for instance, if you play the Slow Foxtrot sample at (low/-700) the duration of the sample is 25 seconds, but if you play it at (high/+700) it lasts 4.5 seconds.

The other application of speed variation is to pitch bend a note for the effect of the bend. This creates an inorganic sounding tone that can be used as a sound effect or a dramatic transition.

New or newly applied techniques

In the process of analyzing my data and compositions I discovered a range of techniques that evolved over the course of my composition process that I had not heard used in the canon of songs with the Mellotron in them. The following section reviews a selection of these techniques. I have created four sub-categories of new techniques including: Melodic, Performance and Arrangement Techniques, Rhythmic Techniques, Data and Transcription Techniques and Tonal Techniques.

Another new element of this study is the genre itself. I am pioneering the use of the Mellotron as a solo instrument in an extended musical form, which has never been done before. Until this point the Mellotron has been used mainly as a background or colour instrument in pop/rock recordings. Its other (initial) use was as dance accompaniment for social clubs and dance halls. Extended performances using the Mellotron as a solo instrument may have been improvised, but no longer exist in notated, or even recorded format.

Many of these techniques are made possible through the interaction between the Mellotron and the DAW (Pro Tools). This is another application of the "old meets new" approach in this study, which is a basis for the compositions' postmodern nature, and a common theme as I am using the new digital Mellotron to trigger the original MKII samples. The data sheets create a bridge between the samples, which have hitherto been undocumented, and the DAW, creating a new context, and new potential for Mellotron composition. Additionally, these compositions could be performed live without pre-recorded materials if there were more than one Mellotron. Logistically, the parts could be divided up and arranged into sheet music for Mellotron players and would include notes about where and how much to pitch shift, and when to change sample sets. The fact that this composition can be entirely reproduced live confirms the relevance of the techniques, as they can be applied by anyone who has access to a digital Mellotron or the original samples.

Melodic, performance and arrangement techniques

Trial and error experimentation with sample length

I developed this technique during the course of one of the compositions that involved using my ear at first to find a progression that suited the preset, followed by experimentation with the duration of each chord. I triggered the first chord for one beat, and transitioned to the second chord, then tried to hold the first chord for two beats before transitioning to the second chord. I then went on to hold the first chord for four beats, eight beats, etc. before moving to the second chord. This is a way for me to use trial and error in a calculated way to determine how long to hold my first sample before transitioning to the second. I paired this process with observations of the transcriptions for this set to have a theoretical explanation for the harmonic movements. In other words, once I had established which sequence I wanted, I would then use the transcriptions to map out what chord progression I had played.

This technique is specifically a Mellotron technique (rather than a general compositional technique) because it originates with prewritten musical phrases, and uses triggering and sequencing as the principal mode of composition. This technique was used as a strategy to compose both the "Gershwin" and the "Tango Piano" pieces in early stages, but both ended up using different techniques for their final arrangement. Regardless, this technique acquainted me with the melodies, phrasing, and pacing of the samples, and functioned as a practical starting point for composition.

Letting a new sample take the thread of continuity

I would like to cite an example that was used earlier, but displays this technique clearly. In the composition 'Honky Tonk Time Zones', I used the Samba 6/8 Tempo in F preset and looped two repeating phrases that were each fragments of their respective samples. After 16 bars I let the sample play out instead of moving to the next one and the nature of the rhythm changed. Instead of using counting and musical symmetry to determine how long I would let this sample play, I listened to its melodic nature and let my intuition dictate the transition back to the main groove. The result of this is an extra two-beats

added onto the section, which creates an interesting and charming nuance to the composition. In other words, I am allowing the form and meter of the composition to organically evolve from the inherent structural features of the instrument. This approach is different from a top-down approach of applying these elements onto the instrument. As a result of this approach, these works are “Mellotron compositions” rather than “compositions played on the Mellotron”.

Building string and horn sections by layering pitch shifted samples

There were two main compositions that I used this technique for; one was using the Moving Bass/Moving Strings Hi set to build a unique symphonic bed for ‘Romantic Strings’. I used exclusively the high/low switch, and the pitch-wheel in normal position and pitched up and down a perfect fifth. Paired with a strategic selection of samples with little movement, this technique made my experiment a success. I had two low-pitched, droning string samples layered over two normal ones, and finally added lead voices that were pitched up (high/+700) to fill the high end of the mix.

The other instance of this technique was in ‘Horn Parade’. For this composition I used the same sample at 3 different tempos to play 3 different styles of horn riff. Additionally, I layered rhythm section horns in to hold down the groove, and built a section by doubling those parts a perfect fifth up (high/+700) on the pitch wheel. The result of this horn-centric layering experiment was also a success, as it remains one of my favorite compositions in the group. This technique is similar to another that will be presented later in the study entitled “Layering the same rhythm section over itself at a different speed”, but the effect of each is distinctly different. Layering riff sections results in either harmonic pads or the effect of an ensemble of different instruments playing together, as is the case with the horns. When rhythm sections are layered over one another there is a jarring rhythmic effect that influences the groove and beat of the song as its principal function.

Building melodic phrases out of sequences of samples

There are a number of techniques that I employed to build melodic phrases out of sequences of samples. As noted before, I found it effective to print out the transcriptions and sight-read through fragments of the samples on the acoustic piano. I also found it effective, as noted, to use musical intuition and sequence the phrases on the Mellotron. Additionally, using only the transcriptions to conceptualize sequences of melodies worked as well. Finally, I had some success using Pro Tools to build melodic phrases in a few cases. One technique that I used was to take two different samples and overlap them in my digital audio editor. I then would experiment with dragging the line that divides them to the left and right to see how it sounds when the sample transition occurred at different times. This technique is the contemporary equivalent of the practice of manually exploring imitation possibilities when writing counterpoint. This involves taking two instances of the same melody and experimenting with it in different rhythmic placements in relation to the original. The second instance can also undergo various types of permutation such as transposition, retrograde, augmentation, diminution and inversion before being placed in relation to the first. In the composition "Tango Piano" I used this technique as a strategy for composing the sequence and timing of the piano parts.

Playing the samples like a human

Once I had finished composing these rhythm sections I chose to practice them and perform them rather than play all the samples separately and constructing them in Pro Tools. Looping together these parts would have certainly been faster, but I found that the human element in performing the loops added a musicality to the rhythms. That being said, there have been circumstances where I was trying to accomplish a different effect, and digital audio editing was a useful and effective tool.

In addition to performing these parts, I found that I preferred to write the parts on the Mellotron, rather than in Pro Tools. Playing the sequences on the Mellotron keyboard, though sometimes taxing on my memory, enhanced the compositions. One example of this is in "Dr. Feel Good", in which the main rhythm section loop is performed on the

Mellotron rather than chopped up in the DAW, giving it a more natural and human (and admittedly imperfect) rhythmic nature.

Using sparse arrangement to bring out human elements

In a few instances like ‘Minor 5’ and ‘Gershwin’, I intentionally wrote a sparse arrangement at a slow tempo to bring out the human elements of the samples. The piano samples in particular worked wonders for this technique and were very evocative.

Rhythmic techniques

Layering rhythm sections

I had a lot of success layering rhythm sections for the “Outro” composition. In that case I built a drum loop that repeated first. I then added what was originally intended to simply be a piano stab, but it had the Cuban/Piano rhythm section underneath it in the mix. The rhythmic effect of the layering rhythms ended up being a wonderful surprise. After successfully layering these two rhythm sections I began to experiment with other sets and found endless interesting rhythmic possibilities. Another example of this technique was in “Post Apocalypse Liberace”, which started with a loop of a sample from the Rhumba/Guitar set. I then added the Key 1 rhythm section sample for the Bossa Nova/Moving Strings Lo set pitch shifted down an octave. The shaker is the primary sound in these samples, which had an interesting interaction with the rhythm guitar loop.

Single hit rhythm section notes that became elements of a drum set

In a number of compositions, I would listen through the tones of the rhythm section keys being played for one beat at a time, in search of elements of the drum set. Sometimes the sample sets would lend themselves to metallic sounds, which tended to be cymbals or high hat, other times they would have a loud cracking sound that sounded like a snare. Other sample sets sounded exactly like floor toms. These rhythm section samples include not only drum set sounds, but usually a guitar, piano, bass, and occasionally orchestral instruments. In these recordings, the tonal instruments would accent different beats that the drums were playing and embellish the tonal quality. Pitch shifting further modified these tones. The result, for example, would be a contemporary sounding snare hit, which

began as a pitch shifted, one beat sample layering guitar, trombone, bass, and snare. Eventually I found that I would occasionally build a drum beat out of arrangements of these 'drum-like' sounds, and use it as the central rhythm of a composition. One example of this occurs in "Schoolyard", in which the sample features multiple instruments hitting at the same time as the snare, on beats two and four. This tonally embellishes the rhythmic punches on beats two and four, and creates a new snare tone in drum loop. This single hit tone was the basis for building the rest of the arrangement.

Using odd time signatures to create an element of surprise

Often in my composition process I would use odd or inconsistent time signatures to create an element of surprise. On the macro scale, the short track lengths and time changes within each vignette leave the listener anticipating surprise while listening. In an individual context I found that letting an individual sample play out after using only a fragment of it repeatedly had an interesting effect. The repeated percussive hit gets the listener familiar with and used to the tone and part before revealing the origin of the sound by playing the sample all the way through. This creates a curiosity and investment for the listener, who ideally is waiting for the composer to reveal the origin of the sample. "The Organizer" provides an example of this technique by starting out as a chopped rhythm section before quickly revealing the original sample by letting it play out, every other measure. This technique is a way in which the instrument suggests the use of unusual time signatures as an inherent element of its nature.

Layering the same rhythm section over itself at a different speed

Several times in my composition process I used this tactic to create tension or urgency. I would first establish a rhythm section loop and record it, and then pitch shift it up to a certain degree, and perform it on beat one over the original recording. I would only let the sample play for a moment, and then I would wait until the start of the next measure or section to activate it again. The effect of this was a slight push in tempo for a split-second that would create subconscious urgency and energy in the piece. The clearest example of this technique is in "Cha Cha Champion" (as seen in figure 4.2), in which the principal rhythm section plays at approximately 90 beats per minute, but on beat one of

each measure, the same sample is triggered at (+700) and is playing at 185 beats per minute. This overlapping of rhythms creates a distinct effect.

Building a rhythm and bass line out of quarter note punches

This technique involves finding or designing a tone with a lot of attack, and starting a rhythm section with quarter note punches. This visceral pulse with the right tone often was the start of a new section as I was composing. “Moonwalk” is a good example of this technique as it uses these quarter note punches as the rhythmic centre of the composition and then builds on it. The punches come from playing E3 on the Fast Bass/Twist in C sample set.

Data and transcription techniques

Use of transcriptions

I would often use the transcriptions to conceptualize ways that the riff section could be manipulated to create new and exciting textures and overlapping melodies. For instance, if I were composing with a string section playing riffs, I would look over my transcriptions and find instances where the samples are long notes (whole notes, tied whole notes) and layer different tones and pitches over one another using the different samples and the pitch wheel. Another example would be if I had a piano chord riff set, I could layer chords that had notes in common and build interesting colors or harmonies out of the layering. My data was essential for the success of these compositions.

Using data sheets for fine tuning tempo match

For this technique I will reference my “Outro” analysis from the previous chapter, and elaborate on the nature of the technique.

“The next step in designing this scene was adding the tonal instruments. I decided to use the Moving Bass/Moving Strings Hi rhythm section samples to overlap with the anthemic drumbeat. This sample features a piano chord played on beat one, an upright bass playing a I-V walking progression, and a subdued jazz drum part playing kick, snare, and splashy ride cymbal. I wanted to use this sample mainly for the piano chord on beat one,

but also wanted to tune the tempo in such a way that it overlapped with the anthemic drums and enhanced them. I decided that the ideal setting was (High/-700) so that the pitch shifted distortion matched aesthetically with the tone of the drum loop. The Bossa Nova sample that was used is originally 96 bpm, but was pitched down an octave so the tempo dropped to 90 bpm before being pitch shifted down (low/-180) to 82 bpm. The Moving Bass/Moving Strings Hi sample is originally 124 bpm, and my data sheet informed me that if I pitch shifted this set down a perfect fifth, it would result in an 82 bpm tempo, which works with the Bossa Nova tempo. One might suspect that the performer could simply pitch shift any two samples until the speed is matching, but the key relationship will not match. This is the reason why the data sheets are practical and functional in the process of overlapping samples.

Essentially what I did here was establish a tempo/timbre for an initial part, and then match the note/timbre with a different sample, followed by fine-tuning the subsequent sample's tempo to the initial one.

Using data to locate the correct tempo/pitch relationship

There were a handful of techniques associated with using the data sets as tools. Most often, I would establish the tonic of a set, and then pitch shift the rhythm section to a certain extent. I would use the data sheets to establish what my new, post pitch shift tonic or root note is, and then tune additional melodic instruments to that key. An example of this occurs in "TV Time", in which the rhythm section is set to Twist in C, and is pitch shifted down a perfect fifth, making the tonic F. The main rhythmic part is quarter notes playing C♯3, which is the tonic of the key (originally C, now F). Once I had the principal rhythm and key established, I found a tone in the same set by experimenting with pitch shifting to different extents.

Once I had selected the tone (without bias about whether the pitch is correct or not), I used the data sheet to see what note I had pitch shifted to. At this point I had a sense for how much pitch shift fine-tuning was necessary to make that tone correspond harmonically with the key of F. I ended up playing E3 on the Mellotron, which was

originally a G, but pitch shifted it up +200, to make it an A, which is a major third above F. See Appendix C for a visual representation of the arrangement with production notes in Pro Tools, and see figure 2.5 for a music theory breakdown of sample sets in C as they correspond to the Mellotron keyboard.

In other instances, I would record a set in its original key, but would want specifically a tone that sounded pitch shifted. In this case I would approximate my tone, and use the data sheets to clarify the exact pitch shift that is necessary to be in key.

The data sheets also can help with piecing together grooves from different samples that are at different tempos. Often I would have an established groove and tempo and would want to transition into a different set at half or cut time while maintaining the same relative tempo. The data sheets would inform me as to how much pitch bend to apply to accomplish this rhythmic transition.

Lastly, I occasionally would use the data sheets to assist me in using the pitch knob for modifying melodies. I knew that I wanted the melodic movement in a certain part to be controlled by the pitch knob, so I opened the data sheets and mapped out the different points to which I would have to turn the knob to execute my melody.

Matching up instruments with keys in common

Another technique that I found useful was to be conscious of which samples have keys in common. There were three different rhythmic and tonal presets on each channel of the MKII as seen in figure 2.2, all of which were in the same key. For example, Bossa Nova, Viennese Waltz and Slow Waltz were all on channel 1 of the MKII, and were all in the key of C, whereas the Dixieland, Slow Foxtrot, and Foxtrot were on channel 3, so they were all in the key of A flat. During my composition process, I regularly experimented with these similar keys when layering different instruments together. The reason for this is that they are least likely to need pitch modification, and can therefore have the least amount of sample distortion. This simple principle is good to be aware of when composing with the Mellotron. I found myself looking for undistorted sounds by

searching for samples that had the closest key centre to the one I was currently working with.

Writing with the transcriptions and a real piano

In some cases, the transcriptions would lead to different choices. For instance, in cases where I was dealing with samples of acoustic piano, I would print out all the transcriptions and sight-read them. I physically cut and pasted together sequences of chords and phrases that sounded good together. This process was sometimes preferable to cutting and pasting experimentally in Pro Tools because it was more organic. For instance, in the Tango Piano Moving Chords preset (as seen in figures 5.1 and 5.2), which was recorded on track one, Part A cycles back and forth between the first measure of these two riff section samples, an arrangement that was discovered using this technique.

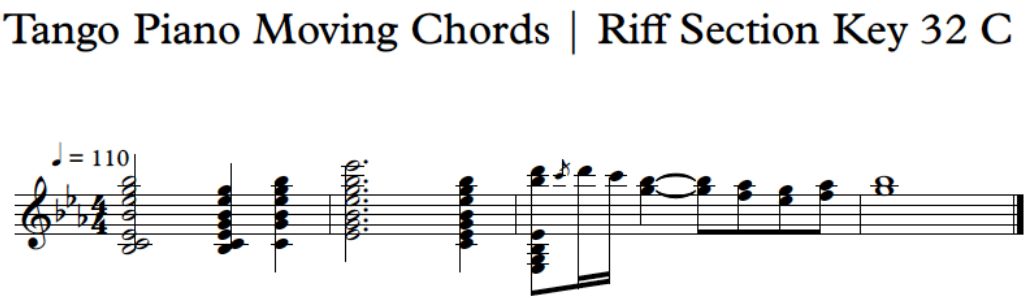

Figure 5.1: Transcription “Tango” 32

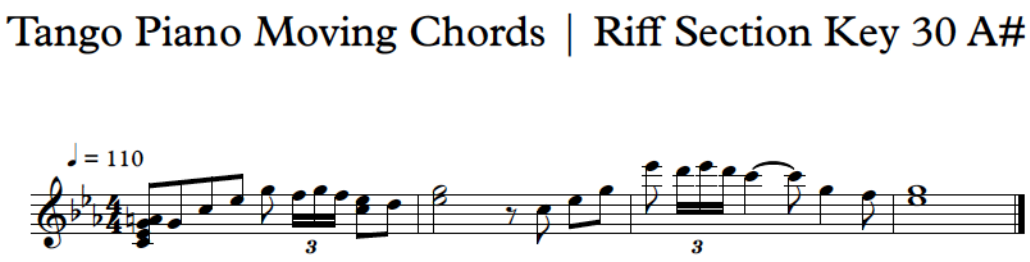

Figure 5.2: Transcription “Tango” 30

Tonal techniques

Using documented tonal descriptions in data sheets

I would often start with a rhythm section that was either sped up or slowed down to an interesting extent, and then use my data to map out what was happening tonally and harmonically. I would make these decisions based on my data sheets that observed the different timbre and tones. I would then try to make radical tempo changes, or build drum loops with single notes from the rhythm section. In the composition “Espionage Smack” this technique was used to find the initial tone, and then the arrangement was built based on the selection.

Finding tone first

I employed a new technique for the addition of lead flute melodies to “Fog Waltz”. I established which tone I wanted in the mix first by listening to the character of the flutes at different speeds, and eventually decided on high switch (-700 pitch shift). Once I had established that tone, I listened through all 17 options of flute samples over the current mix and found the one that was the best harmonic and stylistic fit. I then played and recorded the entire 8-second sample, duplicated it, and cut up the individual phrases in Pro Tools to build a melody.

Overdriven, harmonically enhanced tones from hardware pedals

One of my techniques late in the composition process was to add hardware pedals to the signal chain between the Mellotron and Pro Tools. I found that pedals that amplified or compressed sounds had to be used extremely strategically as they had a tendency to enhance ugly characteristics of the Mellotron tone. By ugly, I mean that the sound is distorted, or dissonant in nature. In other cases, I was trying to make sounds that had percussive attack and grit, and these types of pedals worked well. I used a Poly Octave Generator pedal, which essentially duplicates the audio signal in a different register and blends it with your existing tone. This was successful at thickening up tones, or embellishing certain aspects of tones that were understated in the samples. This technique is used to enhance the haunting, low, single-note tones in "Firework Spectacle".

Intentional chaos using multiple notes or unresolved musical phrases

This simple technique involves playing multiple samples at once on the Mellotron and letting their busy, virtuosic melodies clash together in chaos. This is a very stylistic trick, and was intentionally used sparsely. In "Royal Grand Procession" this tactic is applied in the second half of the composition. In this instance multiple piano samples are played at once to create a disorienting array of sounds.

Concluding remarks

In this chapter I have organized and documented the most relevant and useful techniques for Mellotron performance and composition, based on the analysis of compositions presented in Chapter 4. This chapter addresses my primary research question which asks: *What compositional and performance techniques can be developed on the MKII to expand and enhance its typical use?* I begin the chapter by reviewing existing Mellotron techniques that have been used on recordings or described in texts, addressing the first of my secondary research questions: *How has the Mellotron MKII been used compositionally in popular music, and how has its use evolved since its release in 1964?* Additionally, the chapter displays an application of the new data that has been discovered

in this project, and addresses the question: *How can the MKII's potential be expanded with additional data about the samples and the on-board effects?* The compositions in this project are dually relevant: firstly, they contextualize the Mellotron MKII samples in a contemporary form and style. Secondly, they are an example of the new techniques being applied in a performance/composition context.

In the following chapter, I interpret the analysis and rationalize this project in academic composition by placing it historically in the postmodern idiom, relating it to musique concrète, and explaining the influence of contemporary hip-hop and sample use on the composition. These interpretations of the study situate it historically and reveal both the originality and the limitations of the composition.

Chapter 6: Interpretation of analysis

Introduction

In the following chapter I will reflect on the insights and outcomes of this thesis, and interpret their relevance in the context of academic discourse and contemporary music. Throughout this project I have repeatedly asked myself, “Why is this relevant?” The data, the new techniques, and the original composition all strive to accomplish the same end: they intend to technically, conceptually and creatively explain the MKII presets to future users. The goal of the original composition was to invent a new, unique, highly stylized aesthetic and narrative by blending attributes of the old and new. The general creative vision was to use contemporary production and stylistic choices in the process of sequencing fragments of songs, being played by small studio ensembles pre-1965.

The Mellotron as a contemporary live/studio performance tool

In contemporary music, the Mellotron is used as a live instrument. Many popular bands use the Mellotron for their live performance including: The Smashing Pumpkins, The Black Keys, The Arctic Monkeys, Bruno Mars, Wilco, Foo Fighters and The Zombies, among others. (Resch 2016) All these bands use the digital Mellotron M4000D or the M4000D Mini models, and use them for primarily their flutes and string patches, not their rhythm and fills presets. These digital Mellotrons, as well as vintage analog Mellotrons are also used as tools in recording studios. Similar to their functionality live, the Mellotron is most commonly used for pads and textures created by their orchestral sounds. This limited use adds to the relevance of the new techniques presented in Chapter 5.

Postmodernism

Postmodernism is a musical idiom that has a number of characteristics associated with it. At this part of the study I will list the primary characteristics, and explain how my original composition corresponds to the items on the list.

Oxford Music Online states:

> Postmodernity is marked by a breakdown of authority and orthodoxy, and a realization that multiplicity of voices and perspectives provides a more legitimate reflection of cultural realities…another stylistic element that has also been called postmodern is a rejection of intellectual complexity in favor of increased accessibility…some have characterized postmodernism as prioritizing discontinuity and rupture over ideals of logic and completeness…it embraces 'connection or interpenetration', which reflects neither an embrace nor a rejection of traditional narratives, but rather an awareness of their contingency and a 'playfulness' with the collisions that can result through the juxtaposition of contrasting expressive resources.
>
> (Dell'Antonio 2014).

The above quote can be reduced to the following points, which I will use as a starting point for further discussion of the postmodern qualities of my own composition:

1. Postmodernity challenges authority, rejects intellectual complexity, and obfuscates the distinction between "high" and "low" art.
2. Postmodernity embraces the blending of multiple voices, perspectives, genres and cultures.
3. Postmodernism prioritizes discontinuity.
4. Postmodernism approaches traditional narratives with playfulness

From a theoretical, musicological standpoint, it is necessary to determine whether this original composition should be considered postmodern. Though the definition of postmodernist composition remains ambiguous and debatable, I consider my own composition to fall into the category. According to Kramer, "Postmodern music is not a

neat category with rigid boundaries" (2002, 16-17). The following is an argument for why I believe that my original composition fits into the postmodern paradigm.

In response to characteristic one listed above, the piece will most certainly challenge barriers between high and low art forms by combining the styles of classical, ballroom dance and pop music.

"This is another much-discussed feature of post-modernist cultural production, and it concerns the bending of genres and the appropriation of 'low' cultural forms into 'high'" (Taylor 2002, Pg. 94). The instruments of the Mellotron represent inherently "high" and "low" art forms. As noted before, most of the individual tonal samples are from orchestral instruments, which are clearly categorized as belonging to a "high art" form, western classical music. Yet the rhythm and fills section is comprised of a collection of popular dance and big band styles from the 1930's and 1940's. This kind of popular dance music is, according to traditional parlance, considered a low art form. Mixing the two together creates yet another dimension of cultural ambiguity, changing pitches and timbres of the classical instruments to make them sound strange and warped.

The composition also defies elitist views and expresses some level of irony through the use of the Mellotron as the primary voice. The traditional approach to classical instrumentation held the pure tones of acoustic symphonic instruments in high regard (given the fact that most contemporary symphonies still use entirely acoustic instrumentation), so to use gritty samples of these pure tones is undeniably an artistic statement. In this way, the instrumentation chosen bridges the gap between traditional conceptions of the "high" and "low" art forms, as the composition uses high art tactics like counterpoint and sophisticated arrangements, but is being realized on what was initially intended as a replacement for a family organ or piano with symphonic sounds. The idea that anyone can play a symphonic piece in their living room defies the elitism associated with the exclusivity of "high art".

This vision of mixing pop and symphonic music as an example of postmodern composition relates to what Howard describes as 'The Gorecki Case'. Howard states:

> In February 1993, a new recording of Henryk Gorecki's Third Symphony, the *Symphony of Sorrowful Songs,* reached the no. 6 position on the British pop album charts…In subsequent years, Gorecki's symphony has insinuated itself so deeply into the ears and minds of a new, predominantly young audience that the repercussions of that phenomenon continue to sound long after the symphony's notoriety had crested. One of the more unusual manifestations of this phenomenon is in the work of pop musicians who have taken Gorecki's popularity and crossover appeal as a point of departure, creating songs that combine pop styles and technologies with quotations or references to Gorecki's music.
>
> (Howard 2002, Pg. 195)

This revitalization of style mixed with technology and pop music is a noteworthy example of mixing high and low art, as well as combining genres, both central goals in my thesis. Additionally, postmodern theory embraces the use of technology, which is an essential part of my work. The use of multi-track recording and sampling is pivotal to the final composition, both by means of the compositional process and the sonic aesthetic.

In response to characteristic two, the composition is strongly aligned with the idea of multiple voices and perspectives being united to form a postmodern composition. Postmodernism "includes quotations of or references to music of many traditions and cultures," (Kramer 2002 16-17). One of the central goals of the composition was to combine and overlay a variety of styles from 1930's and 1940's popular dance music. The outcome of quoting distinctly different styles in the same piece has remained a central curiosity, embracing pluralism and eclecticism. The result is a work that represents and sounds like the Mellotron as a style in itself, rather than an instrument merely imitating other styles and genres.

In response to characteristic three, the composition certainly embraces discontinuity and rupture over ideals of logic in its eclecticism. It ties together hundreds of samples in a multitude of ways, often pleasant, but other times intentionally discordant and chaotic with the intention of defying the traditional classical and pop music standards and traditions. The composition embraces an eclectic assortment of genres beyond the 15 dance styles including various sub-genres of hip-hop, indie music, film music, and numerous others. The integration of all these styles confirm the piece's support of discontinuity as a compositional approach.

In response to characteristic four, I will quote Vincent Persichetti in *Twentieth Century Harmony*:

> Contemporary musical resources include a wide range of materials of the past and present, and the available techniques yield abundant expressive returns…there are daringly experimental and strongly traditional forces which bring divergent materials together.
>
> (Persichetti 1961, Pg. 9).

It is interesting that Persichetti made this statement at around the time of the original release of the MKII. The source of my sounds were recorded over fifty years ago, and the form and stylistic theme of the composition references and relates to contemporary hip-hop music. This chronologically diverse format for approaching composition and songwriting is central to my creative vision, and is evident in the final long form composition. Additionally, the essential character of the way that my composition is organized and formatted is playful, as it is constructed out of short, contrasting sections with frequently tongue-in-cheek or generally humorous titles. The structure and conception of the piece itself are playful, explicitly avoiding the tone of seriousness so often associated with concert music predating the postmodern era, and indeed still associated with much concert music today.

Musique Concrète

The composition process is indebted to the philosophy of musique concrète, developed by Pierre Schaeffer in 1948. My composition techniques varied widely for the sake of experimentation, but a common thread through most of the techniques was an emphasis on determining parts and sequences based on the nature of the sound, rather than the music-theory architecture. I did use the transcriptions and tempo data to help with certain techniques, but in general the aesthetic quality of the samples was the central point of interest. This concept of prioritizing the design of the sound influenced my process. If one were to compare Schaeffer's musique concrète compositions with the originally intended output of the Mellotron, one would observe a polar difference in their philosophies of sample use.

Schaeffer's compositions are abstract, metreless soundscapes incorporating recorded noises and sounds from everyday life. These compositions certainly prioritize the aesthetics of sound over written music, but also consequentially sacrifice traditional melody, harmony, themes, structure, and form. As a result of these attributes, most interpret Schaeffer's compositions as avant-garde, abstract soundscapes rather than songs.

As we know, the Mellotron was designed as a highly purpose-directed dance music instrument incorporating samples of traditional instruments. It was designed to use the revolutionary sampling technology to recreate the most traditional sounds and songs for dancing. I argue that my work has carved out some middle ground between these two approaches to sampling, emphasizing the aesthetics of the sounds as the priority, but maintaining the attributes that are necessary to construct a song, such as melody, harmony and form. My compositional philosophy does relate to the aspects of Schaeffer's work that align with postmodernism (though I would not assume that he is postmodern, necessarily), namely its eclectic and unconventional nature.

Unique, contemporary application of the samples

Mix tape/film reel format

The creative centre of this composition is the idea of there being a harmonious relationship between 1960's sounds and performances, and current day musical style and technology. I essentially set out to build contemporary hip-hop-style drum beats mixed with short, cinematic scenes out of the MKII presets, with the intention of designing a composition based on a mix tape, or producer's reel. In hip-hop music culture, producers often have mix tapes that feature short vignettes of musical ideas that they have developed, with the intention of shopping the ideas to vocalists. I decided that this format and presentation of the work could pay homage to this relatively contemporary tradition in hip-hop culture. This format also relates to a film show reel, which works in the same way, presenting short, emotive statements in succession. Hip-hop and film

music are both genres/styles that I constantly tried to evoke through the composition process.

Contemporary tools

In addition to using a relatively contemporary format, I used technology to enhance the sounds. This included a digital audio workstation (Pro Tools), which has a diverse array of digital effects, and a series of hardware pedals that were used in my signal chain, along with a contemporary digital Mellotron M4000.

Theme of the piece and creative direction

This section reviews and follows up on the concept of the creative theme for the piece that was established in the compositional methodology section in Chapter 3, and analyses the outcome of the creative direction. The conceptual goal of the composition was to create a simultaneously old- and new-sounding piece that emphasized selective attributes from the original Mellotron while also embracing new technologies, styles and attributes from contemporary music. Additionally, this use of the Mellotron explicitly bridges the gap between old and new approaches to sampling, namely musique concrète/dance hall band simulation as contrasted with contemporary hip-hop sampling. In his doctoral dissertation, Nathanael James Bates discusses the relationship between hip-hop and musique concrète with regard to their approaches to sampling:

> Hip-hop followed a similar technological trajectory to musique concrète in that it progressed from vinyl to digital, growing out of the impulse to turn music playback devices into music production tools. Seemingly blithely unaware of musique concrète, hip-hop also began with the turntable but, critically, hip-hop skipped the magnetic tape phase that was so essential to the development of musique concrète, and instead moved straight to digital sampling…It is out of hip-hop that comes the commonly understood definition of sampling: the reuse of recognizable fragments of the recorded music of others.
>
> (Bates 2013, Pg. 30)

As Bates notes, hip-hop sampling tends to use fragments of recordings of other people's songs, whereas musique concrète uses a variety of individual sounds, often found in natural environments. This study uses elements of both hip-hop and musique concrète, as it uses both fragments of prerecorded songs like hip-hop, and new individual sounds by way of manipulation of the samples. The difference between my study and hip-hop sampling, as described by Bates, is that my samples were recorded as fragments and designed to be sequenced, and did not originate in a full composition.

I settled on a handful of old attributes as bullet points for my creative direction. The original tones and performances on the Mellotron express themselves and add a human feeling to the composition. In other words, the character and musical personality of the pre-1965 session players is expressed in the composition. Throughout my composition process I constantly settled back into genre choices that were similar to Motown and soul music. I preserved and enhanced the cinematic nature of the samples by allowing moments reminiscent of subtle cinematic underscore to exist in the composition. I also decided to embrace the charming, comical nature of some of the samples. This composition is not self-conscious about sounding silly or humorous at times, and it strategically uses moments of pastiche and comic relief as compositional devices.

The inherently new aspects that I decided to embrace and embellish in this composition were mostly centred on contemporary editing and effects-processing technology. I allowed myself to make the rhythms and drum loops loud, aggressive and visceral, like some contemporary hip-hop. I embraced the opportunity to use new, easily applied versions of effects including overdrive, harmonic enhancement, delay, reverb, equalization and compression. Arguably the most important characteristic of contemporary music that I embraced was looping. I wanted to use loops and sequencing both in a live performance context and spliced together in Pro Tools.

This thought experiment resulted in a focused creative direction. I began with a general, conceptual goal, which is to make the composition sound old and new simultaneously. I addressed the influences and aspects of the project that are inherently new and old, and

strategically selected the ones that I thought would contribute to a compelling and exciting original work. I referred to this direction constantly during my composition process, and it informed many decisions that I made. In the end, I believe that the composition accomplishes its original goal.

Techniques, transcription and data

In addition to the composition, this thesis offers a reflexive, narrative account of a large-scale composition process with the Mellotron. This gives insight into the relationship between the instrument and the composer, and the evolution of different techniques as the instrument became more thoroughly understood and accessible. When I refer to the relationship between the instrument and the composer, I mean that the study shows specifically what barriers a composer comes upon during the writing process, and which aspects of Mellotron composition are more intuitive. Additionally, I provide examples for ways in which the new data can help to overcome frustrations with the instrument. The composition seeks out the "nature" of the samples, and attempt to write in such a way that maximizes their character and charm. By "nature", I refer to the essence of the style and aesthetic that the sample originally set out to imitate or present. Chapter 5 aimed to provide thoughtful techniques that can be applied by any composer using the Mellotron. The data and transcriptions offer a comprehensive tool kit as well. All the Mellotron composition resources in this thesis are original and new insights into the instrument.

Concluding remarks

This interpretation has historically contextualized the Mellotron composition, and revealed the aspects of the project that are new and original, while also reviewing the development of new techniques and the creative process. This addresses the second half of the primary research question regarding the reinterpretation of the instrument's original social role to function in a contemporary social and stylistic environment. The chapter began by describing postmodernism, explaining why the original composition falls into this idiom. It then drew similarities to musique concrète, contemporary hip-

hop, and film music. The explanation of the long scale form of the piece was presented, along with the composition's theme of "old and new".

This chapter explains how the composition uses the Mellotron samples and new data to preserve and emphasize its best qualities as an instrument while also reinterpreting its function and context using contemporary styles, technologies and forms. In this manner, the composition aims to achieve the goal set forth by the research question, while also achieving the stylistic goal of sounding "old and new". This historical context also relates to my third research sub-question, which asks why this original composition is relevant. As the composer, I consider its relevance to lie in the eclectic manner in which it is influenced stylistically, aesthetically and formally by film, hip-hop and musique concrète, cutting across a broad stylistic and temporal swathe to create a novel composition simultaneously unique to the 1960s-era Mellotron while undoubtedly contemporary in character.

Conclusion

In my Conclusion I will present all the original research questions, and explicitly answer them with reference to the specific chapters in this thesis. The findings from each chapter will be evaluated and drawn together to present an argument that the original Mellotron composition and new techniques introduced in this project contribute new, relevant knowledge to the fields of musicology and music composition.

The central focus of this project is the new Mellotron techniques that it presents, and the secondary focus is the application of those new techniques in the form of an original composition. Though both aspects of this project are intertwined with one another, they have the potential to function separately, and I will spell out their implications separately as an organizational tactic in this conclusion.

I will begin by answering the three sub-questions, and then continue by separately answering each half of the primary research question before finally summarizing the implications of the research as it relates to all the questions.

Research sub-questions

How has the Mellotron MKII been used compositionally in popular music, and how has its use evolved since its release in 1964?

Chapter 1 focused primarily on theoretical methodologies, but also established a list of existing literature on the Mellotron MKII as well as an overview of the ways in which the instrument has been used compositionally since its release in 1964. The chapter reveals that only one academic work has been published on the Mellotron, and that there are minimal additional non-academic sources on the topic. The implication of this is that there are gaps in the knowledge base on the Mellotron, which this thesis aims to fill.

Chapter 2 continues to clarify the extent of these gaps by compiling the standard music theory data that is available on the instrument to date, and providing the implications of this lack of data as a possible explanation for why the rhythm and fills presets have been used so infrequently by composers. In addition to identifying the missing data on the subject, this chapter also presents the few existing instances of the rhythm and fills presets being used as a composition tool since their release in 1964. The fact that there are only a few compositions that use these sample sets validates that they are not often used in popular music. The cryptic nature of the sample sets is the most logical explanation for why they have not been used.

Chapter 5 categorizes and analyses the existing performance and compositional techniques that have been used on the Mellotron since its release, which proves to be a limited application of the instrument. Finally, Chapter 6 introduces the MKII as a contemporary live/studio performance tool, which provides insight into its functionality and common use in current times. The implication of this overview is that the Mellotron MKII presets are not used currently as a performance tool, but that the more traditional functions of the Mellotron, notably the string and flute single note sample sets, are commonly used to replace orchestral instruments in a live performance or recording setting.

This thesis gives a comprehensive history of the Mellotron's use in various contexts from its release in 1964 to present day, and takes note of the limited nature, and one-dimensionality of its use, before providing explanation for why this has happened. That explanation includes the cryptic nature of the rhythm and fills presets as they relate to music theory. This thesis identifies the gaps in Mellotron data, and then fills them with new data, before eventually applying the data to the development of new techniques.

How can the MKII's potential be expanded with additional data about the samples and the on-board effects?

Chapter 2 established that the MKII's potential has been minimized by the lack of data regarding the sample sets. Chapter 3describes the methodology for data collection, which validates the quality of the data and therefore its value. Chapter 4 applies the new data sets by way of compositional experimentation, which provides examples of their potential functionality. This leads to Chapter 5, which reinforces the ways in which the data can be used, as it is the centrepiece of most of the new techniques. This data is universally applicable to any Mellotron performer or composer, and is presented for the first time in this research. Chapter 6helps us understand the ways in which the instrument is used in modern performance and composition, illuminating the ways in which it is not being utilized, and identifying the reasons. The transcription charts allow a composer to identify the keycentre and note selection of the samples so as to place them strategically in their compositions. The tempo data allows the composer to transpose any individual sample into the appropriate key of the song that they are working on, and also allows them to quickly calculate the appropriate tempo of a sample. With data and control over the note-selection, tempo and key of the samples, Mellotron composers can now overcome the barriers of the instrument, and ideally use it fluidly with other instruments as a composition or performance tool.

What does an artistically and conceptually fulfilling composition, using exclusively the MKII rhythm and fills presets sound like? Why is it relevant?

The original composition included in this thesis answers the first half of this question, but the second half requires more explanation. In order to qualify whether this original composition is relevant, it is necessary to understand what it is trying to achieve, and whether it accomplishes these goals. Additionally, the method of composition, the theoretical position, and the historical context are all important factors in understanding the relevance of the work. Chapter 1 presents the nature of artistic research and reflexivity, which make up the theoretical foundation of the composition process.

Chapter 2validates the cultural value of the Mellotron as a topic of discussion and study by referencing many major artists that have used it in historically significant songs. In presenting these examples, it also illuminates the fact that there are very few instances of the rhythm and fills samples being used in composition and performance, which further qualifies my composition as being original. Chapter 4 describes the process of composing each individual composition. This is a prerequisite to their relevance, which is contingent upon a legitimate theoretical framework underpinning the study. The chapter also represents the first extended insight into the processes of a Mellotron composer. As noted before, the presentation of the new techniques further validates the relevance of the composition. Chapter 5 maps out these new techniques and their respective examples in the work. Finally, this long form original Mellotron composition is only relevant if it successfully functions in a contemporary stylistic environment. Chapter 6 presents influences and styles with regard to both aesthetics and form that contextualize the composition, motivating for its relevance to a contemporary listener.

Research question

What compositional and performance techniques can be developed on the MKII to expand and enhance its typical use, reinterpreting the instrument's original social role to function in a contemporary social and stylistic environment?

Now that the sub-questions have been answered based on the implications of each chapter, I will address the two sides of the primary research question. Over the course of this project my research has uncovered a number of compositional and performance techniques on the Mellotron MKII, which are categorized into: melodic, performance and arrangement, rhythmic, data, transcription and tonal techniques. The techniques are presented in an applied context, with examples of their use referenced in the original composition that is included in the study.

Chapter 2 provides an overview of the ways in which the Mellotron MKII has been used in a compositional or performance context to date. This is a necessary step in establishing what techniques have already been discovered and applied, leading to the

question of what remains to be discovered on the topic. The basis for the new techniques is centred on the new data that is presented in this study. Chapter 2 functions to establish the music theory data that exists on the Mellotron, and Chapter 3 reviews the new data that this study presents. Additionally, the data collection methodology is reviewed, which validates the new data as sound and carefully collected.

Chapter 3 also introduces the composition methodology, which describes the creative process. This creative process functioned as the experimental research that led to the new techniques. The intentionality of writing with reference to making the composition sound simultaneously old and new, as well as referencing film and hip-hop as creative directions certainly influenced the techniques that resulted from the composition. For instance, if I had been writing music with the same tools, but had intended to make the composition sound specifically like 1964 big band music, or 2017 electronic dance music, the approach and resulting techniques would have been vastly different. For this reason, the compositional methodology supports and gives insight into the new techniques that this project presents, as well as the stylistic nature of the original composition.

Chapter 5 presents several new strategies, techniques and ways of thinking about the Mellotron MKII samples to enhance their potential. It suggests new ways to sequence samples, ways to perceive the relationships between the samples, and suggestions for layering the samples in ways that make them sound like traditional or non-traditional orchestral instruments. This section offers methods of approaching performance and improvisation on the instrument, as well as conceptualizing the samples in terms of their timbre, their rhythm, and their tonality. Additionally, the study offers ways in which the data sets and transcriptions can be used to troubleshoot issues with layering the samples into existing compositions, or onto each other gracefully and harmonically.

The main contribution that this study makes to Mellotron literature is the section of practical, new techniques. This study is the first categorization of existing Mellotron techniques, which is a useful contribution to the field. The combination of new data and

techniques functions to expand and enhance the typical use of the Mellotron MKII rhythm and fills samples, making them approachable and useful to any composer with a basic understanding of music theory.

The second part of my primary research question focuses on the reinterpretation of the instrument's original social role to function in a contemporary social and stylistic environment. This project works on two levels, both as an expanded model of performance practice techniques, and as an original long form composition using exclusively the Mellotron MKII. The original composition intends to function in a contemporary social and stylistic environment, and provides insight into the composition process through reflexive methodologies.

Chapter 2 describes the instrument's original social role as a one-man band keyboard for social dance clubs with the intention of having less expensive music entertainment without sacrificing the multi-instrumental sound. The Mellotron experienced some small success in this domain, but is generally known for the unique tone of its single-instrument string and flute samples, used on famous albums by The Beatles and The Rolling Stones, among others. Essentially, the main function of the instrument originally centred on the rhythm and fills presets, but the single note sample patches made it famous. This study describes the aspects of the rhythm and fills presets that makes them challenging to perform and compose with as an initial explanation for why historically they have hardly been used. The original composition in this thesis incorporates the nostalgic tones that made the instrument famous, but more importantly the rhythm and fills presets, which were so central to its initial intended function.

Chapter 3 introduces the creative direction for the composition, tying in postmodernism, film music and hip-hop. These more contemporary styles influenced the composition and presented the sample sets in a way that successfully functions in a contemporary environment. Chapter 4 describes the use of Pro Tools as a compositional tool, describing how it affected my process and aided in the reinterpretation of the instrument. Digital Audio Workstations such as Pro Tools are commonplace in contemporary music

production, so this added dimension of the music being captured and edited through a contemporary interface adds to the aspect of reinterpretation. Additionally, it is an example of how the Mellotron MKII and the DAW can interact to increase the functionality of the samples.

Chapter 5 maps out all the new techniques for the rhythm and fills sample sets, several of which are made easier with the help of Pro Tools. Additionally, all new techniques function to add to the reinterpretation of the instrument. Chapter 6 elaborates on the influence of postmodernism, which is a central philosophy to the composition. Postmodernism, alongside Schaeffer's musique concrète, contemporary hip-hop and film music, formed the basic theoretical foundation for my composition. Through these influences, the resulting composition retains the nostalgic tonal nature of the 1964 Mellotron samples, but presents the newly developed data and techniques, while also representing contemporary music styles. This composition can function in a contemporary social and stylistic environment because of these contemporary influences and their postmodern nature.

Implications of the study

This study situates the Mellotron historically and contemporaneously, exploring its potential for creating new sounds with old material. The written component in conjunction with the composition establishes and demonstrates the Mellotron's capability for extended solo work. This application of the instrument suggests a role as a potential sound source in classical/concert ensemble music, a use that the Mellotron has never been put to before. The additional functionality of the instrument as a result of this study makes the Mellotron more practical for improvisation, composition and performance in new musical contexts. Additionally, the research expands scholarly/educational literature on electromechanical keyboards, providing in-depth data, which complements surveys such as Shepard's *Refining Sound (*2013) and Vail's *The Synthesizer* (2014).

From a practical perspective, the new techniques and the documentation of the composition process are universally applicable to any Mellotron player interested in

learning to perform or compose with the instrument. In the analysis chapter, each sound and arrangement of the composition is explained comprehensively. The cryptic musical architecture of the MKII rhythm and fills presets is broken down and explained, which is another practical impact of the study. The transcriptions and tempo charts have an additional practical impact on the field, functioning as an in-depth reference manual for anyone interested in mastering the instrument.

The ideal outcome of this study, and the mapping out of the Mellotron's functionality, is increased popularity of the instrument as a result of it becoming easier to understand and play. Additionally, this study has the potential to influence and expand the musical style of players of the instrument.

Relationship to the field

The field of academic study on this topic is quite minimal to this point, with no studies or publications that provide Mellotron data, transcriptions, techniques or compositions. My study is the first of its kind to present this information, and it is the first composition that uses exclusively Mellotron rhythm and fills presets as an instrument. There are a number of publications that review the history of the Mellotron, and databases that document its use in different songs across its 50-year existence. There is only one academic publication that includes the Mellotron, and it uses it as a tool for trying to stump software that auto-detects instruments. The historical information and application of the Mellotron in popular song have been reviewed in this project, but the impact of the study falls on the new research it provides.

Limitations of the study

There are a number of limitations of this study. Included is the possible methodological imprecision in documenting the tempo data. The transcriptions were created by listening to the samples and then writing them down on sheet music. They were double checked by a professional transcriber, but even with multiple ears checking them, there is the possibility of error.

Additionally, any study that bases its methodology on reflexive research must acknowledge that the perspective and context of the researcher impacts the study itself. In this project I have acknowledged and taken into account my relationship to the material as explicitly as possible, and have modified my practices and methods at a number of stages so as to maintain relative objectivity with the data and the composition. That being said, even the most skilled researcher must present their own personal perspective and their place in history, in conjunction with the nature of reflexivity, as a limitation to the study.

Suggestions for further research

This study could potentially lead to additional Mellotron research and compositions. One suggestion for future researchers is to transcribe and collect tempo data for the other models of Mellotron, and also the Chamberlin samples. The field of Mellotron composition only has room to grow, which is why I hope that more scholars/musicians attempt to write stylistic, original music with the instrument. The transcriptions could be used to integrate MIDI compatibility to the digital Mellotron samples, which would expand the compositional possibilities of the instrument. According to Oxford Music Online, MIDI (Musical Instrument Digital Interface) is:

> A hardware and software standard established in 1983 for the communication of musical data between devices such as synthesizers, drum machines and computers. It has virtually replaced earlier methods of playing one synthesizer from the keyboard of another, or of synchronizing the performance of one drum machine or sequencer to that of another. The information exchanged may include notes, program changes, volumes and other elements.
>
> (Burnand 2009)

In order for the MKII rhythm and fills presets to be available in MIDI, the transcriptions and tempos in this thesis would need to be input and connected to each individual sample through the MIDI program. The result would be easy transposition of the samples in the DAW, rather than on the Mellotron hardware unit. Editing would be easier and more

fluid, and the Mellotron would have additional functionality as it relates to interacting with other sequencers and samplers.

Concluding remarks

This study has presented a reflexive, contemporary perspective on Mellotron composition, as well as the first published long form composition for solo Mellotron. It has also provided the academic community and Mellotron players with new techniques, tools and resources for composing, improvising, and performing with the Mellotron MKII.

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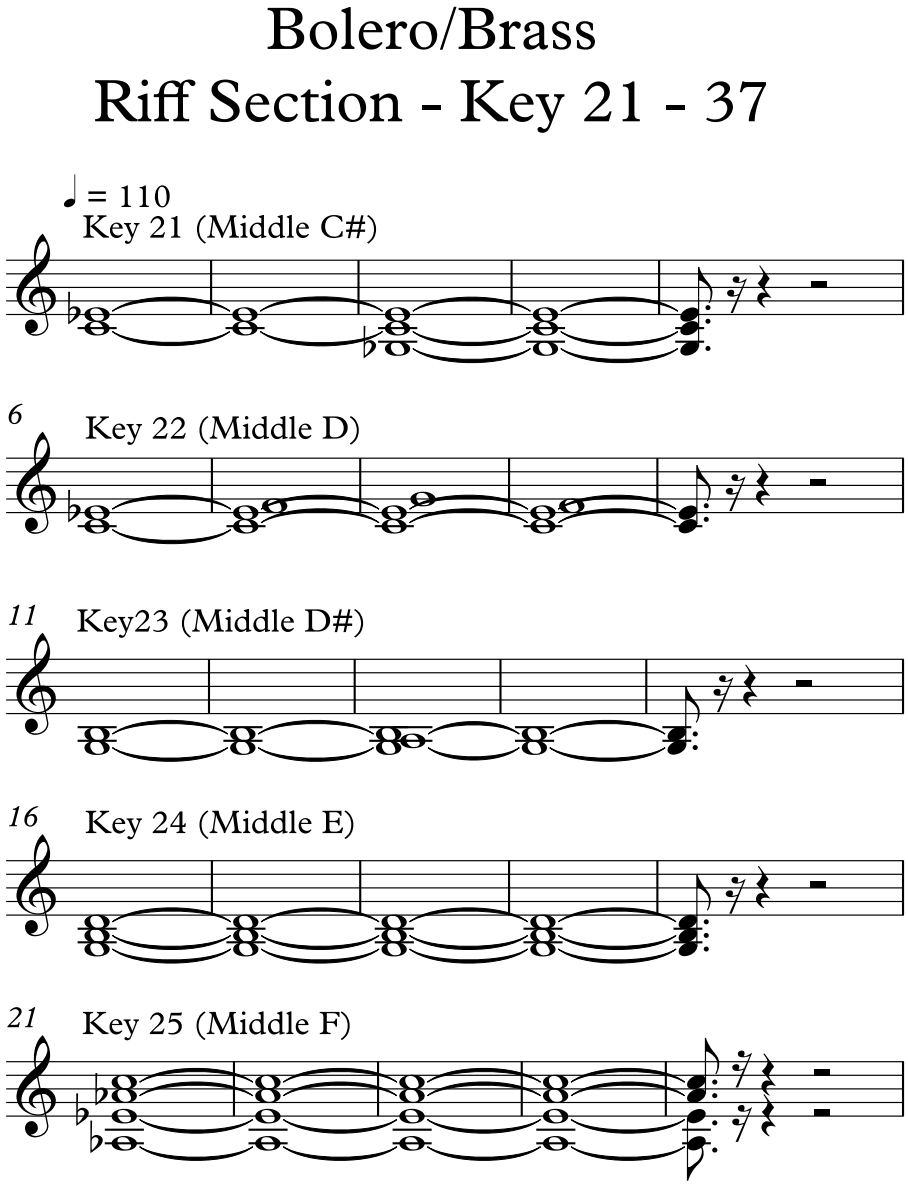
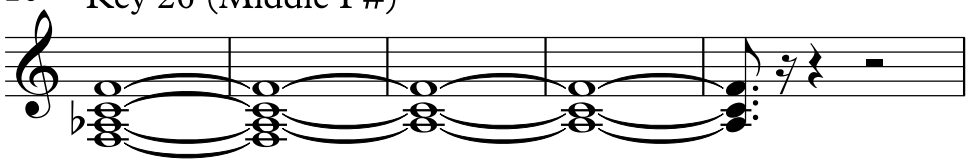
Appendix A: Transcriptions of lead instrument riffs

Bolero/Brass

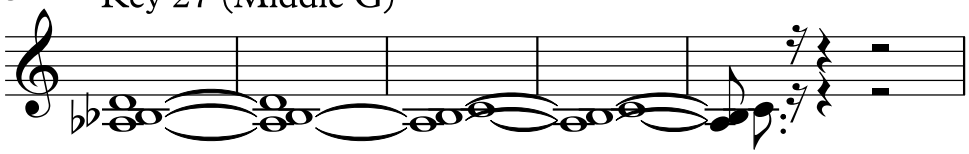


2

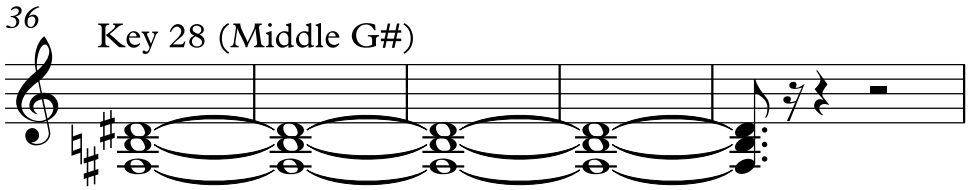
26 Key 26 (Middle F#)



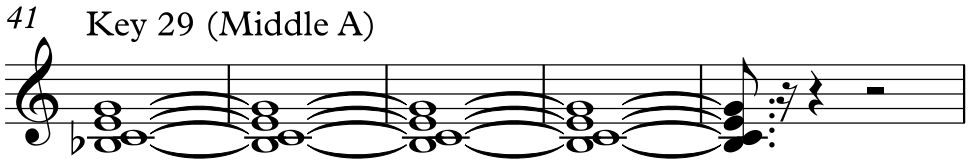
31 Key 27 (Middle G)



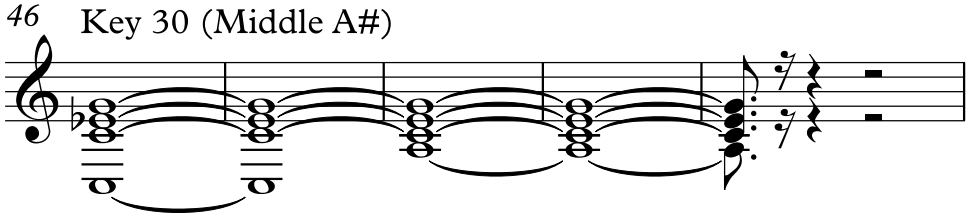
36 Key 28 (Middle G#)



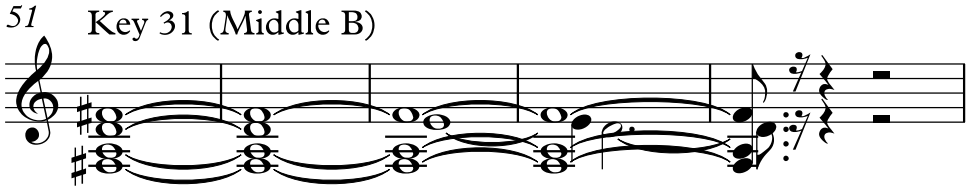
41 Key 29 (Middle A)

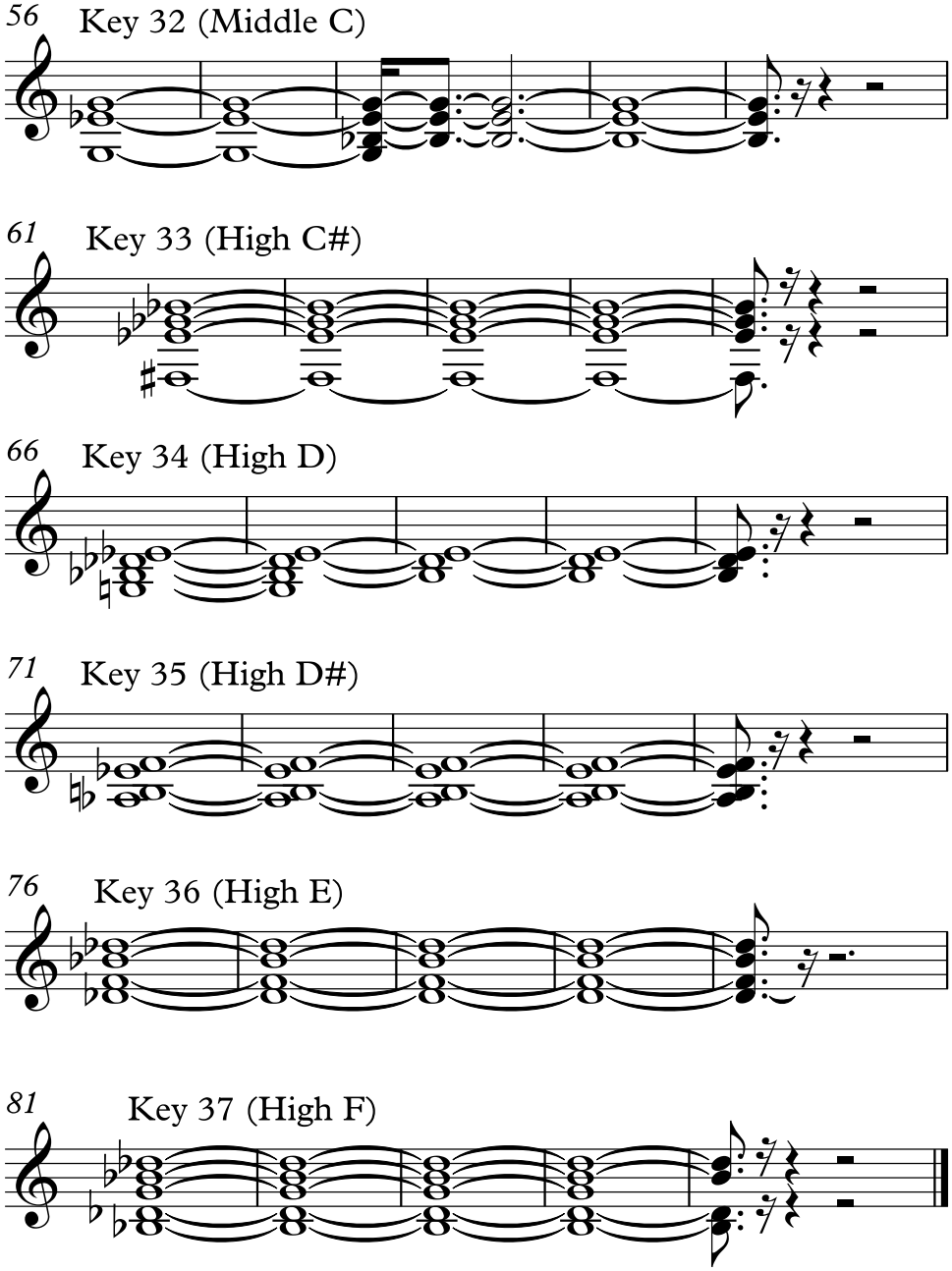


46 Key 30 (Middle A#)

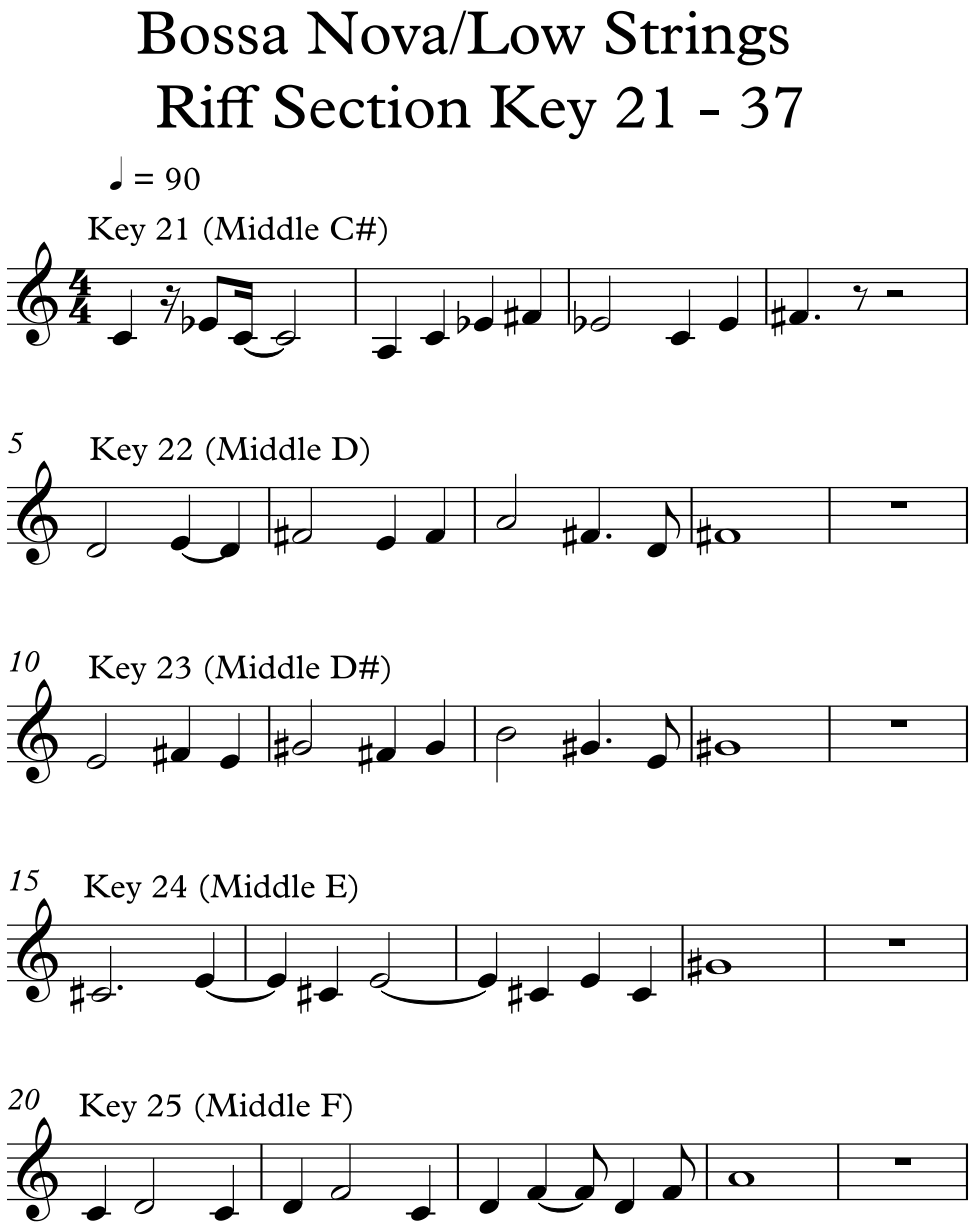


51 Key 31 (Middle B)



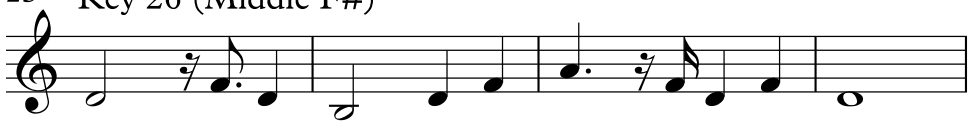

56
Key 32 (Middle C)
61
Key 33 (High C#)
66
Key 34 (High D)
71
Key 35 (High D#)
76
Key 36 (High E)
81
Key 37 (High F)

Bossa Nova/Moving Strings Lo

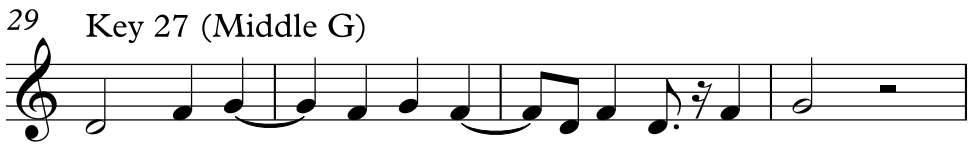


2

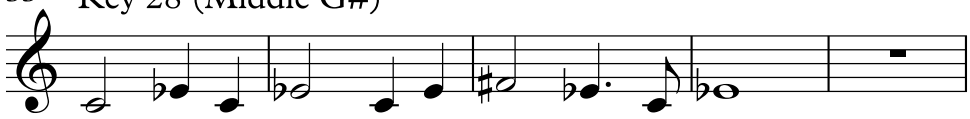
25 Key 26 (Middle F#)



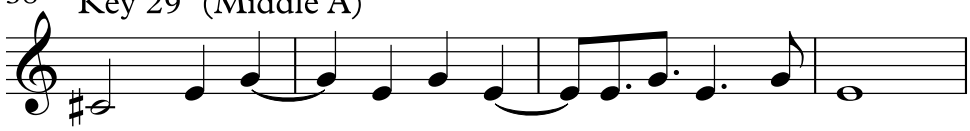
29 Key 27 (Middle G)



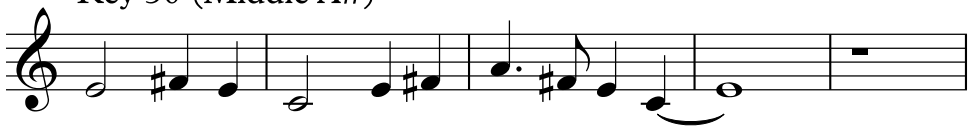
33 Key 28 (Middle G#)



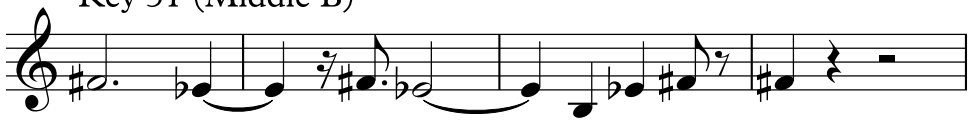
38 Key 29 (Middle A)



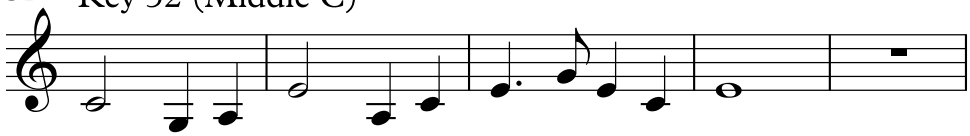
42 Key 30 (Middle A#)



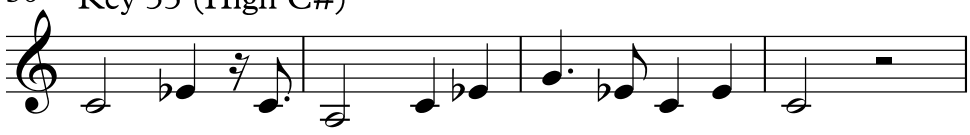
47 Key 31 (Middle B)



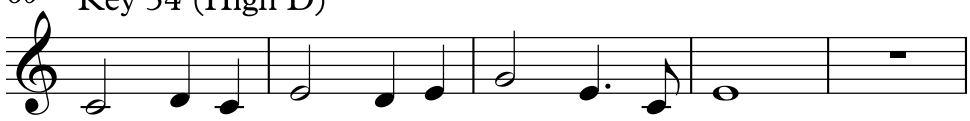
51 Key 32 (Middle C)



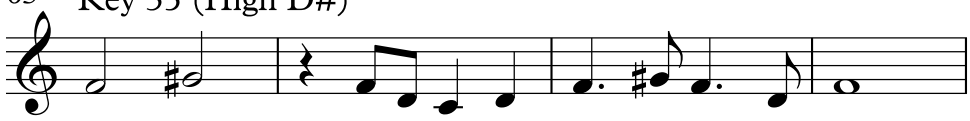
56 Key 33 (High C#)



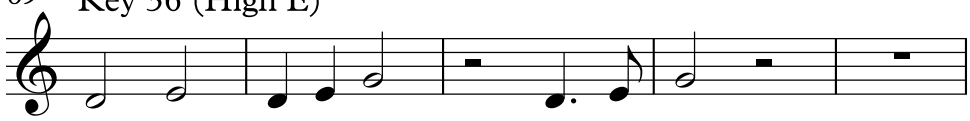
60 Key 34 (High D)



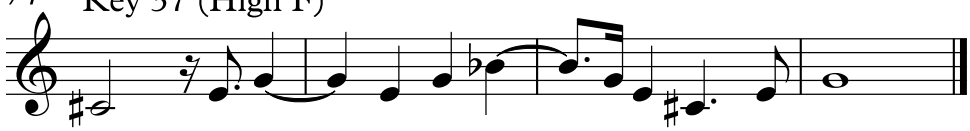
65 Key 35 (High D#)



69 Key 36 (High E)

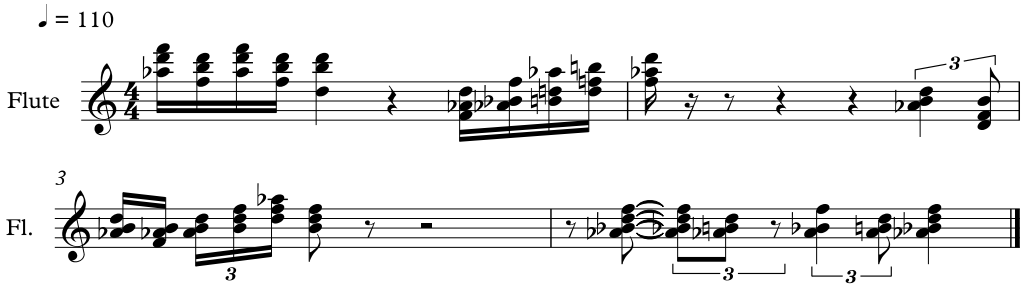


74 Key 37 (High F)

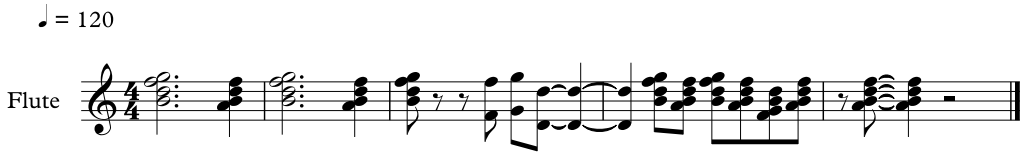


Cha Cha/Swinging Flutes

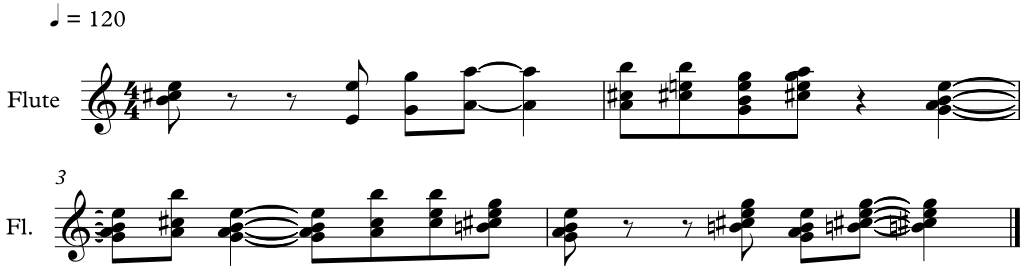
Cha Cha Swinging Flutes | Riff Section Key 21 C#



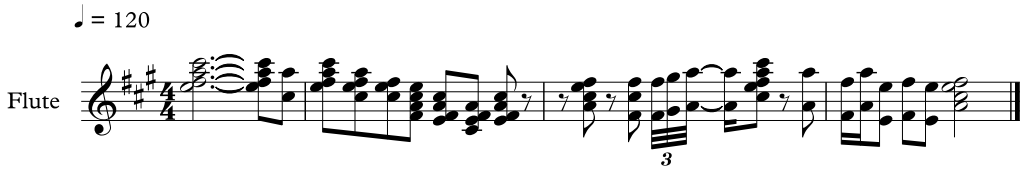
Cha Cha Swinging Flutes | Riff Section Key 22 D



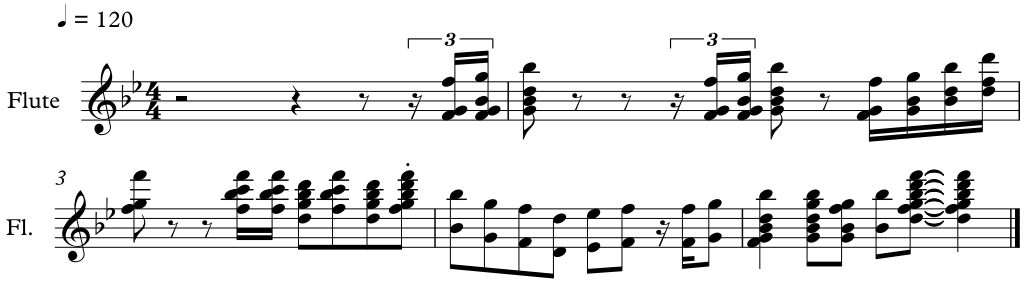
Cha Cha Swinging Flutes | Riff Section Key 23 D#



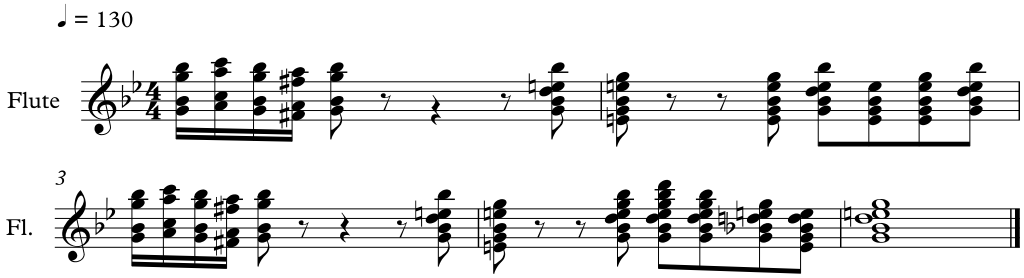
Cha Cha Swinging Flutes | Riff Section Key 24 E



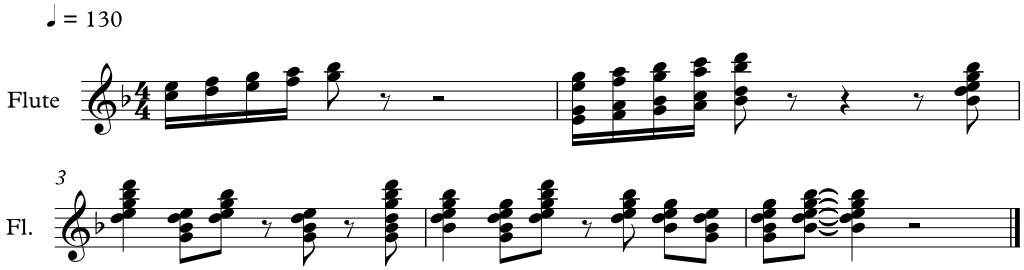
Cha Cha Swinging Flutes | Riff Section Key 25 F



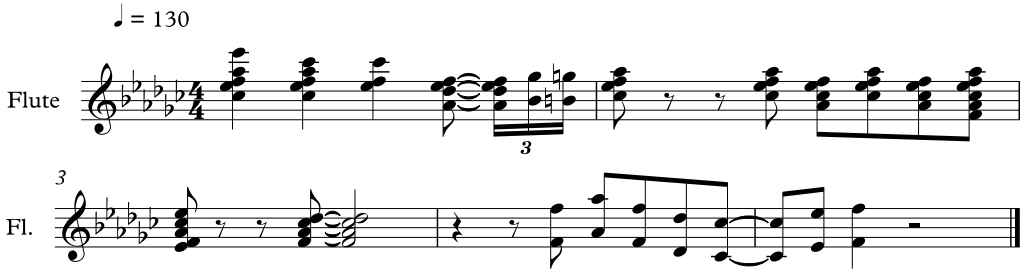
Cha Cha Swinging Flutes | Riff Section Key 26 F#



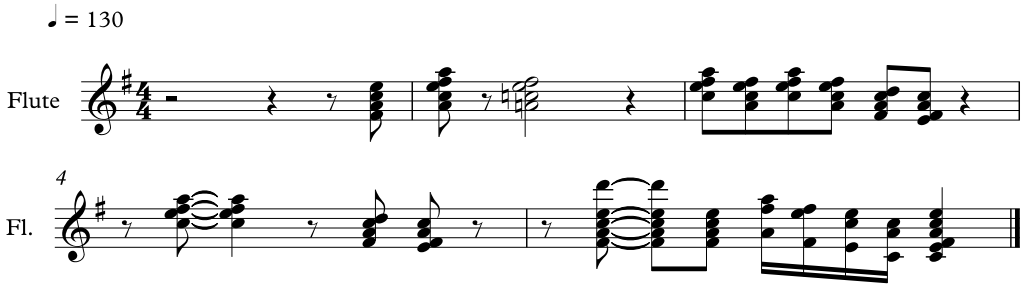
Cha Cha Swinging Flutes | Riff Section Key 27 G



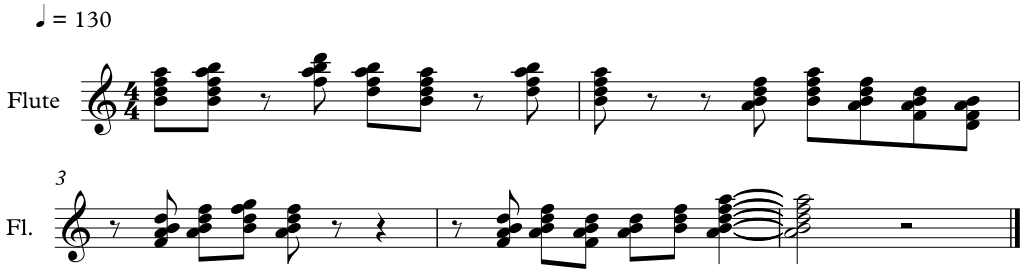
Cha Cha Swinging Flutes | Riff Section Key 28 G#



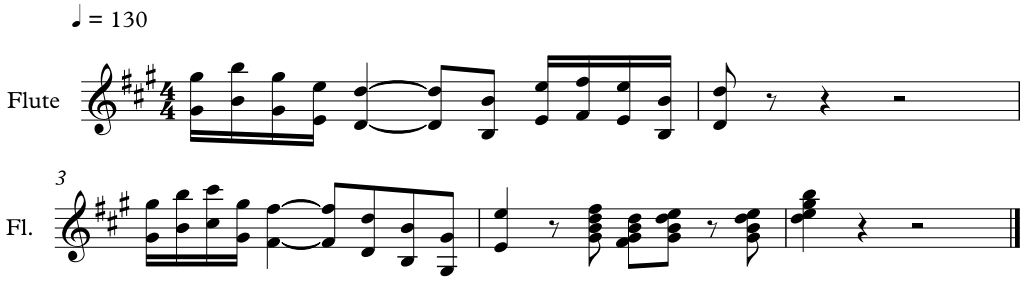
Cha Cha Swinging Flutes | Riff Section Key 29 A



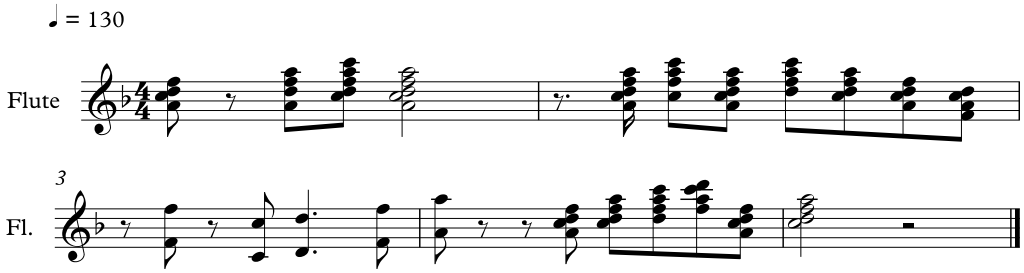
Cha Cha Swinging Flutes | Riff Section Key 30 A#



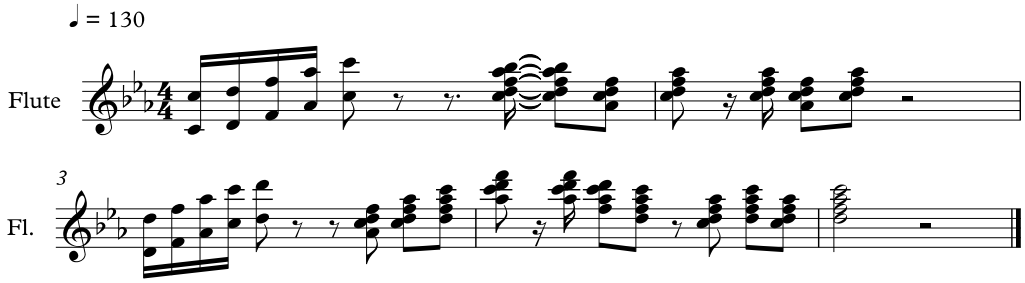
Cha Cha Swinging Flutes | Riff Section Key 31 B



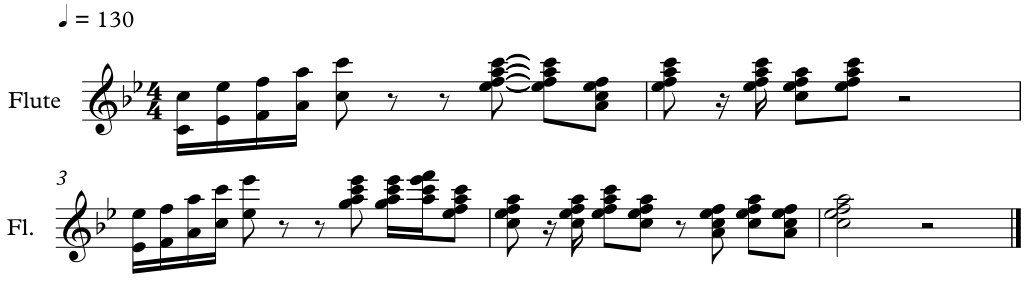
Cha Cha Swinging Flutes | Riff Section Key 32 C



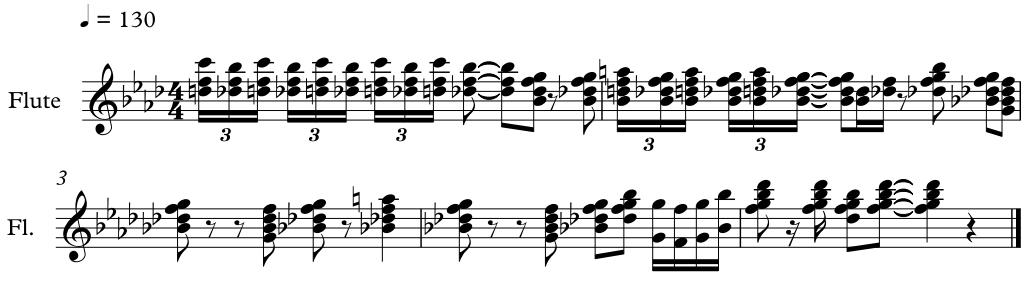
Cha Cha Swinging Flutes | Riff Section Key 33 C#



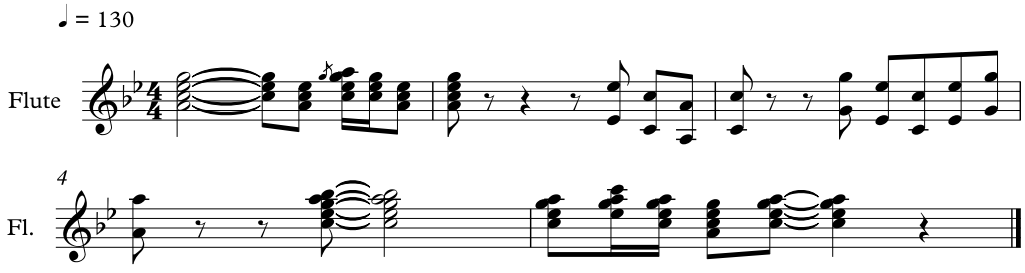
Cha Cha Swinging Flutes | Riff Section Key 34 D



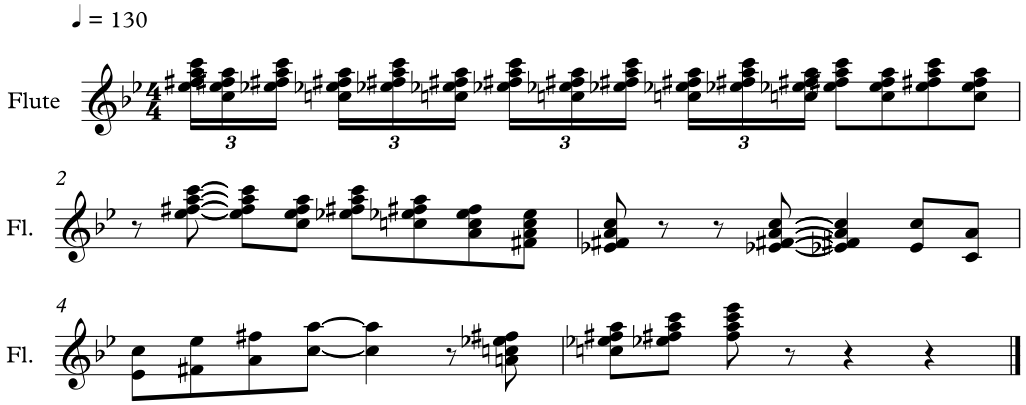
Cha Cha Swinging Flutes | Riff Section Key 35 D#



Cha Cha Swinging Flutes | Riff Section Key 36 E

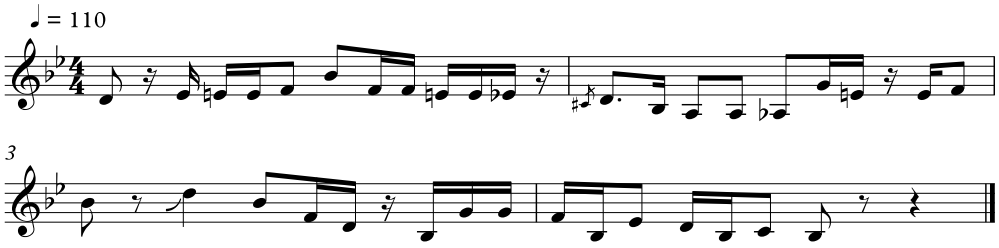


Cha Cha Swinging Flutes | Riff Section Key 37 F

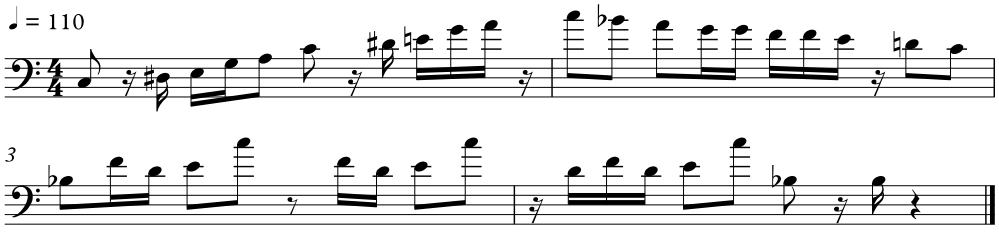


Dixieland/Trombones

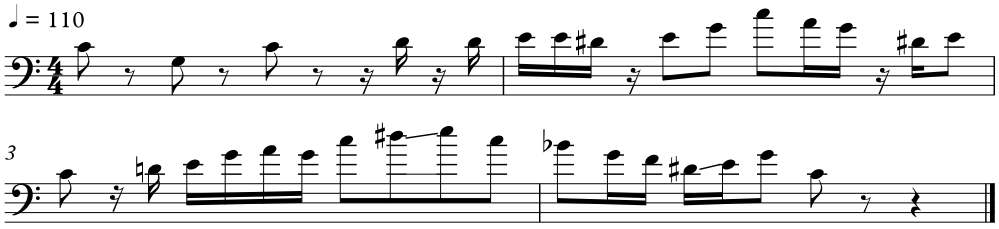
Dixieland Trombone | Riff Section Key 22 D



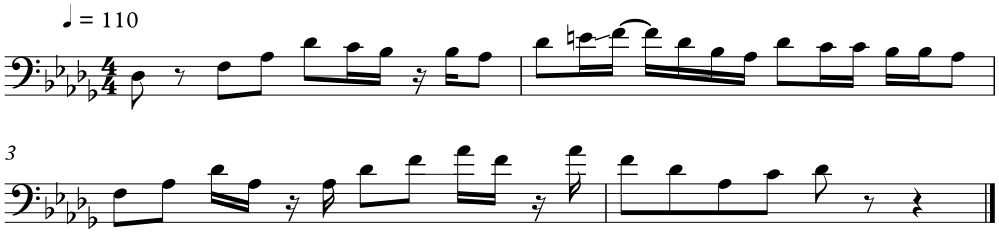
Dixieland Trombone | Riff Section Key 23 D#



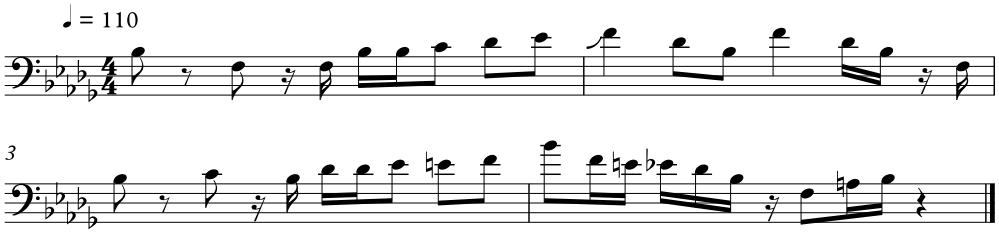
Dixieland Trombone | Riff Section Key 24 E



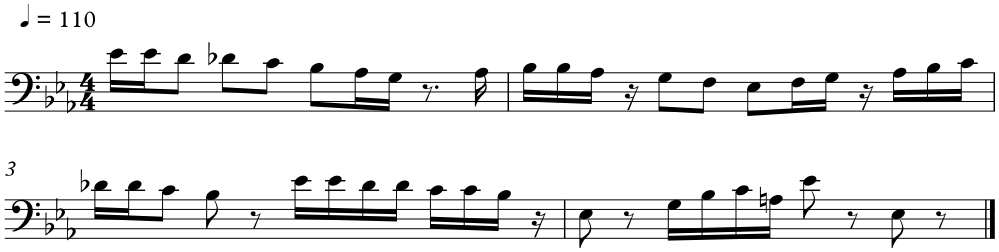
Dixieland Trombone | Riff Section Key 25 F



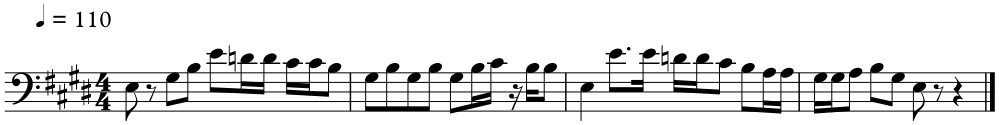
Dixieland Trombone | Riff Section Key 26 F#



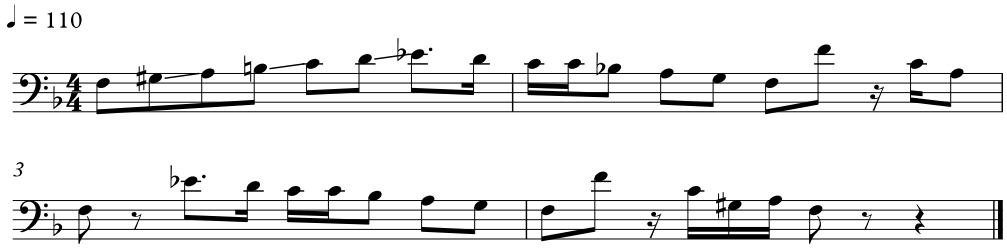
Dixieland Trombone | Riff Section Key 27 G



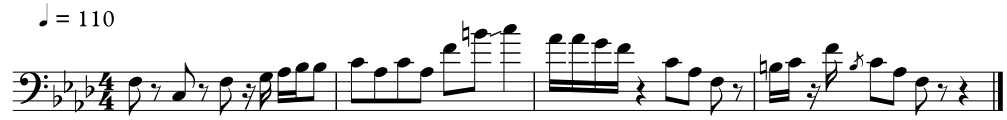
Dixieland Trombone | Riff Section Key 28 G#



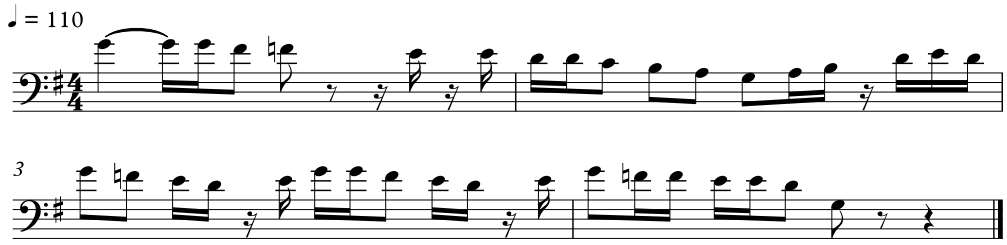
Dixieland Trombone | Riff Section Key 29 A



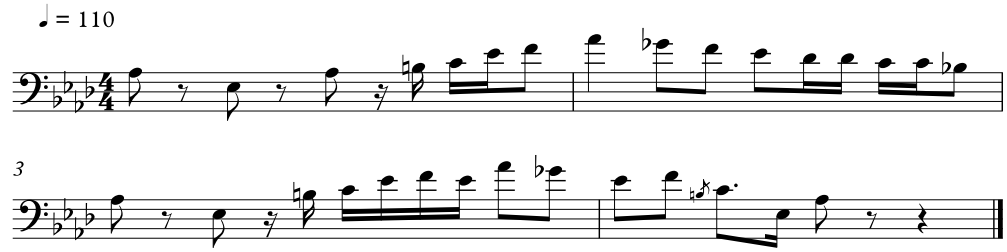
Dixieland Trombone | Riff Section Key 30 A#



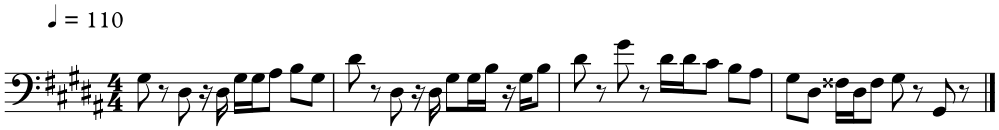
Dixieland Trombone | Riff Section Key 31 B



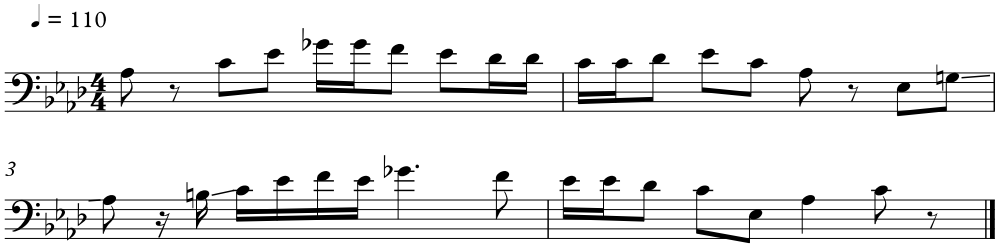
Dixieland Trombone | Riff Section Key 32 C



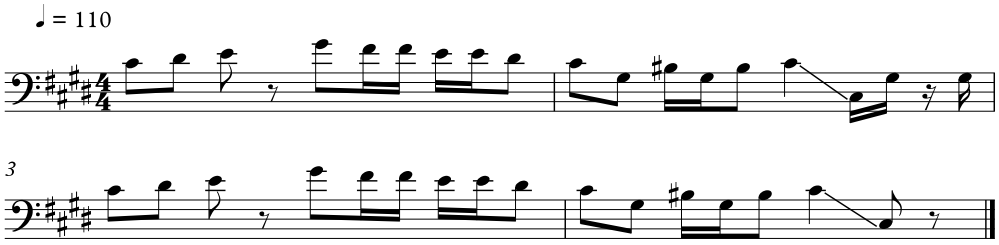
Dixieland Trombone | Riff Section Key 33 C#



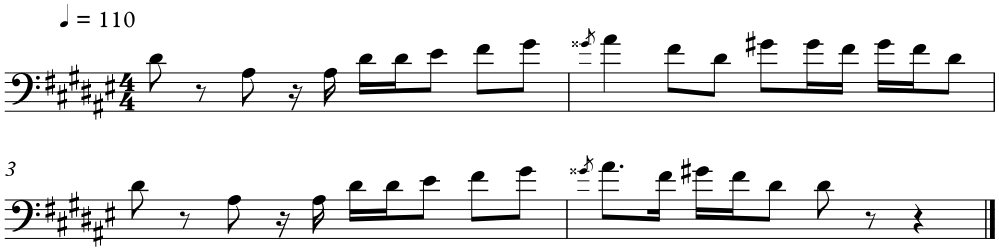
Dixieland Trombone | Riff Section Key 34 D



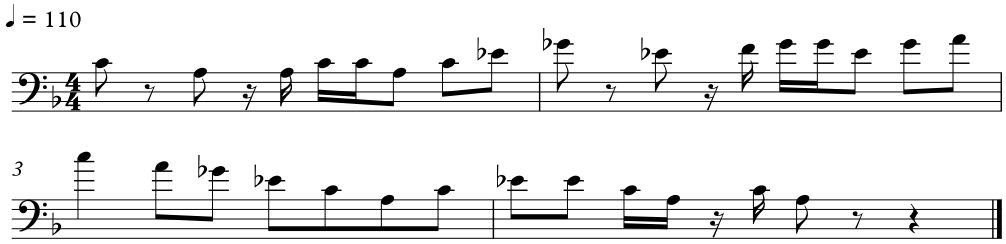
Dixieland Trombone | Riff Section Key 35 D#



Dixieland Trombone | Riff Section Key 36 E

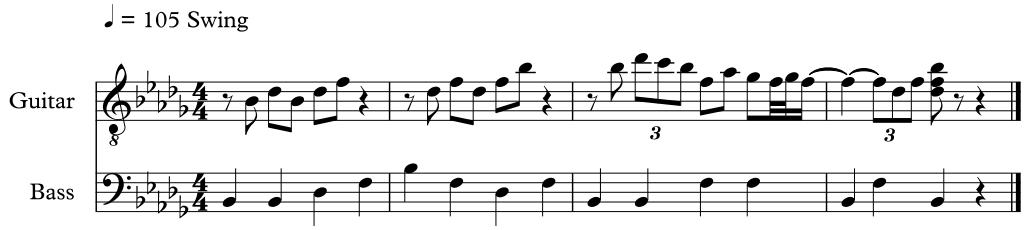


Dixieland Trombone | Riff Section Key 37 F

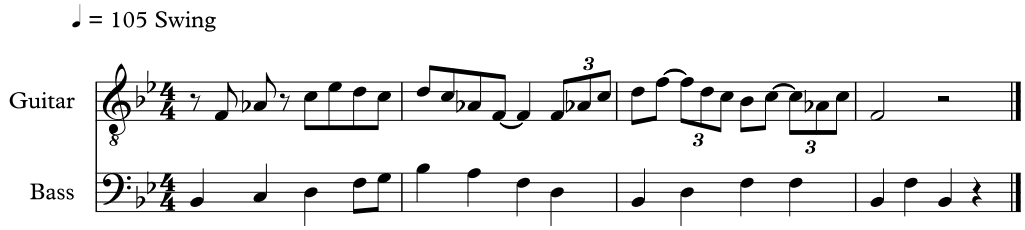


Cuban/Piano Chords

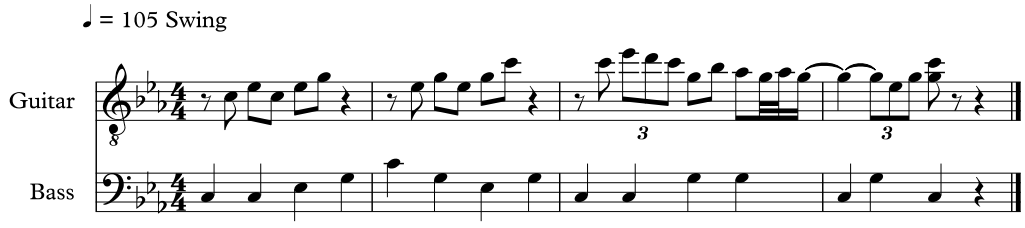
Cuban Rhythm | Riff Section Key 2 F#



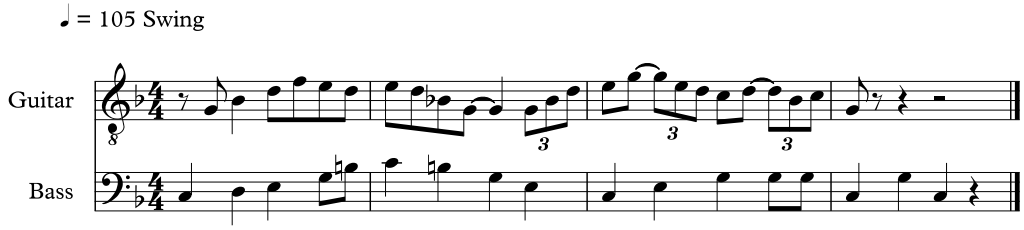
Cuban Rhythm | Riff Section Key 3 G



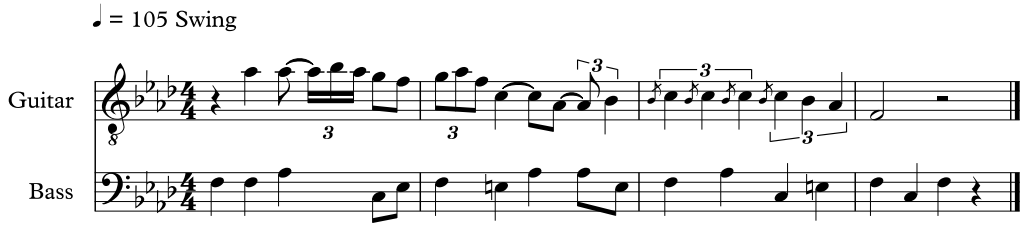
Cuban Rhythm | Riff Section Key 4 G#



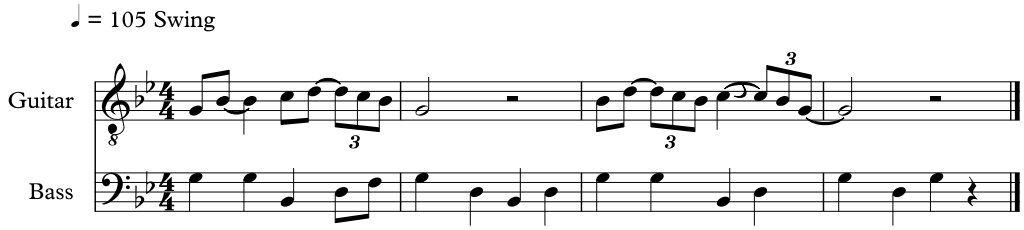
Cuban Rhythm | Riff Section Key 5 A



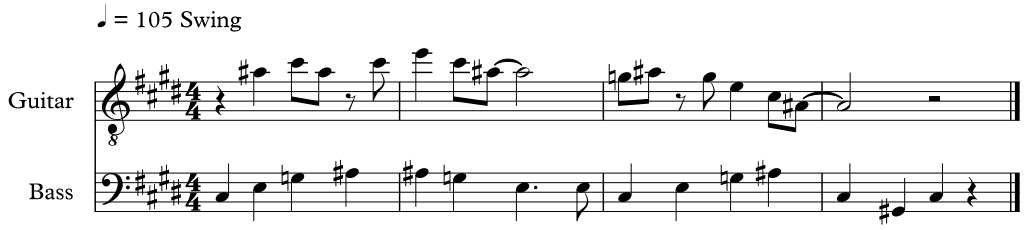
Cuban Rhythm | Riff Section Key 6 A#



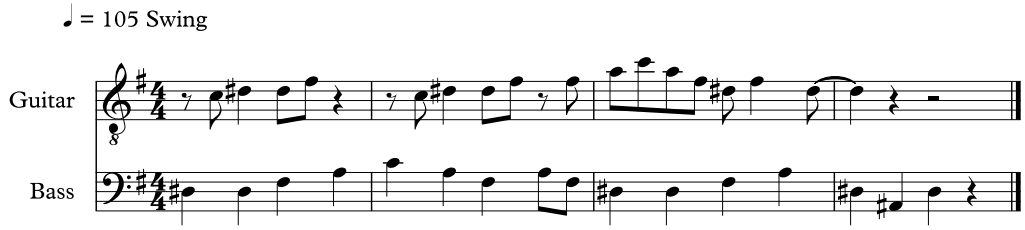
Cuban Rhythm | Riff Section Key 7 B



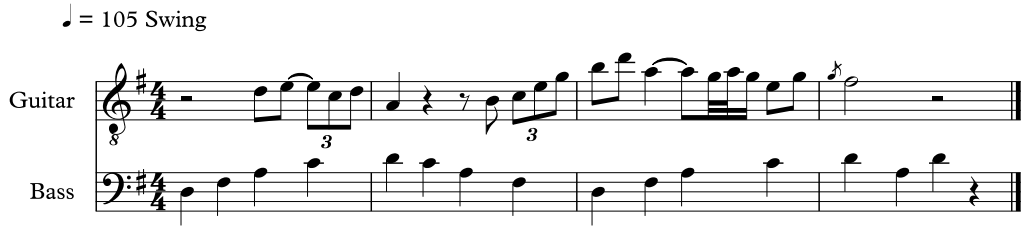
Cuban Rhythm | Riff Section Key 8 C



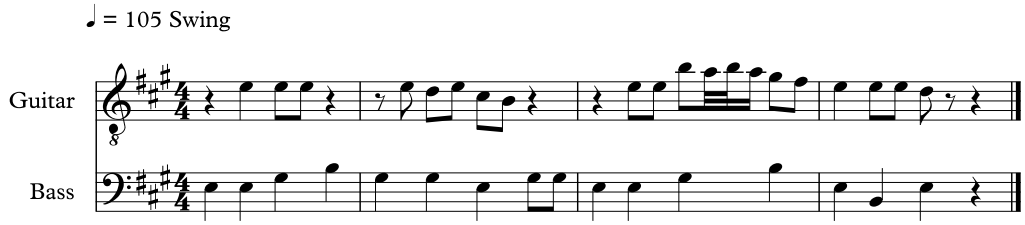
Cuban Rhythm | Riff Section Key 9 C#



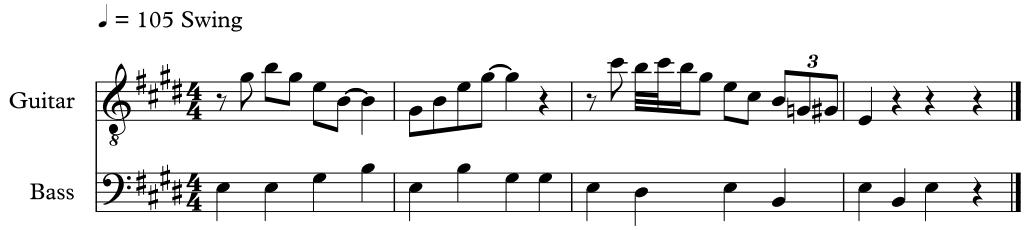
Cuban Rhythm | Riff Section Key 10 D



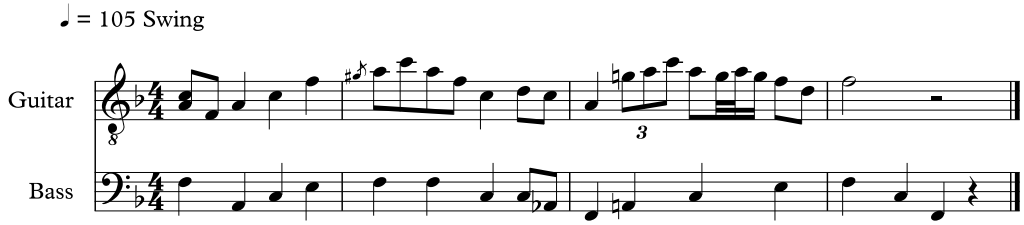
Cuban Rhythm | Riff Section Key 11 D#



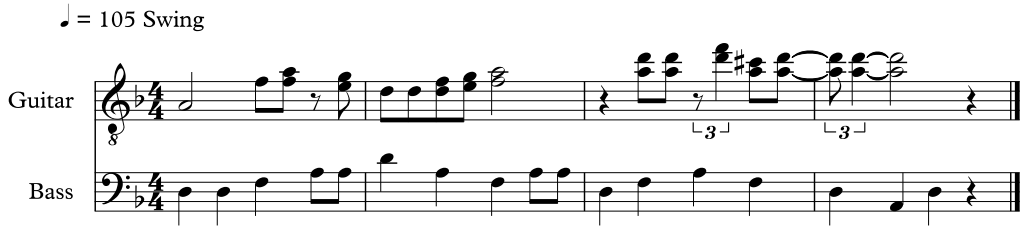
Cuban Rhythm | Riff Section Key 12 E



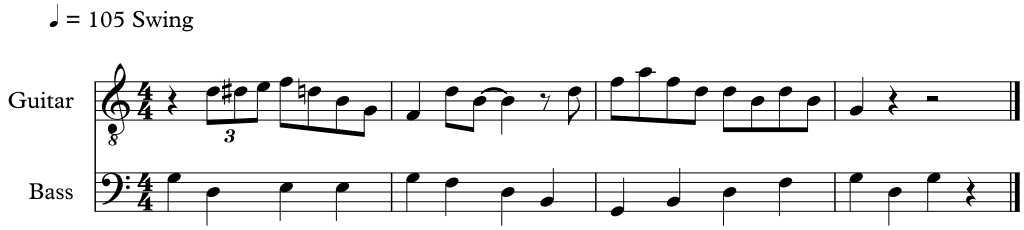
Cuban Rhythm | Riff Section Key 13 F



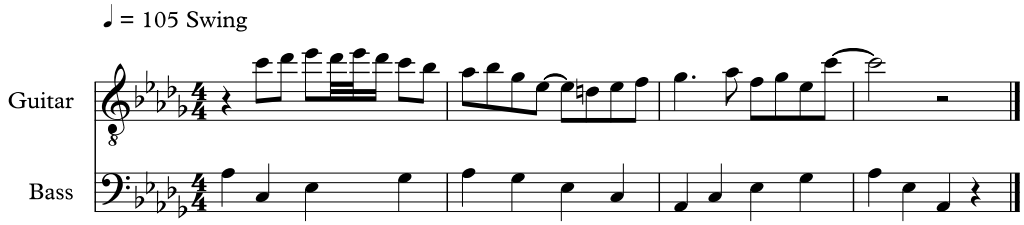
Cuban Rhythm | Riff Section Key 14 F#



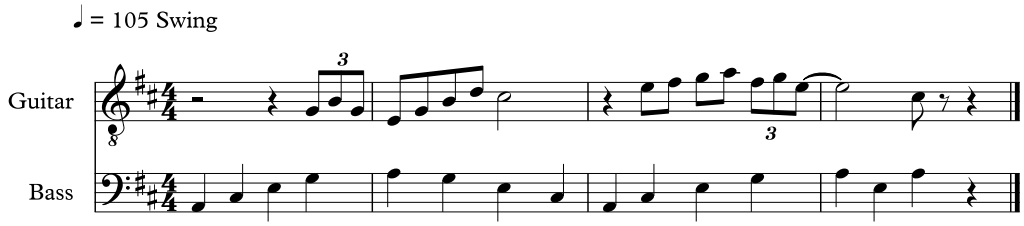
Cuban Rhythm | Riff Section Key 15 G



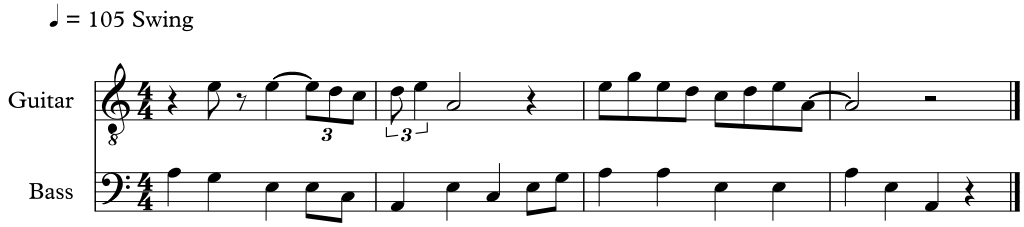
Cuban Rhythm | Riff Section Key 16 G#



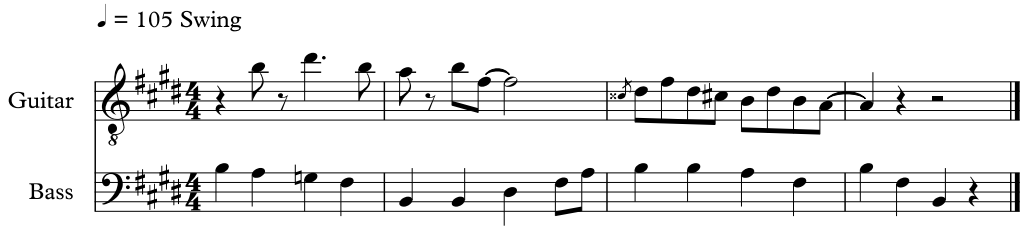
Cuban Rhythm | Riff Section Key 17 A



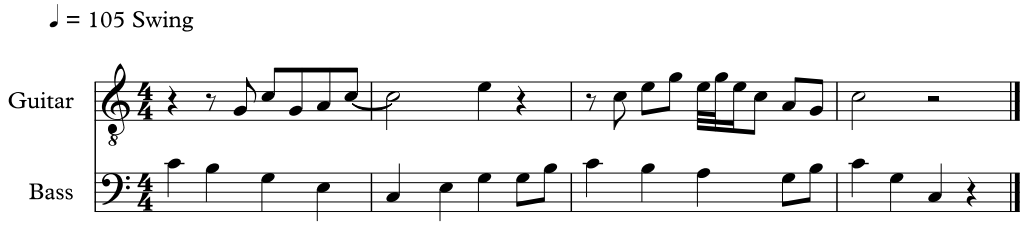
Cuban Rhythm | Riff Section Key 18 A#



Cuban Rhythm | Riff Section Key 19 B

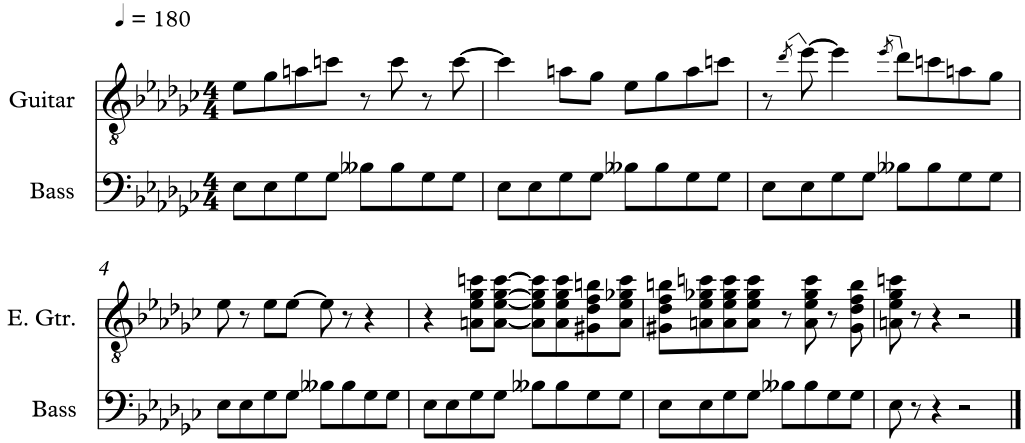


Cuban Rhythm | Riff Section Key 20 C

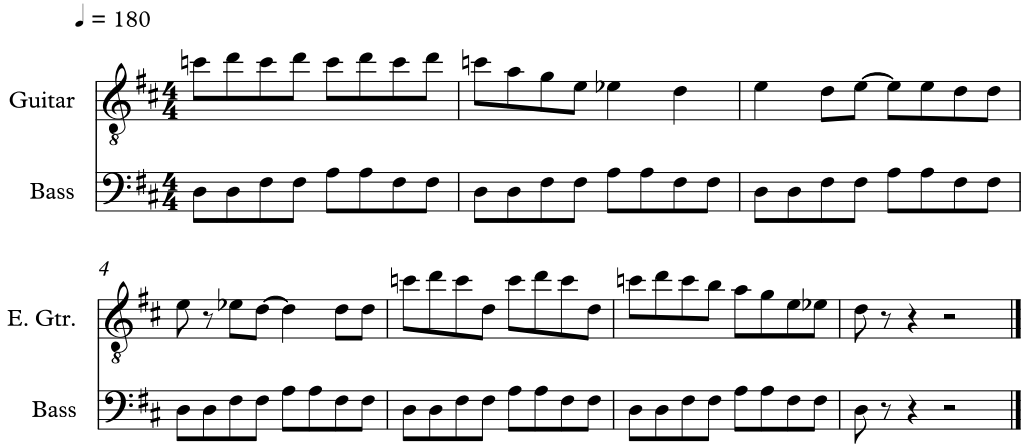


Fast Jazz Bass/Twist in C

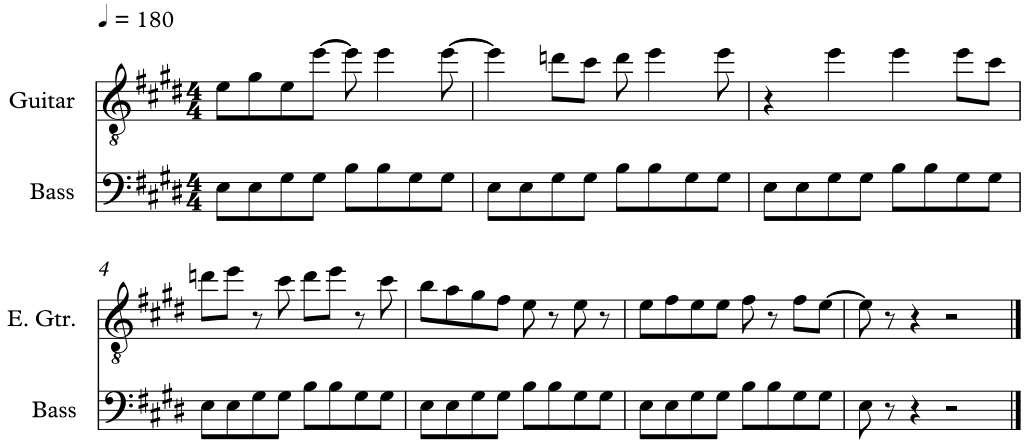
Fast Jazz Bass Twistin | Riff Section Key 21 C#



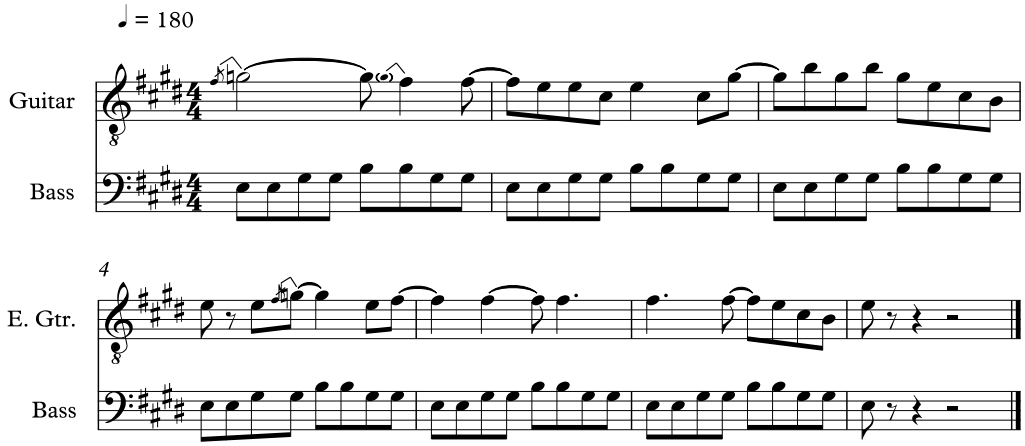
Fast Jazz Bass Twistin | Riff Section Key 22 D



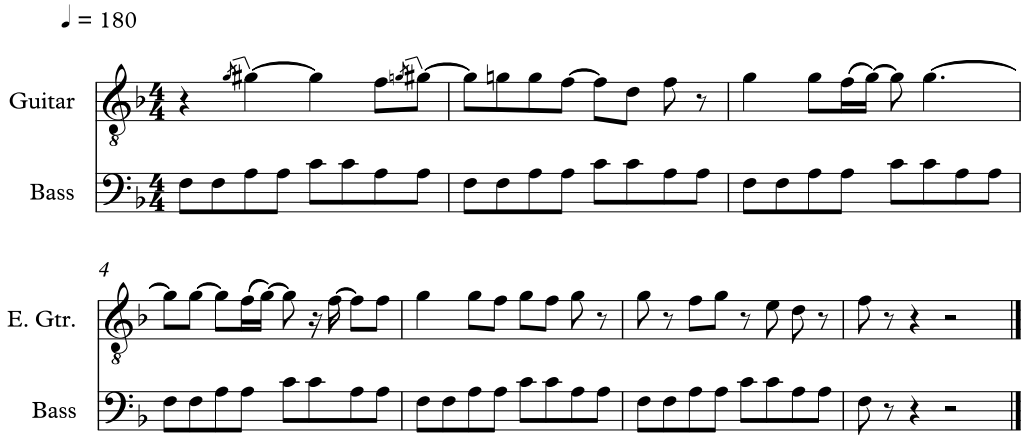
Fast Jazz Bass Twistin | Riff Section Key 23 D#



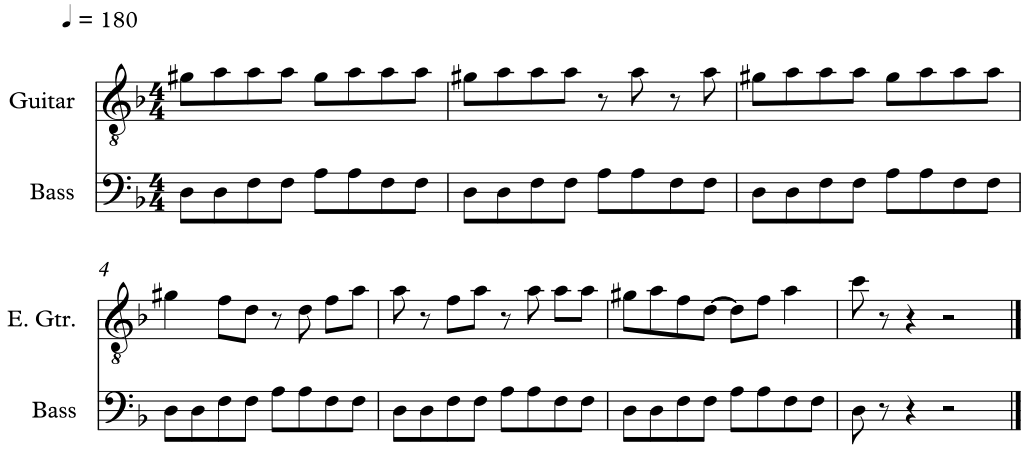
Fast Jazz Bass Twistin | Riff Section Key 24 E



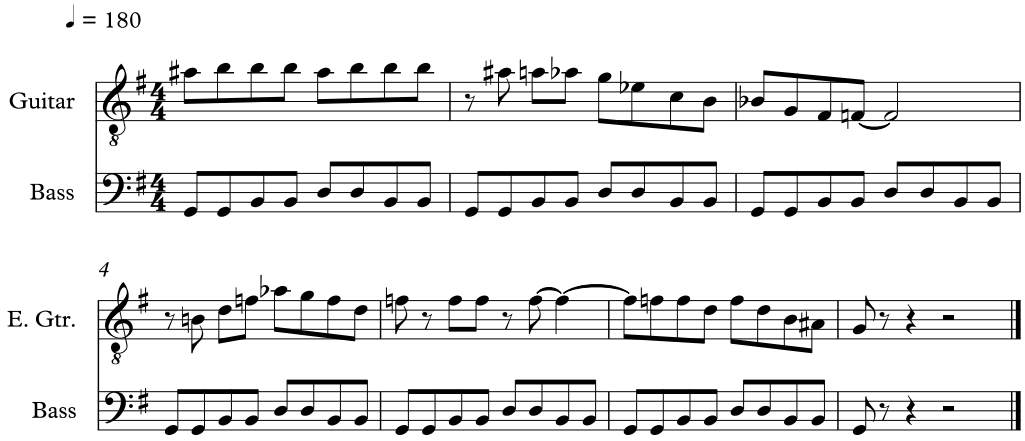
Fast Jazz Bass Twistin | Riff Section Key 25 F



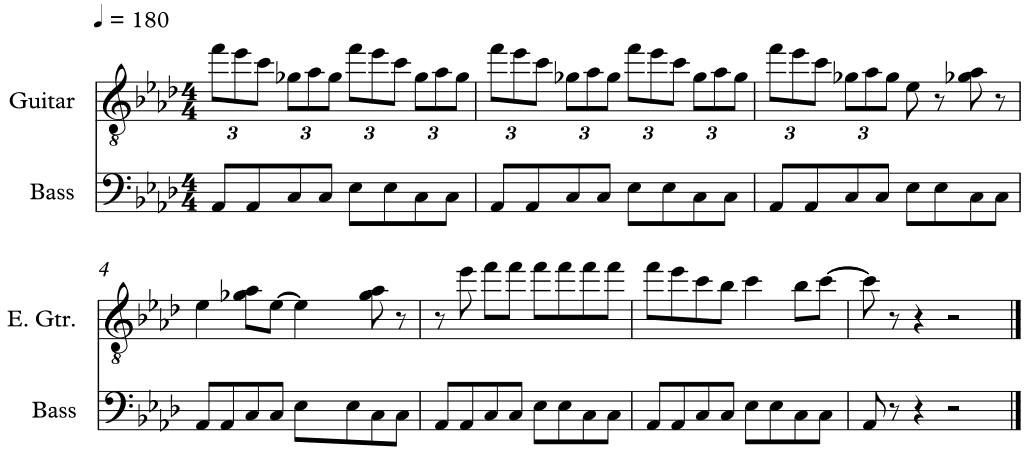
Fast Jazz Bass Twistin | Riff Section Key 26 F#



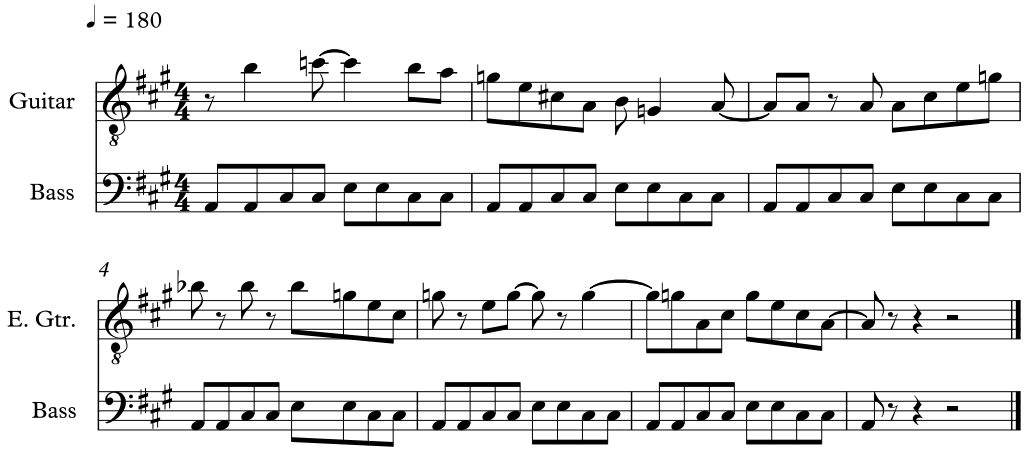
Fast Jazz Bass Twistin | Riff Section Key 27 G



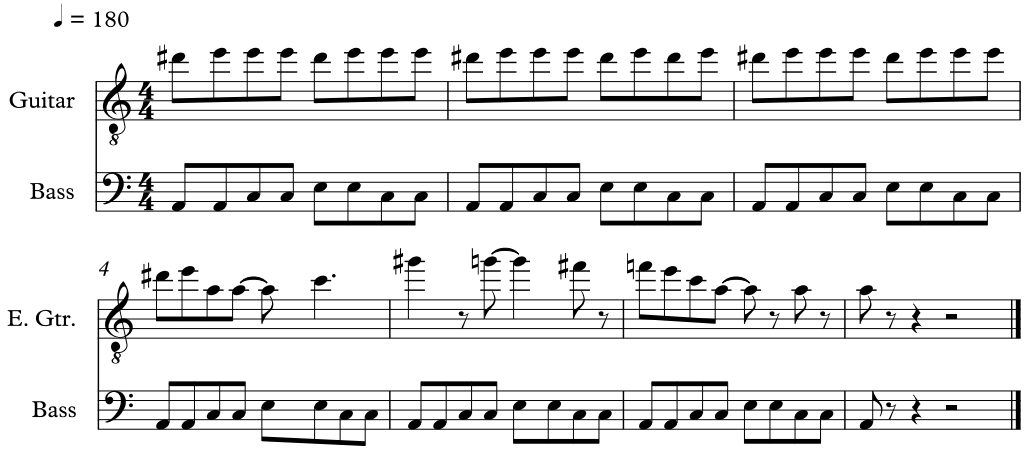
Fast Jazz Bass Twistin | Riff Section Key 28 G#



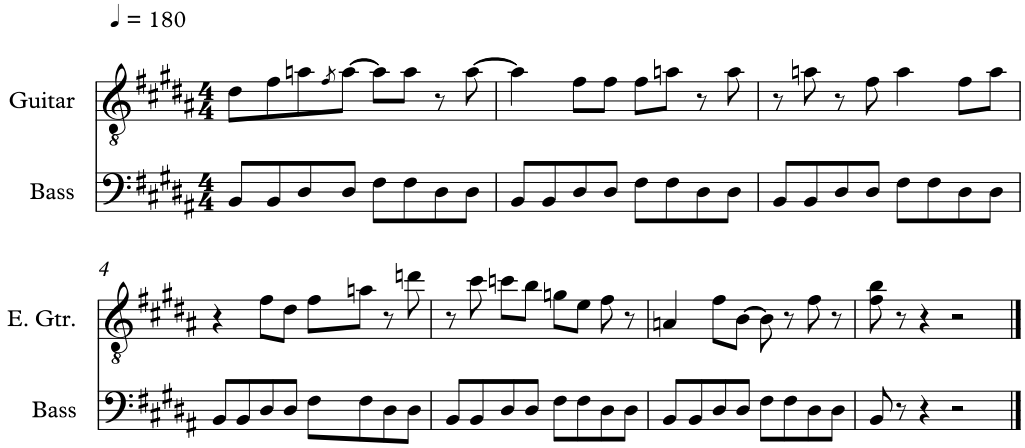
Fast Jazz Bass Twistin | Riff Section Key 29 A



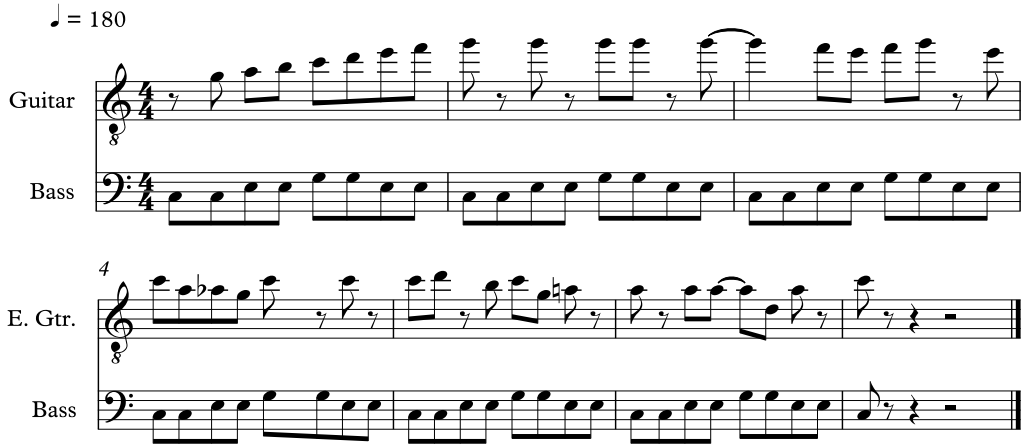
Fast Jazz Bass Twistin | Riff Section Key 30 A#



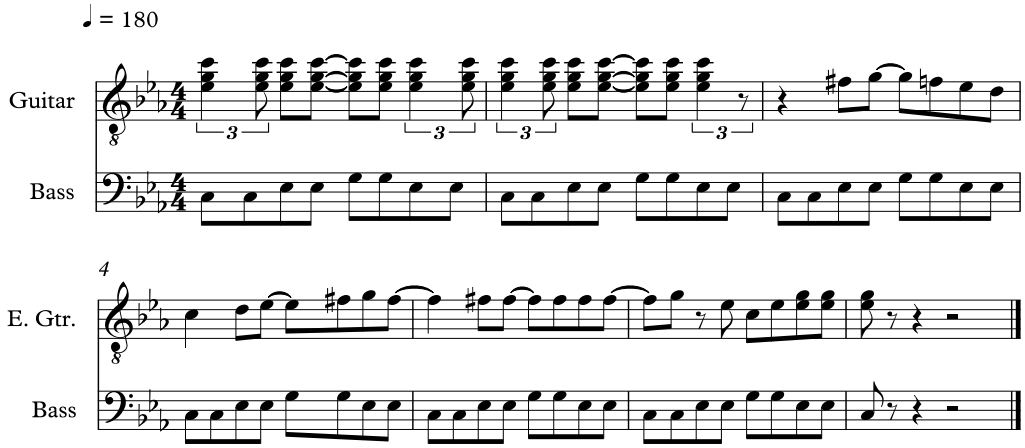
Fast Jazz Bass Twistin | Riff Section Key 31 B



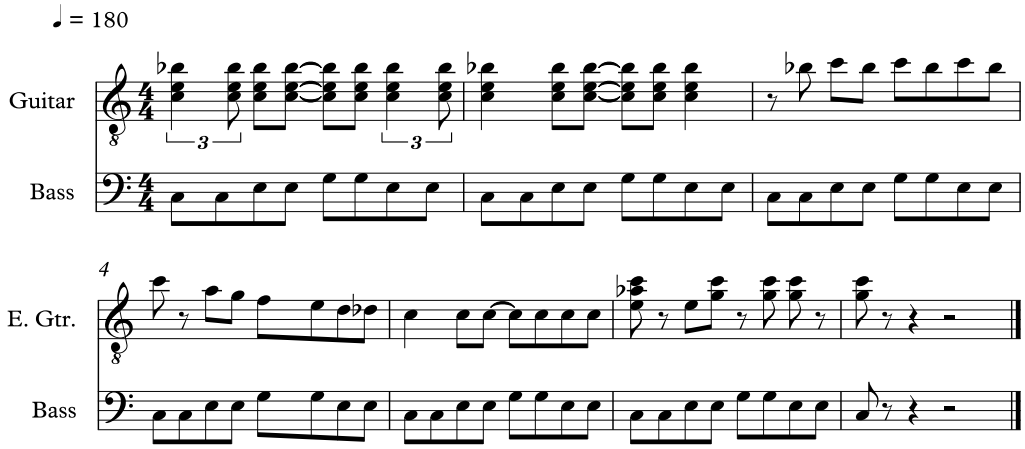
Fast Jazz Bass Twistin | Riff Section Key 32 C



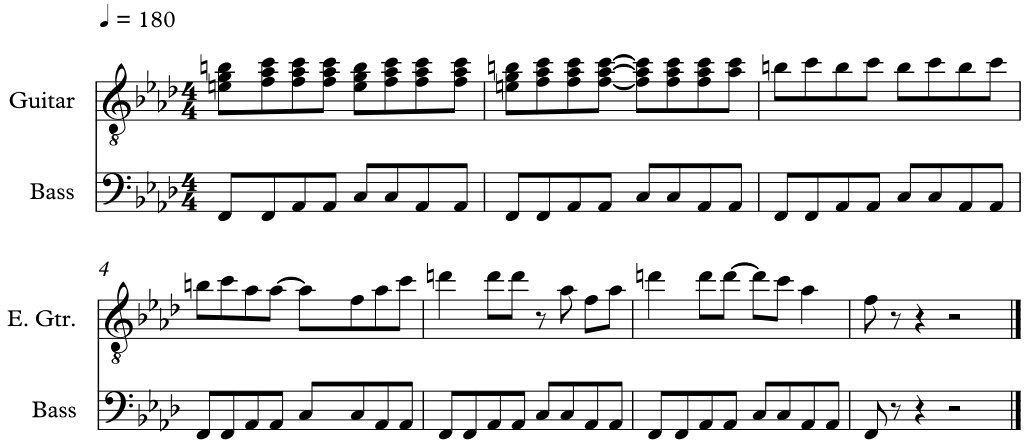
Fast Jazz Bass Twistin | Riff Section Key 33 C#



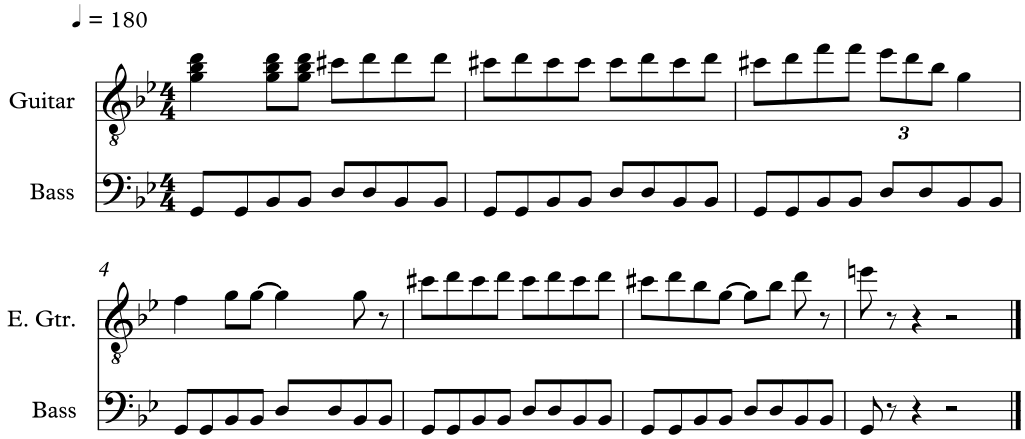
Fast Jazz Bass Twistin | Riff Section Key 34 D



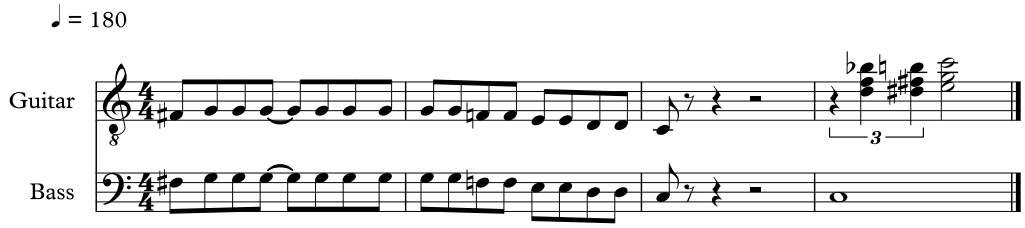
Fast Jazz Bass Twistin | Riff Section Key 35 D#



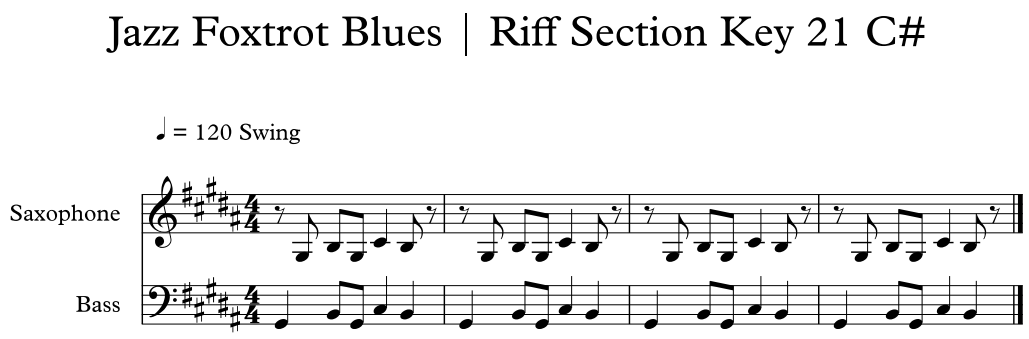
Fast Jazz Bass Twistin | Riff Section Key 36 E

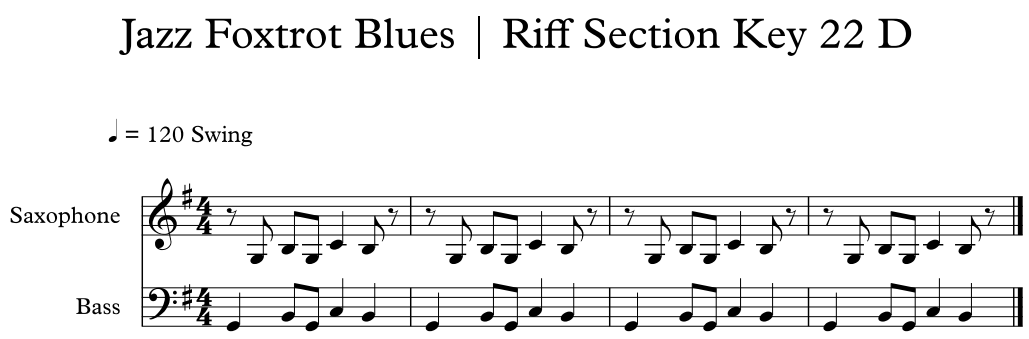


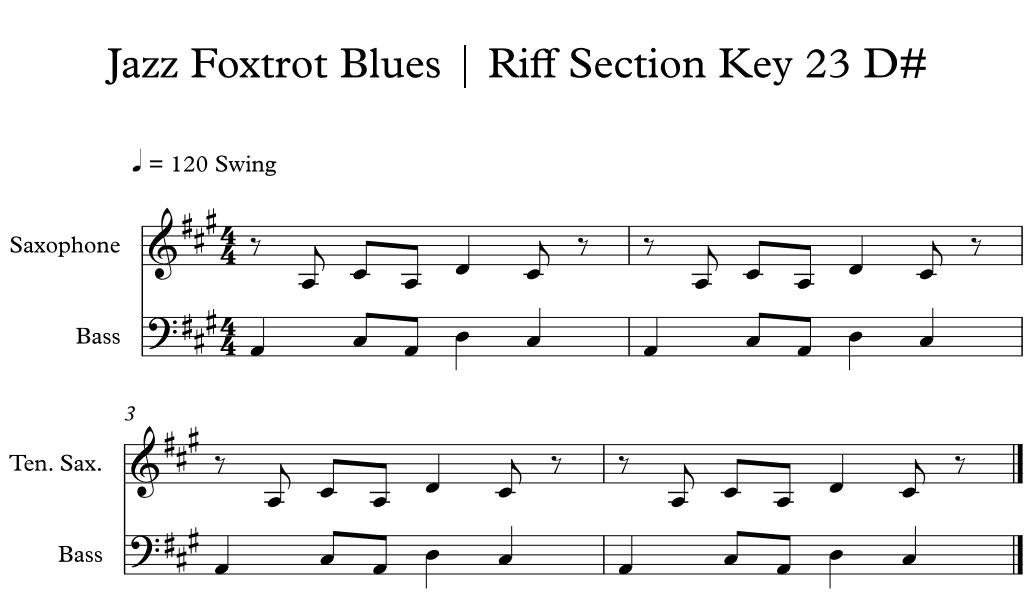
Fast Jazz Bass Twistin | Riff Section Key 37 F



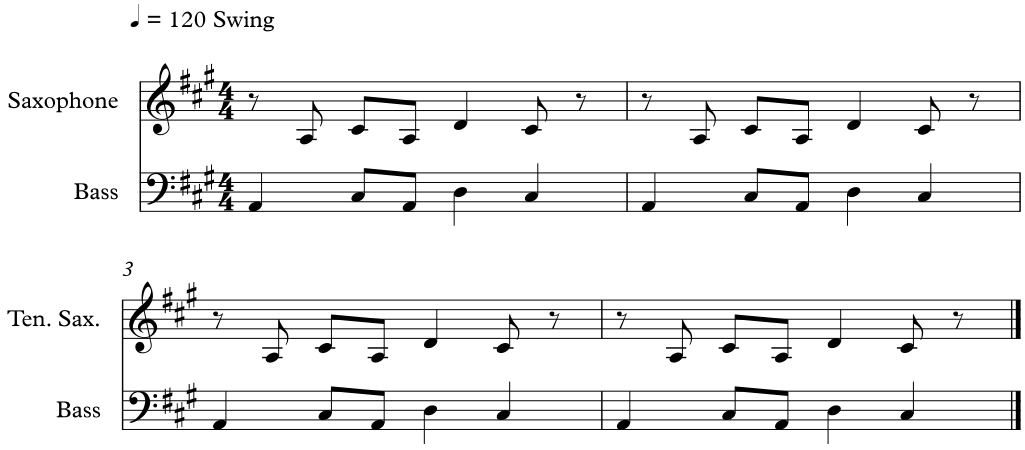
Jazz Foxtrot/Blues Beat in F



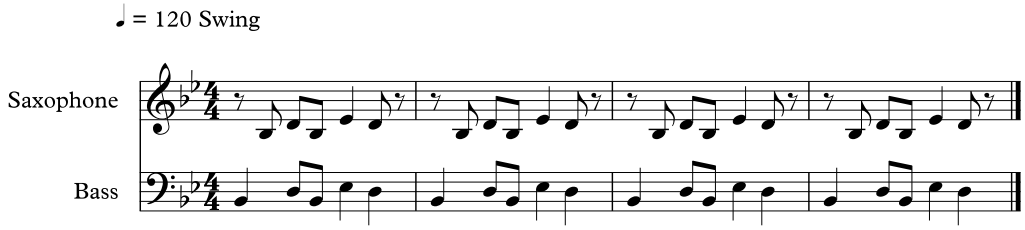




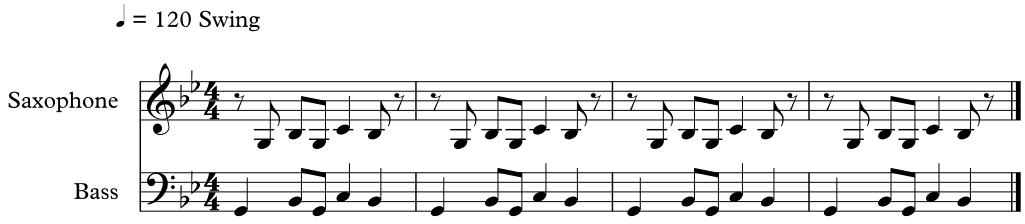
Jazz Foxtrot Blues | Riff Section Key 24 E



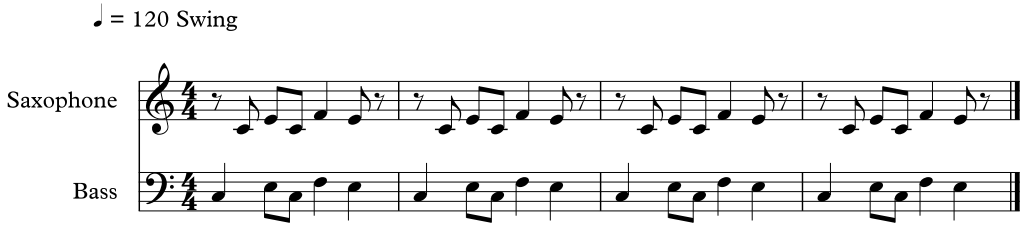
Jazz Foxtrot Blues | Riff Section Key 25 F



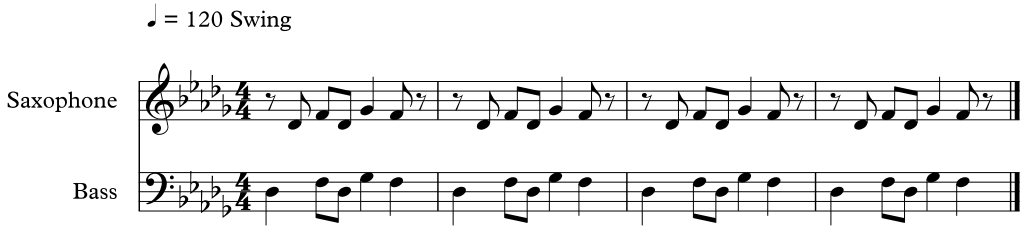
Jazz Foxtrot Blues | Riff Section Key 26 F#



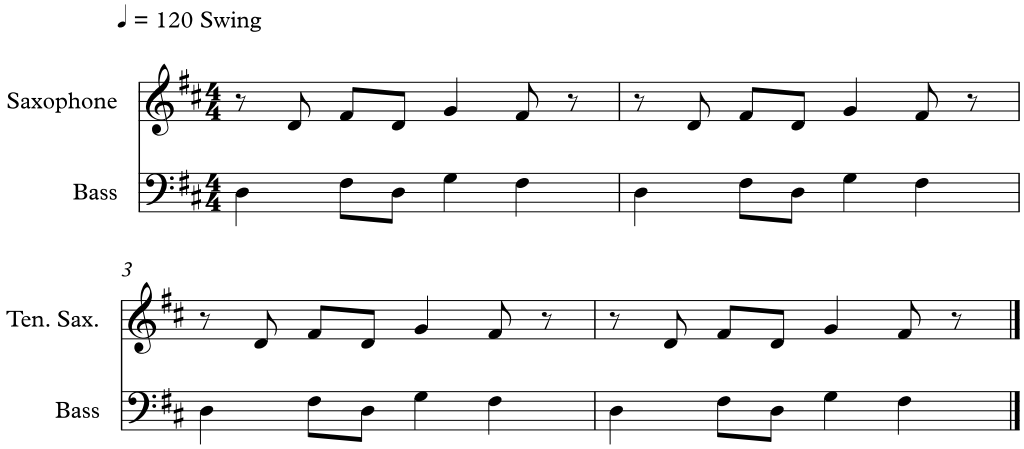
Jazz Foxtrot Blues | Riff Section Key 27 G



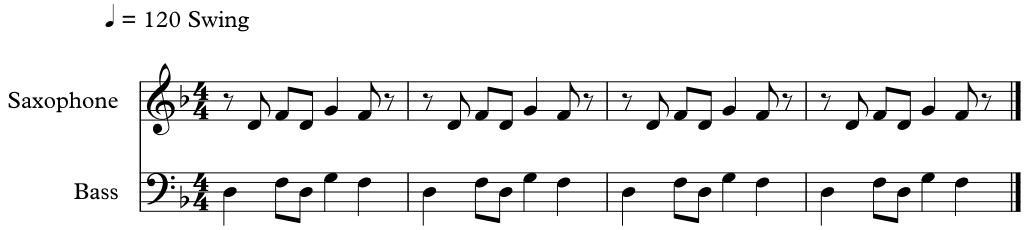
Jazz Foxtrot Blues | Riff Section Key 28 G#



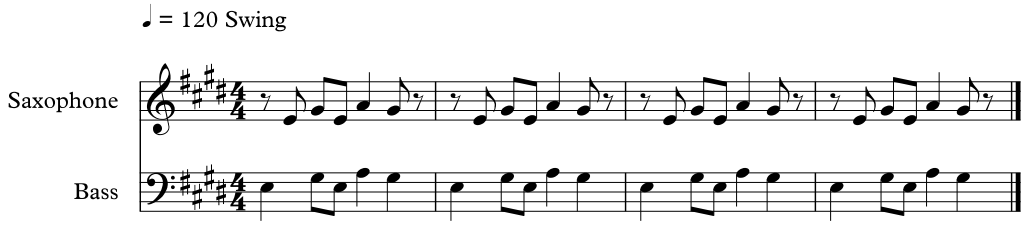
Jazz Foxtrot Blues | Riff Section Key 29 A



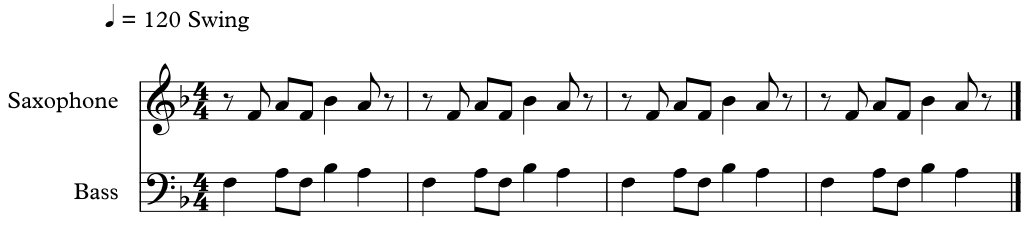
Jazz Foxtrot Blues | Riff Section Key 30 A#



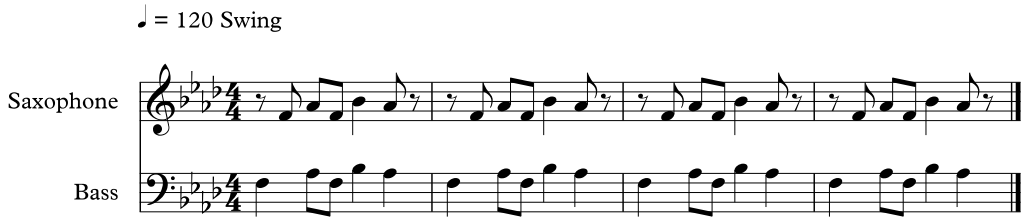
Jazz Foxtrot Blues | Riff Section Key 31 B



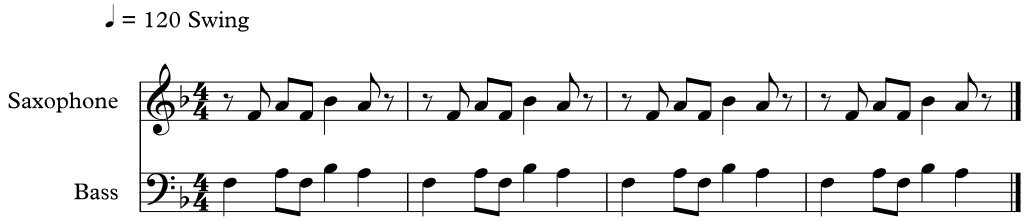
Jazz Foxtrot Blues | Riff Section Key 32 C



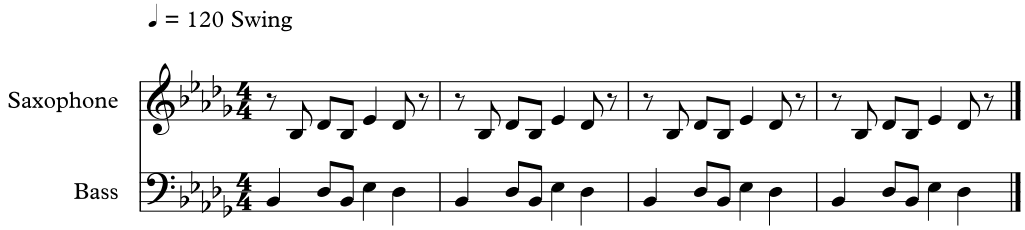
Jazz Foxtrot Blues | Riff Section Key 33 C#



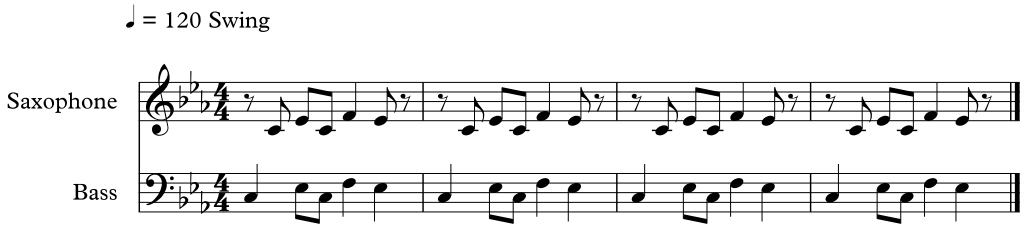
Jazz Foxtrot Blues | Riff Section Key 34 D



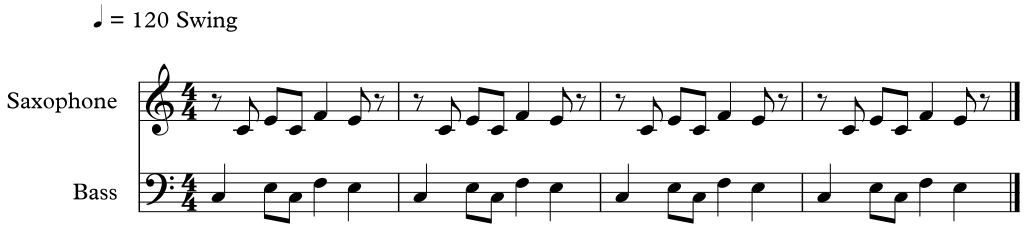
Jazz Foxtrot Blues | Riff Section Key 35 D#



Jazz Foxtrot Blues | Riff Section Key 36 E

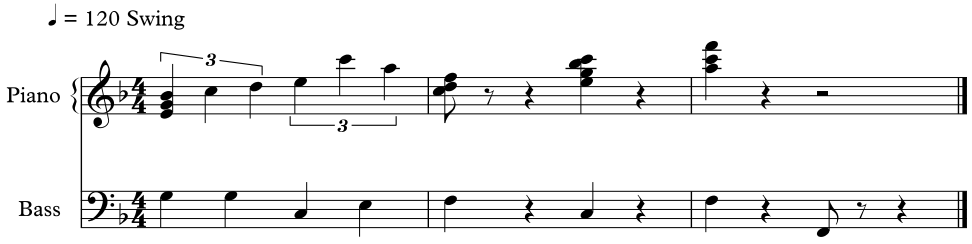


Jazz Foxtrot Blues | Riff Section Key 37 F

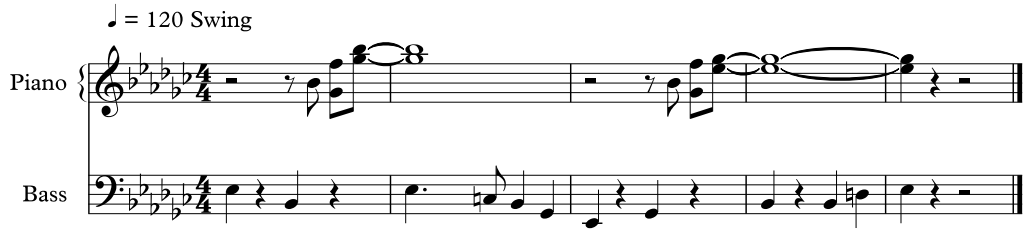


Moving Bass Jazzy Piano

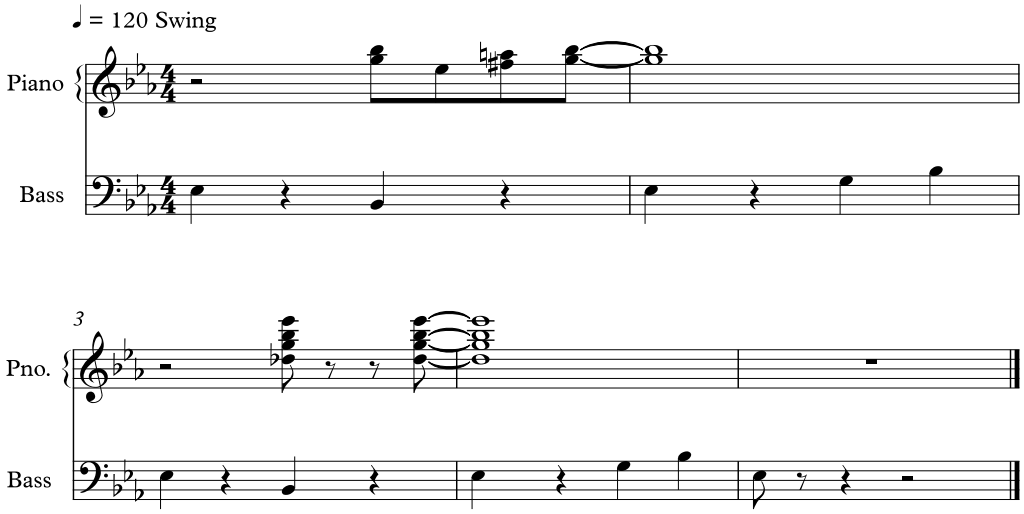
Moving Bass Jazzy Piano | Riff Section Key 1 F



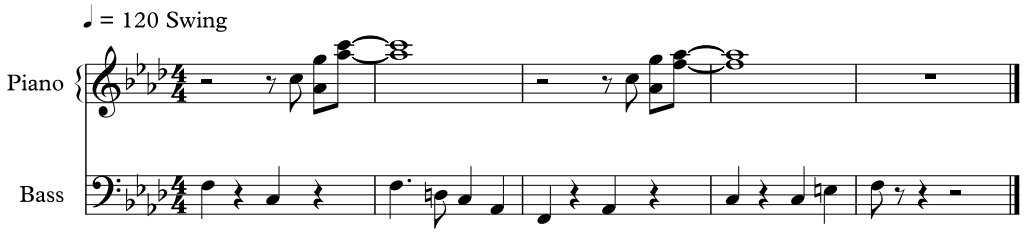
Moving Bass Jazzy Piano | Riff Section Key 2 F#



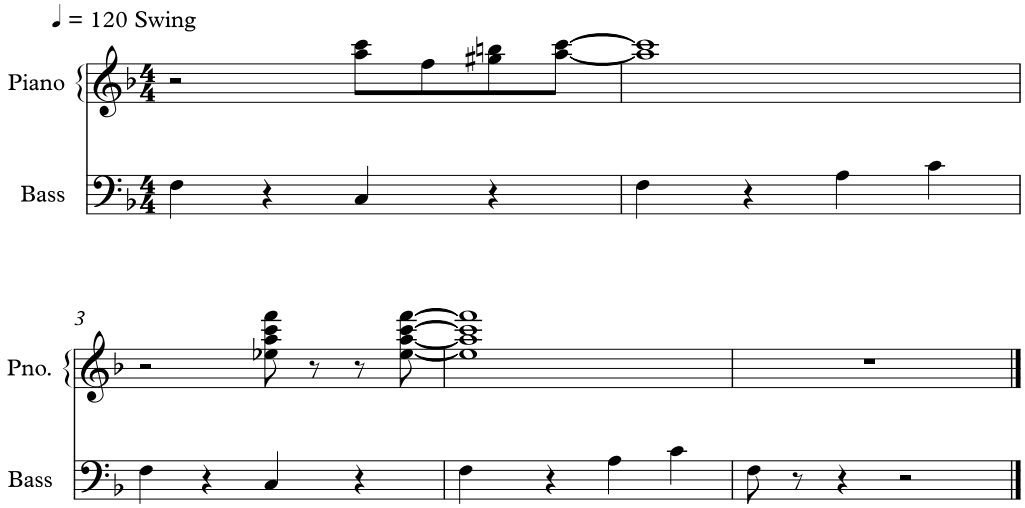
Moving Bass Jazzy Piano | Riff Section Key 3 G



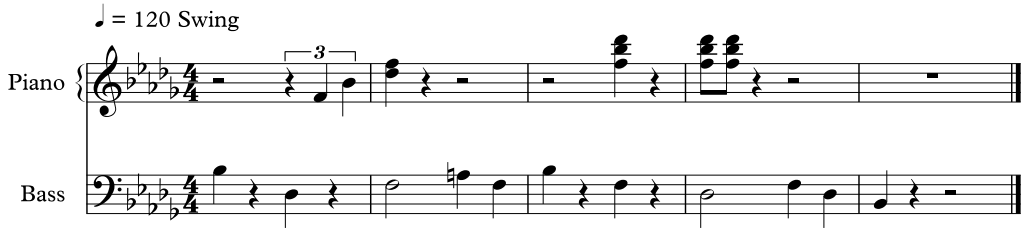
Moving Bass Jazzy Piano | Riff Section Key 4 G#



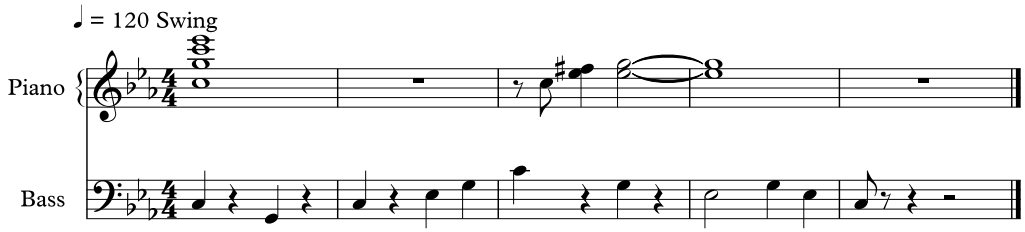
Moving Bass Jazzy Piano | Riff Section Key 3 G



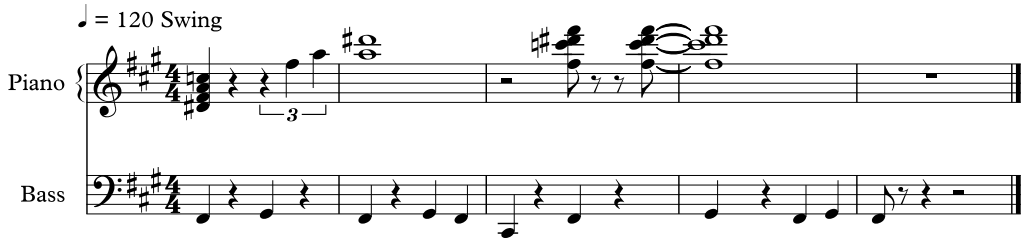
Moving Bass Jazzy Piano | Riff Section Key 6 A#



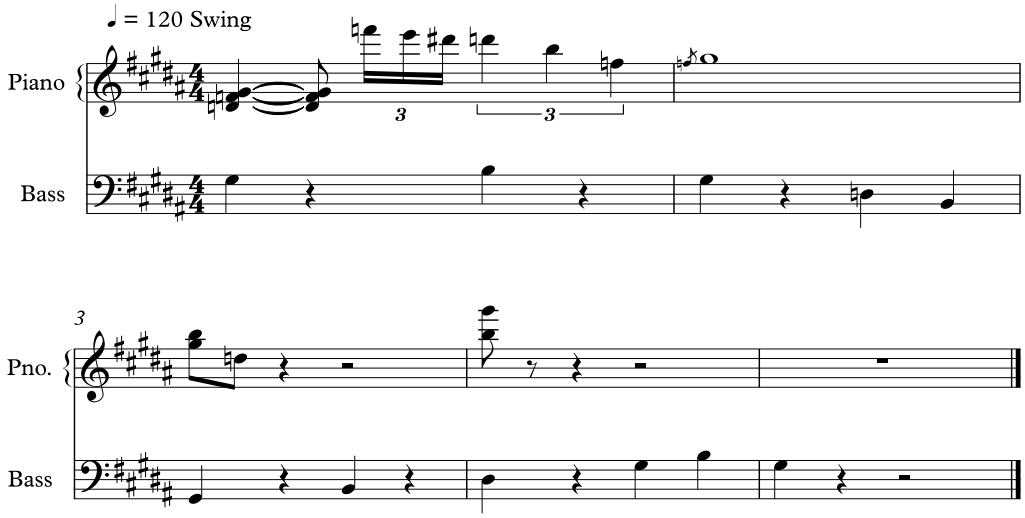
Moving Bass Jazzy Piano | Riff Section Key 7 B



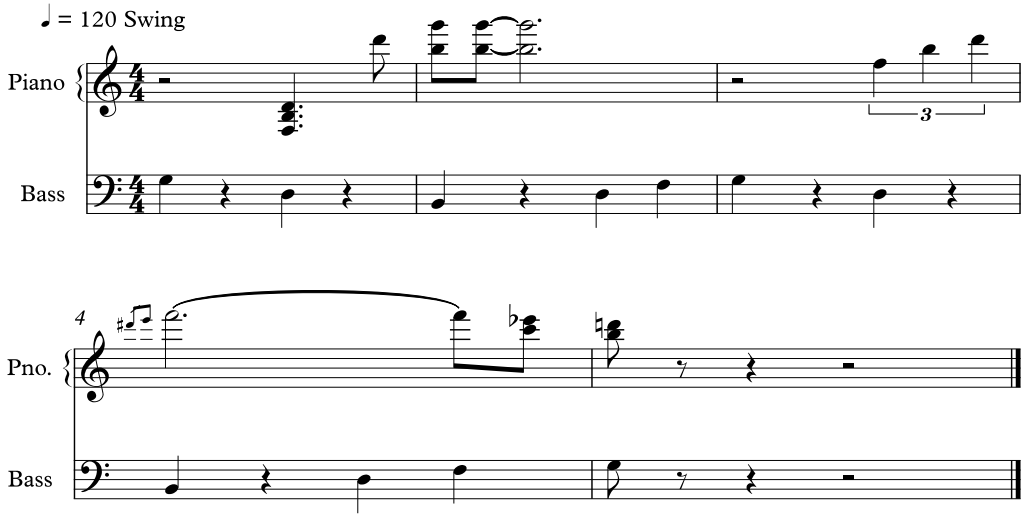
Moving Bass Jazzy Piano | Riff Section Key 8 C



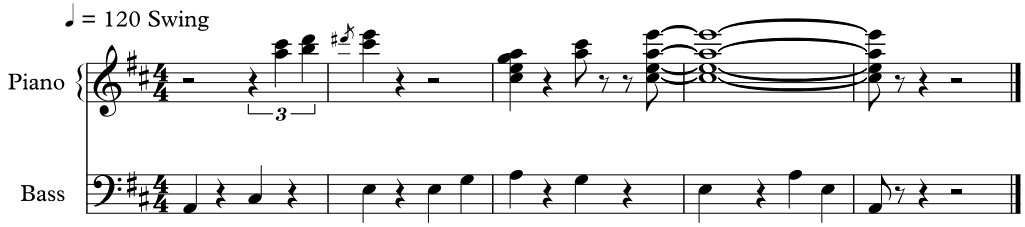
Moving Bass Jazzy Piano | Riff Section Key 9 C#



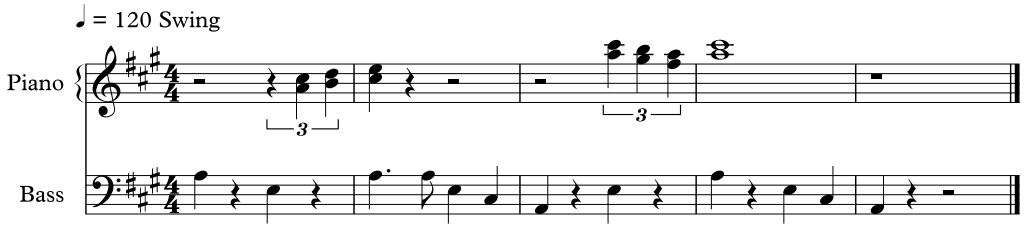
Moving Bass Jazzy Piano | Riff Section Key 10 D



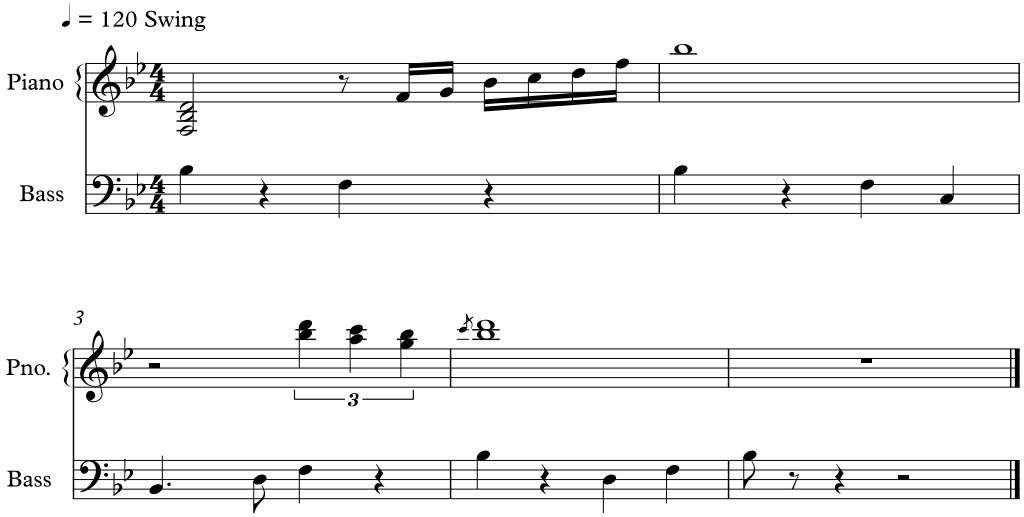
Moving Bass Jazzy Piano | Riff Section Key 11 D#



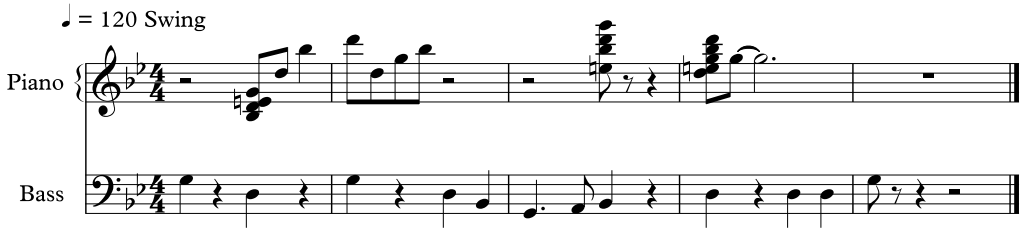
Moving Bass Jazzy Piano | Riff Section Key 12 E



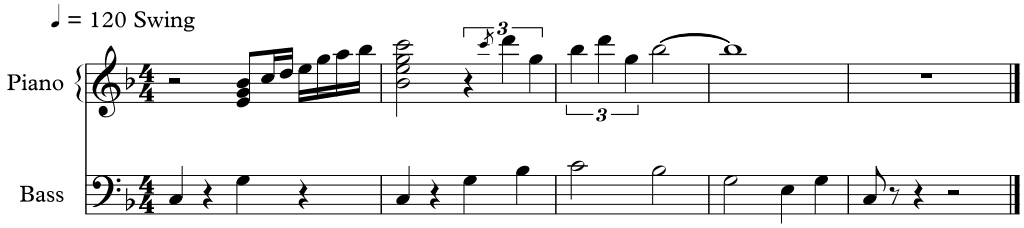
Moving Bass Jazzy Piano | Riff Section Key 13 F



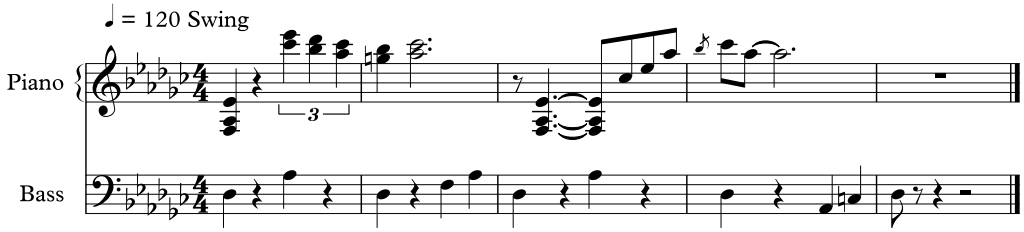
Moving Bass Jazzy Piano | Riff Section Key 14 F#



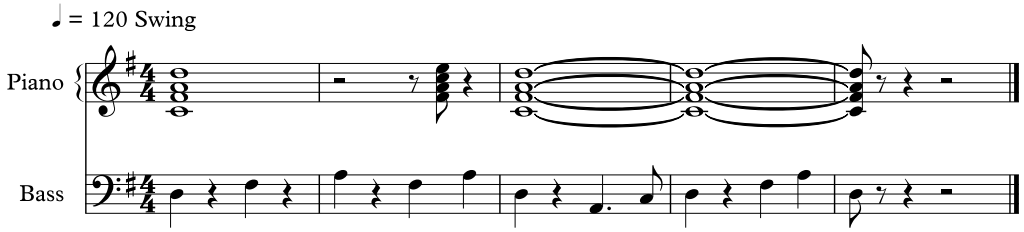
Moving Bass Jazzy Piano | Riff Section Key 15 G



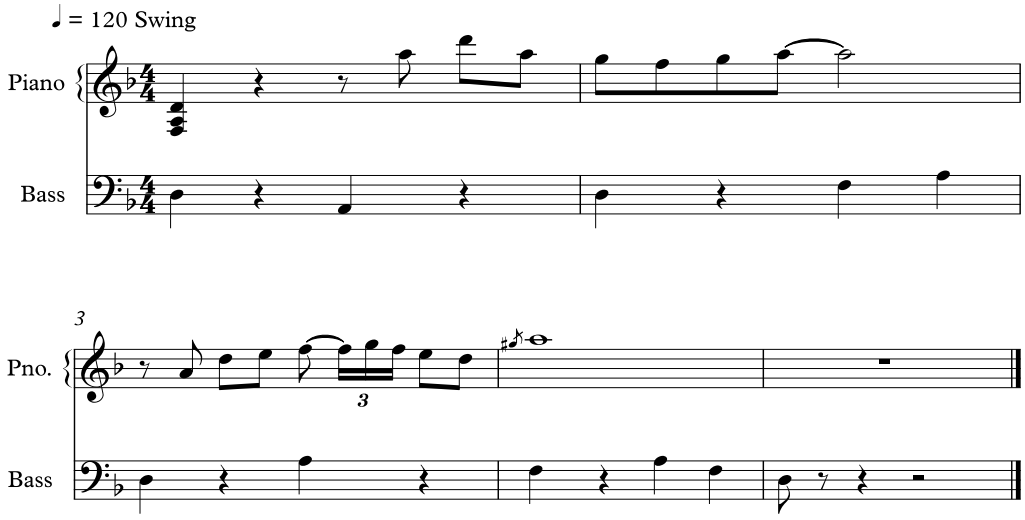
Moving Bass Jazzy Piano | Riff Section Key 16 G#



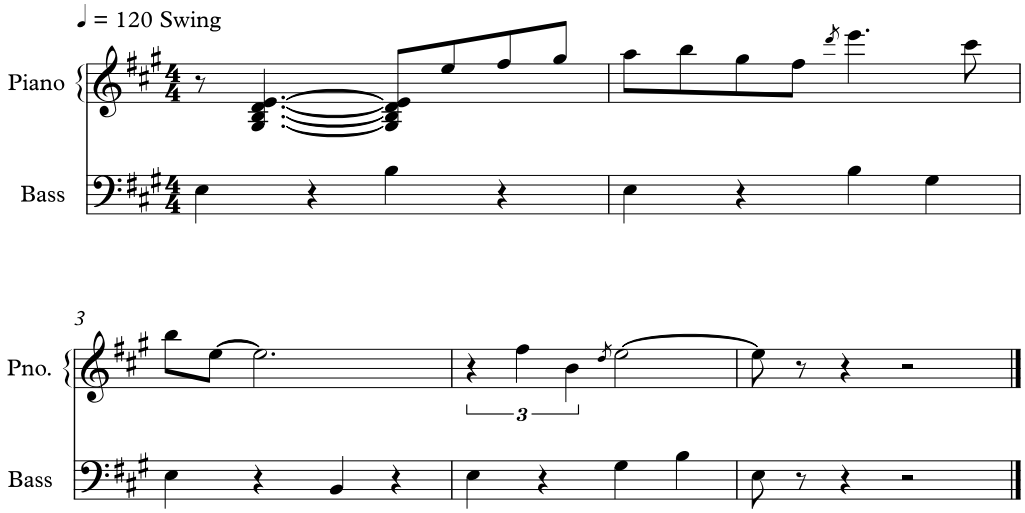
Moving Bass Jazzy Piano | Riff Section Key 17 A



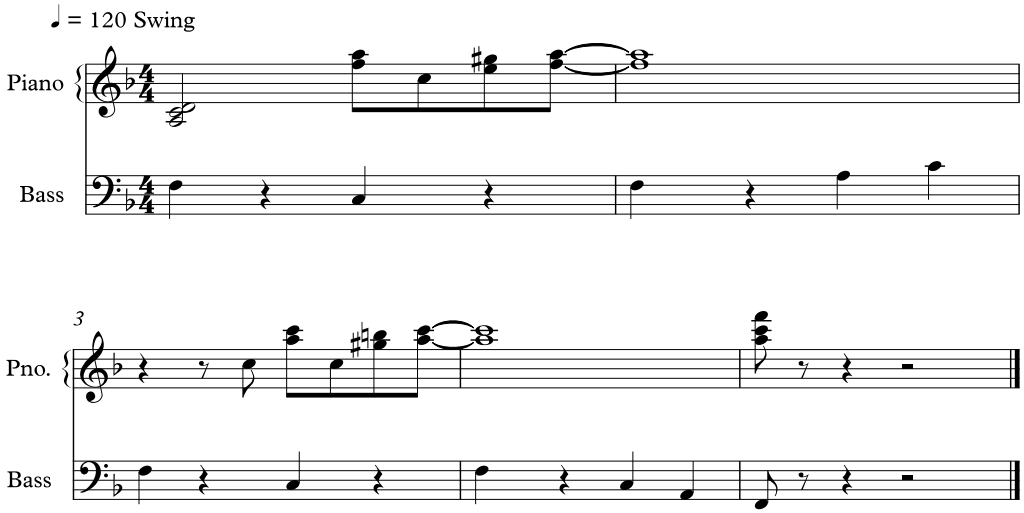
Moving Bass Jazzy Piano | Riff Section Key 18 A



Moving Bass Jazzy Piano | Riff Section Key 19 B

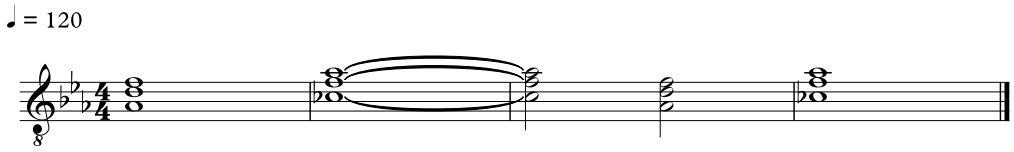


Moving Bass Jazzy Piano | Riff Section Key 20 C

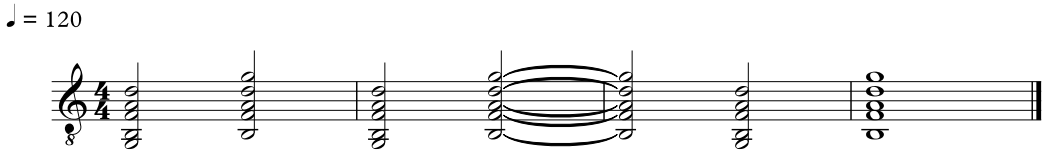


Moving Bass/Moving Strings Hi

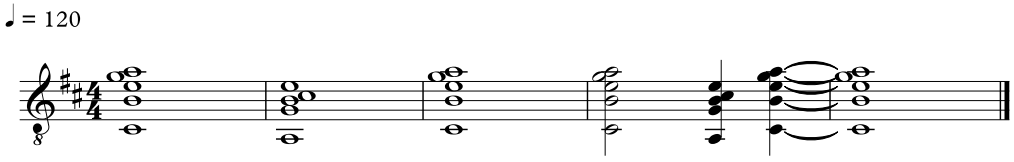
Moving Bass Cello/Violin | Riff Section Key 21 C#



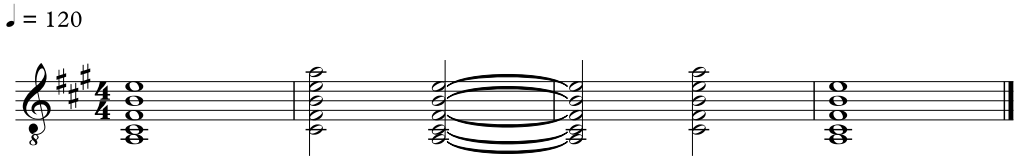
Moving Bass Cello/Violin | Riff Section Key 22 D



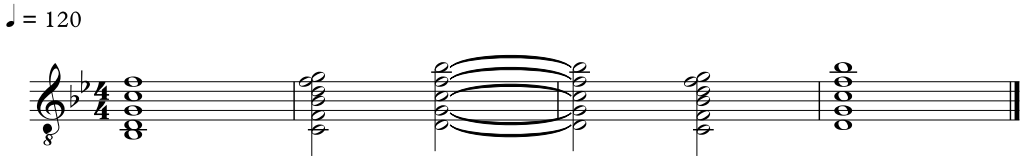
Moving Bass Cello/Violin | Riff Section Key 23 D#



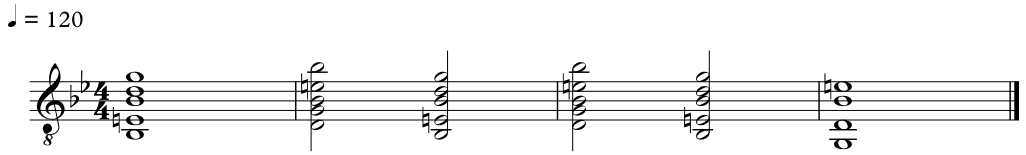
Moving Bass Cello/Violin | Riff Section Key 24 E



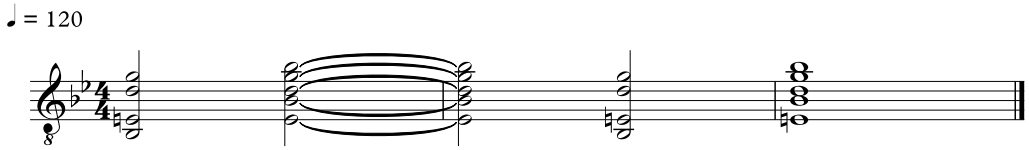
Moving Bass Cello/Violin | Riff Section Key 25 F



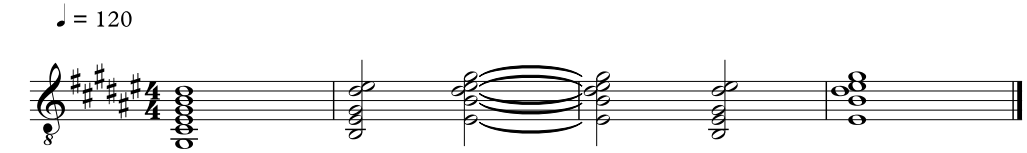
Moving Bass Cello/Violin | Riff Section Key 26 F#



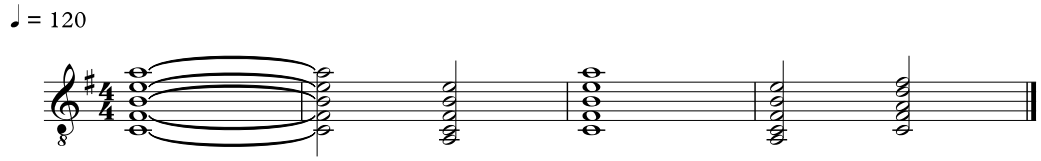
Moving Bass Cello/Violin | Riff Section Key 27 G



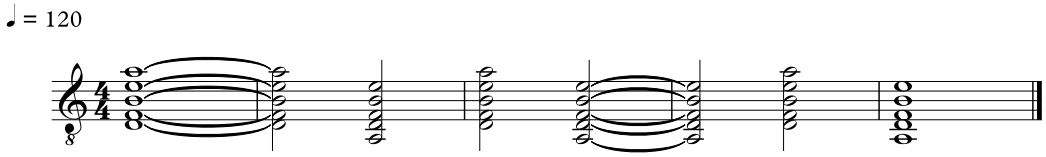
Moving Bass Cello/Violin | Riff Section Key 28 G#



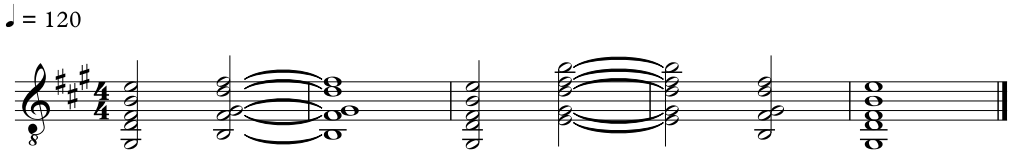
Moving Bass Cello/Violin | Riff Section Key 29 A



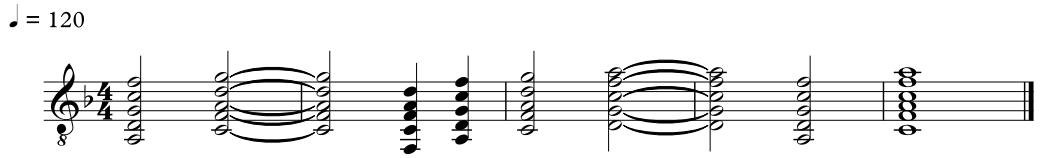
Moving Bass Cello/Violin | Riff Section Key 30 A#



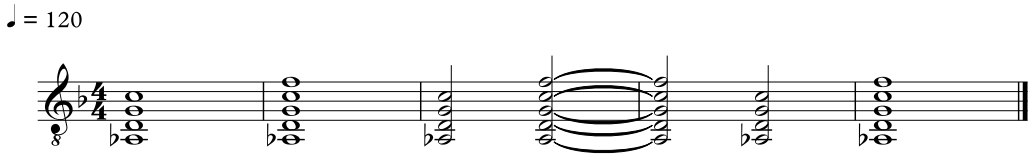
Moving Bass Cello/Violin | Riff Section Key 31 B



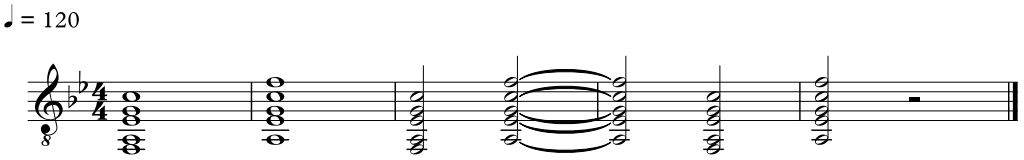
Moving Bass Cello/Violin | Riff Section Key 32 C



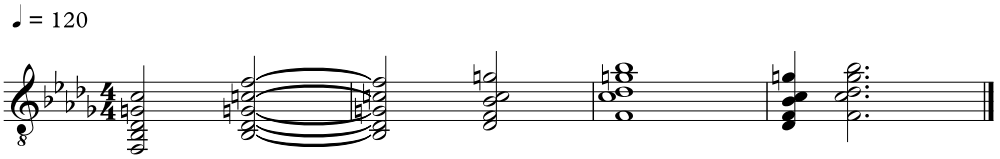
Moving Bass Cello/Violin | Riff Section Key 33 C#



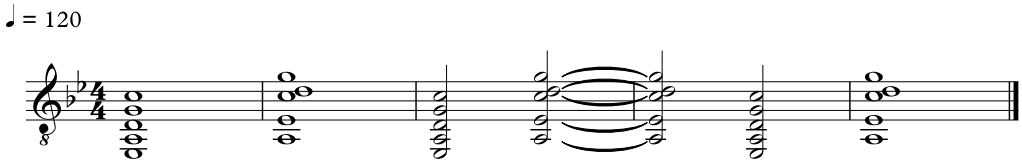
Moving Bass Cello/Violin | Riff Section Key 34 D



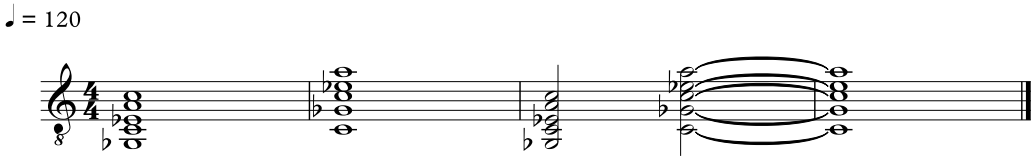
Moving Bass Cello/Violin | Riff Section Key 35 D#



Moving Bass Cello/Violin | Riff Section Key 36 E

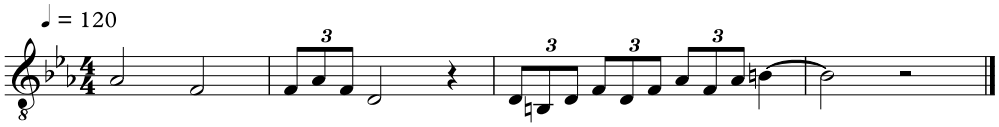


Moving Bass Cello/Violin | Riff Section Key 37 F

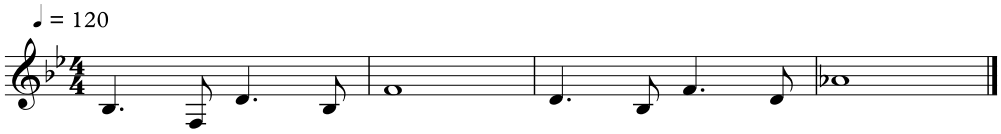


Quickstep/Swinging Sax

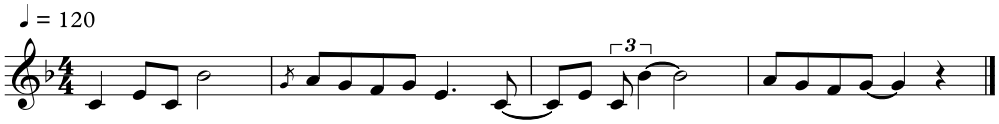
Quickstep Sax | Riff Section Key 21 C#



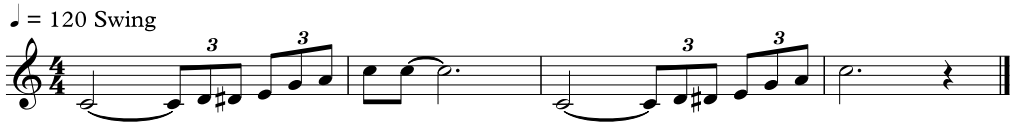
Quickstep Sax | Riff Section Key 22 D



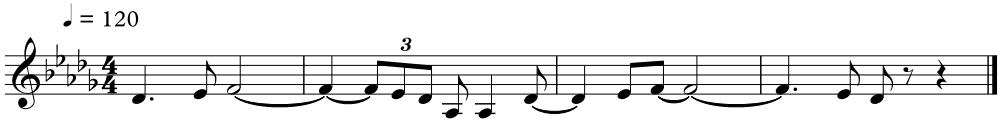
Quickstep Sax | Riff Section Key 23 D#



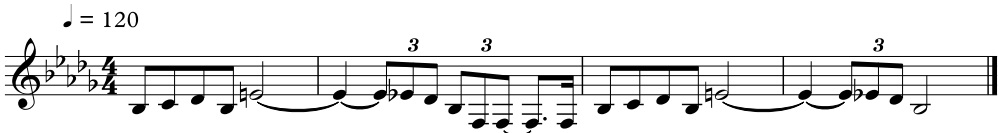
Quickstep Sax | Riff Section Key 24 E



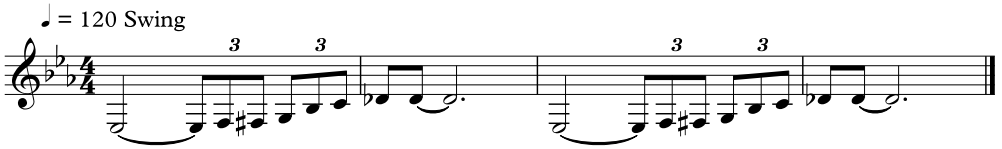
Quickstep Sax | Riff Section Key 25 F



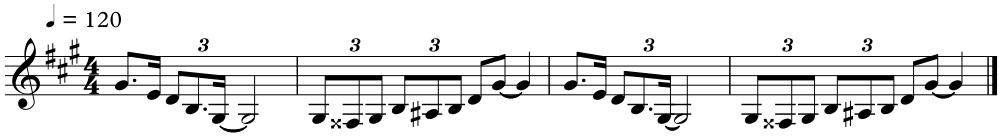
Quickstep Sax | Riff Section Key 26 F#



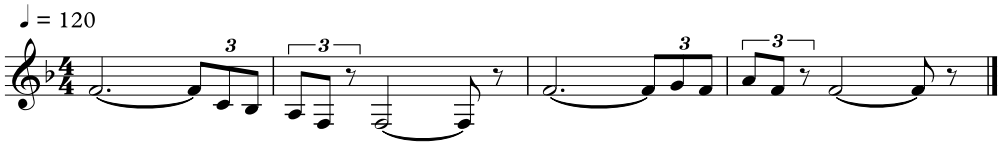
Quickstep Sax | Riff Section Key 27 G



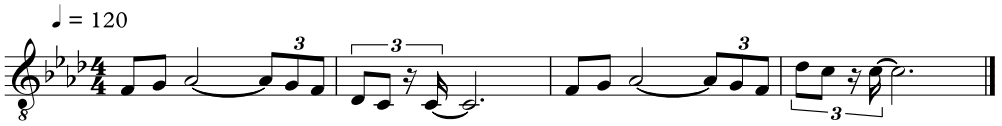
Quickstep Sax | Riff Section Key 28 G#



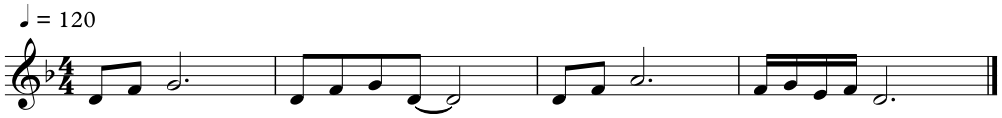
Quickstep Sax | Riff Section Key 29 A



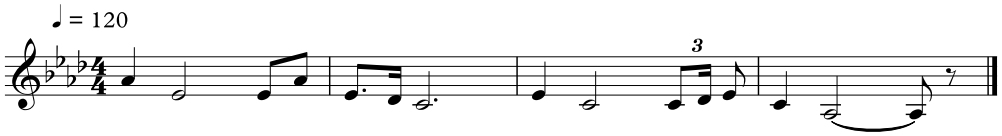
Quickstep Sax | Riff Section Key 30 A#



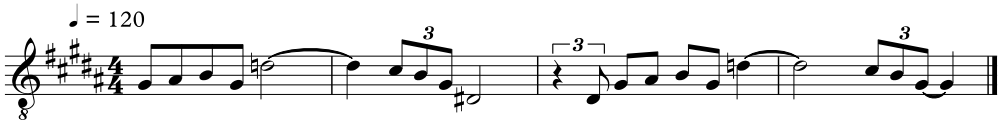
Quickstep Sax | Riff Section Key 31 B



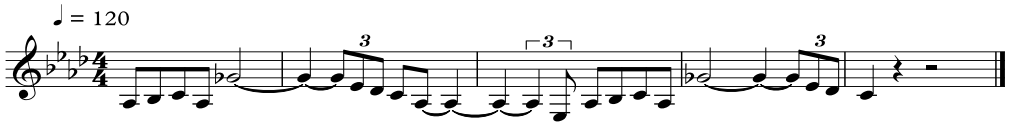
Quickstep Sax | Riff Section Key 32 C



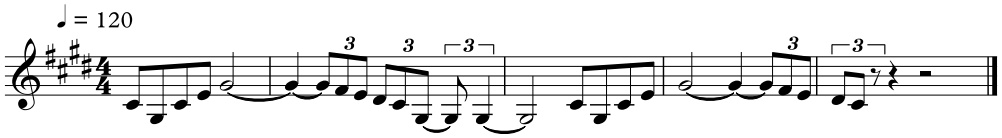
Quickstep Sax | Riff Section Key 33 C#



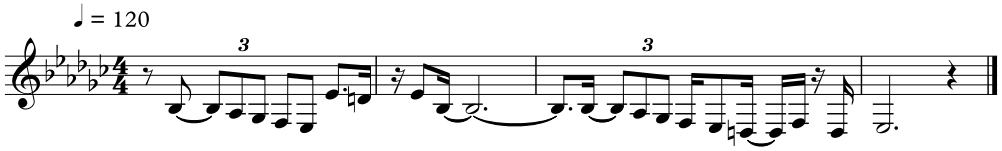
Quickstep Sax | Riff Section Key 34 D



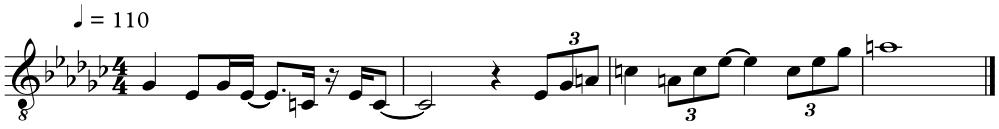
Quickstep Sax | Riff Section Key 35 D#



Quickstep Sax | Riff Section Key 36 E

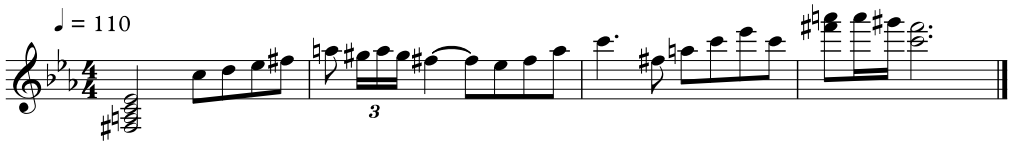


Quickstep Sax | Riff Section Key 37 F

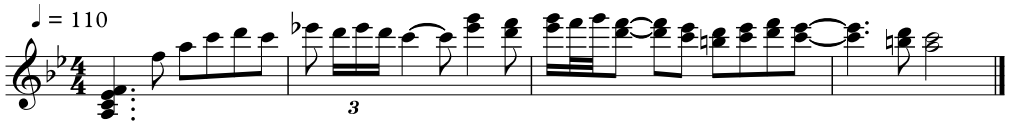


Tango/Piano Chords

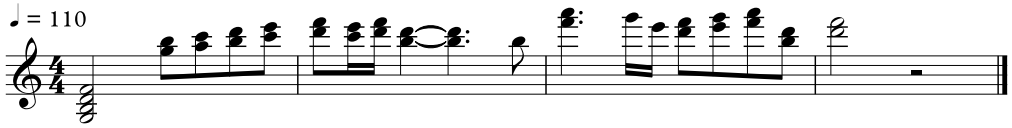
Tango Piano Moving Chords | Riff Section Key 21 C#



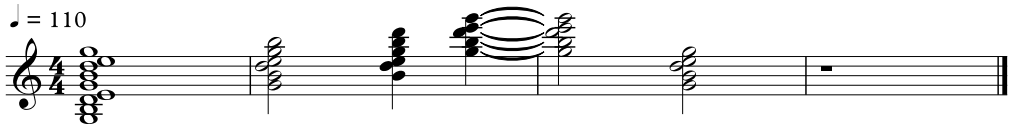
Tango Piano Moving Chords | Riff Section Key 22 D



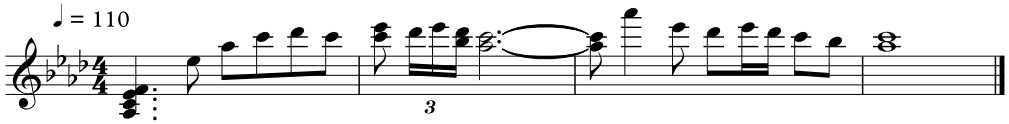
Tango Piano Moving Chords | Riff Section Key 23 D#



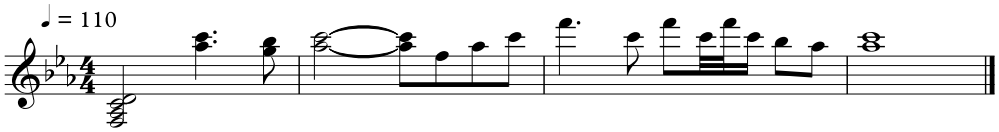
Tango Piano Moving Chords | Riff Section Key 24 E



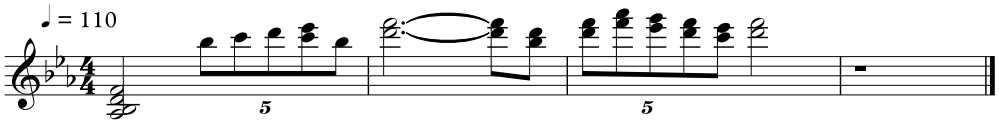
Tango Piano Moving Chords | Riff Section Key 25 F



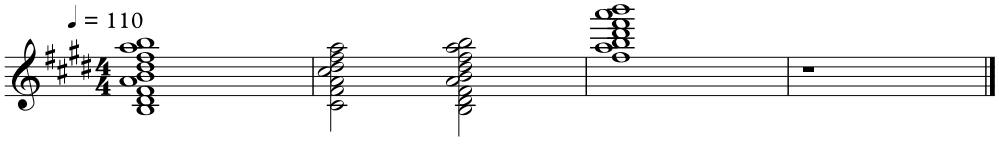
Tango Piano Moving Chords | Riff Section Key 26 F#



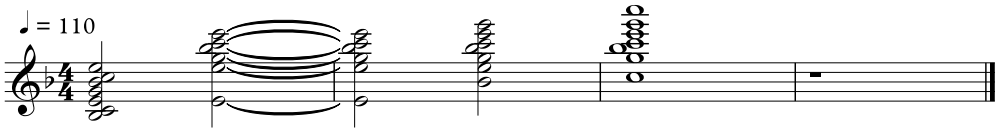
Tango Piano Moving Chords | Riff Section Key 27 G



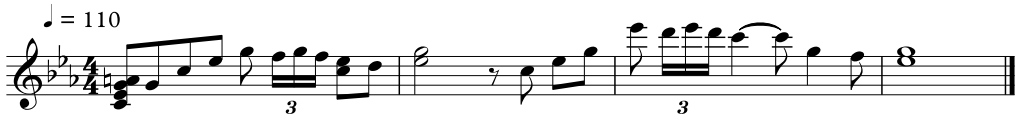
Tango Piano Moving Chords | Riff Section Key 28 G#



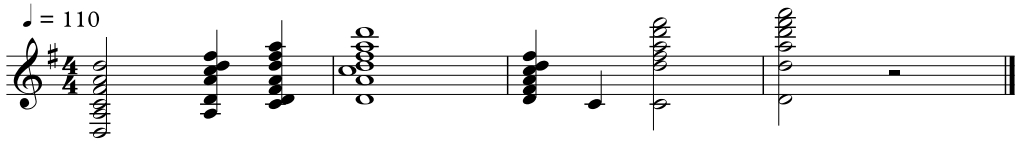
Tango Piano Moving Chords | Riff Section Key 29 A



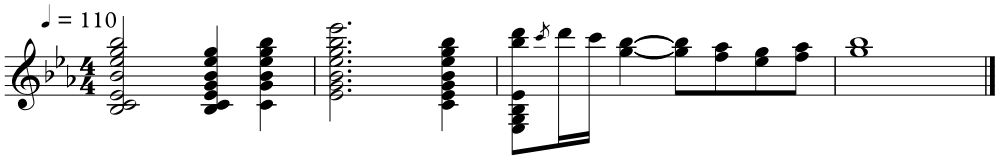
Tango Piano Moving Chords | Riff Section Key 30 A#



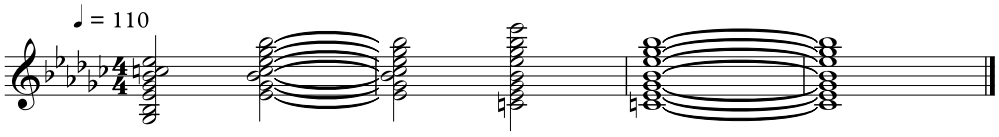
Tango Piano Moving Chords | Riff Section Key 31 B



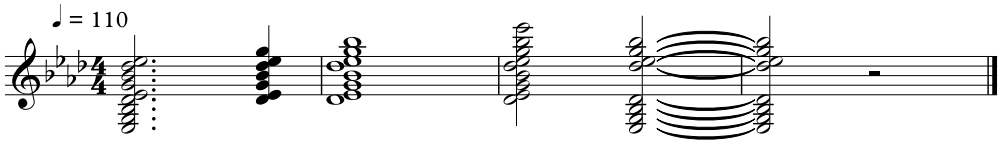
Tango Piano Moving Chords | Riff Section Key 32 C



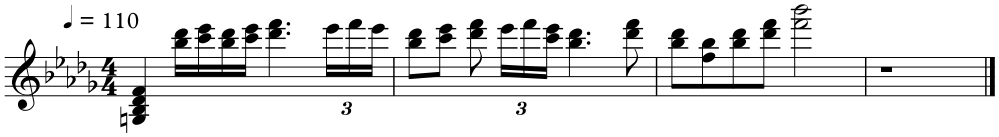
Tango Piano Moving Chords | Riff Section Key 33 C#



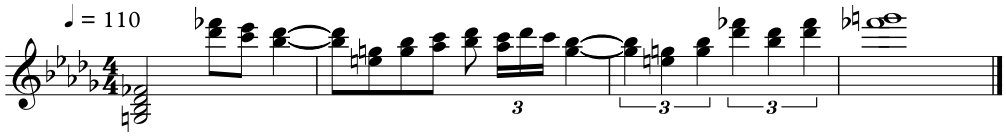
Tango Piano Moving Chords | Riff Section Key 34 D



Tango Piano Moving Chords | Riff Section Key 36 E



Tango Piano Moving Chords | Riff Section Key 37 F



Appendix B: Pitch shift/key/tempo data sheets

Bolero/Brass

Tempo	Tonic	High/Low	Pitch Shift
38	A ♭	Low	-7
40	A		-6
42	B ♭		-5
45	B		-4
47	C		-3
50	D ♭		-2
53	D		-1
56	E ♭		0
60	E		1
64	F		2
67	G ♭		3
71	G		4
74	A ♭		5
79	A		6
84	B ♭		7
76	A ♭	High	-7
79	A		-6
84	B ♭		-5
89	B		-4
94	C		-3
99	D ♭		-2
105	D		-1
112	E ♭		0
118	E		1
122	F		2
127	G ♭		3
133	G		4
148	A ♭		5
158	A		6
168	B ♭		7

Bossa Nova/Moving Strings Lo

Tempo	Tonic	High/Low	Pitch Shift
61	F	Low	-7
64	G ♭		-6
69	G		-5
72	A ♭		-4
77	A		-3
81	B ♭		-2
84	B		-1
90	C		0
96	D ♭		1
103	D		2
108	E ♭		3
113	E		4
119	F		5
126	G ♭		6
136	G		7
120	F	High	-7
128	G ♭		-6
138	G		-5
144	A ♭		-4
154	A		-3
162	B ♭		-2
168	B		-1
180	C		0
192	D ♭		1
206	D		2
216	E ♭		3
226	E		4
238	F		5
252	G ♭		6
272	G		7

Cha Cha/Swinging Flutes

Tempo	Tonic	High/Low	Pitch Shift
41	B ♭	Low	-7
44	B		-6
47	C		-5
50	D ♭		-4
52	D		-3
55	E ♭		-2
59	E		-1
62	F		0
65	G ♭		1
68	G		2
72	A ♭		3
76	A		4
81	B ♭		5
86	B		6
93	C		7
82	B ♭	High	-7
86	B		-6
91	C		-5
95	D ♭		-4
102	D		-3
111	E ♭		-2
118	E		-1
124	F		0
129	G ♭		1
145	G		2
159	A ♭		3
166	A		4
175	B ♭		5
182	B		6
185	C		7

Dixieland/Trombones

Tempo	Tonic	High/Low	Pitch Shift
37	D ♭	Low	-7
39	D		-6
41	E ♭		-5
44	E		-4
46	F		-3
49	G ♭		-2
52	G		-1
56	A ♭		0
58	A		1
63	B ♭		2
65	B		3
68	C		4
73	D ♭		5
77	D		6
82	E ♭		7
74	D ♭	High	-7
78	D		-6
82	E ♭		-5
88	E		-4
92	F		-3
98	G ♭		-2
104	G		-1
112	A ♭		0
117	A		1
125	B ♭		2
130	B		3
136	C		4
146	D ♭		5
154	D		6
163	E ♭		7

Cuban/Piano Chords

Tempo	Tonic	High/Low	Pitch Shift
37	D ♭	Low	-7
39	D		-6
41	E ♭		-5
44	E		-4
46	F		-3
49	G ♭		-2
52	G		-1
56	A ♭		0
58	A		1
63	B ♭		2
65	B		3
68	C		4
73	D ♭		5
77	D		6
82	E ♭		7
74	D ♭	High	-7
78	D		-6
82	E ♭		-5
88	E		-4
92	F		-3
98	G ♭		-2
104	G		-1
112	A ♭		0
117	A		1
125	B ♭		2
130	B		3
136	C		4
146	D ♭		5
154	D		6
163	E ♭		7

Fast Jazz Bass

Tempo	Tonic	High/Low	Pitch Shift
45	E ♭	Low	-7
47	E	Low	-6
49	F	Low	-5
51	G ♭		-4
57	G		-3
61	A ♭		-2
65	A		-1
68	B ♭		0
74	B		1
77	C		2
79	D ♭		3
82	D		4
89	E ♭		5
96	E		6
101	F		7
92	E ♭	High	-7
99	E		-6
106	F		-5
109	G ♭		-4
112	G		-3
120	A ♭		-2
126	A		-1
132	B ♭		0
141	B		1
150	C		2
160	D ♭		3
171	D		4
182	E ♭		5
193	E		6
203	F		7

Twist in C

Tempo	Tonic	High/Low	Pitch Shift
61	F	Low	-7
66	G ♭		-6
70	G		-5
72	A ♭		-4
76	A		-3
81	B ♭		-2
86	B		-1
90	C		0
96	D ♭		1
100	D		2
108	E ♭		3
114	E		4
122	F		5
130	G ♭		6
140	G		7
122	F	High	-7
132	G ♭		-6
140	G		-5
144	A ♭		-4
152	A		-3
162	B ♭		-2
172	B		-1
180	C		0
192	D ♭		1
200	D		2
216	E ♭		3
228	E		4
260	F		5
270	G ♭		6
280	G		7

Jazz Foxtrot

Tempo	Tonic	High/Low	Pitch Shift
40	E ♭	Low	-7
44	E		-6
48	F		-5
52	G ♭		-4
56	G		-3
59	A ♭		-2
62	A		-1
68	B ♭		0
72	B		1
78	C		2
85	D ♭		3
90	D		4
94	E ♭		5
98	E		6
102	F		7
90	E ♭	High	-7
96	E		-6
102	F		-5
112	G ♭		-4
120	G		-3
127	A ♭		-2
130	A		-1
136	B ♭		0
142	B		1
148	C		2
156	D ♭		3
168	D		4
180	E ♭		5
192	E		6
204	F		7

Blues Beat in F

Tempo	Tonic	High/Low	Pitch Shift
40	B ♭	Low	-7
44	B		-6
48	C		-5
52	D ♭		-4
56	D		-3
59	E ♭		-2
62	E		-1
66	F		0
72	G ♭		1
78	G		2
85	A ♭		3
90	A		4
94	B ♭		5
98	B		6
102	C		7
90	B ♭	High	-7
96	B		-6
102	C		-5
112	D ♭		-4
120	D		-3
127	E ♭		-2
130	E		-1
136	F		0
142	G ♭		1
148	G		2
156	A ♭		3
168	A		4
180	B ♭		5
192	B		6
204	C		7

Moving Bass/Moving Strings Hi

Tempo	Tonic	High/Low	Pitch Shift
41	B ♭	Low	-7
44	B		-6
47	C		-5
50	D ♭		-4
52	D		-3
55	E ♭		-2
59	E		-1
62	F		0
65	G ♭		1
68	G		2
72	A ♭		3
76	A		4
81	B ♭		5
86	B		6
93	C		7
82	B ♭	High	-7
86	B		-6
91	C		-5
95	D ♭		-4
102	D		-3
111	E ♭		-2
118	E		-1
124	F		0
129	G ♭		1
145	G		2
159	A ♭		3
166	A		4
175	B ♭		5
182	B		6
185	C		7

Quickstep/Swinging Sax

Tempo	Tonic	High/Low	Pitch Shift
41	B ♭	Low	-7
44	B		-6
47	C		-5
50	D ♭		-4
52	D		-3
55	E ♭		-2
59	E		-1
62	F		0
65	G ♭		1
68	G		2
72	A ♭		3
76	A		4
81	B ♭		5
86	B		6
93	C		7
82	B ♭	High	-7
86	B		-6
91	C		-5
95	D ♭		-4
102	D		-3
111	E ♭		-2
118	E		-1
124	F		0
129	G ♭		1
145	G		2
159	A ♭		3
166	A		4
175	B ♭		5
182	B		6
185	C		7

Rhumba/Guitar

Tempo	Tonic	High/Low	Pitch Shift
43	F	Low	-7
46	G ♭		-6
49	G		-5
51	A ♭		-4
54	A		-3
58	B ♭		-2
61	B		-1
64	C		0
68	D ♭		1
71	D		2
76	E ♭		3
81	E		4
85	F		5
91	G ♭		6
99	G		7
86	F	High	-7
92	G ♭		-6
97	G		-5
102	A ♭		-4
108	A		-3
115	B ♭		-2
122	B		-1
128	C		0
136	D ♭		1
143	D		2
155	E ♭		3
162	E		4
171	F		5
182	G ♭		6
198	G		7

6/8 Tempo in F

Tempo	Tonic	High/Low	Pitch Shift
42	B ♭	Low	-7
48	B		-6
50	C		-5
52	D ♭		-4
54	D		-3
57	E ♭		-2
60	E		-1
64	F		0
68	G ♭		1
71	G		2
74	A ♭		3
80	A		4
85	B ♭		5
90	B		6
95	C		7
85	B ♭	High	-7
96	B		-6
100	C		-5
104	D ♭		-4
108	D		-3
114	E ♭		-2
120	E		-1
128	F		0
136	G ♭		1
142	G		2
148	A ♭		3
161	A		4
170	B ♭		5
181	B		6
190	C		7

Samba

Tempo	Tonic	High/Low	Pitch Shift
36	E ♭	Low	-7
40	E		-6
44	F		-5
48	G ♭		-4
52	G		-3
55	A ♭		-2
58	A		-1
32	B ♭		0
68	B		1
74	C		2
81	D ♭		3
86	D		4
90	E ♭		5
94	E		6
100	F		7
86	E ♭	High	-7
92	E		-6
104	F		-5
108	G ♭		-4
116	G		-3
123	A ♭		-2
128	A		-1
132	B ♭		0
138	B		1
144	C		2
152	D ♭		3
164	D		4
176	E ♭		5
188	E		6
200	F		7

Slow Foxtrot/Organ

Tempo	Tonic	High/Low	Pitch Shift
37	D ♭	Low	-7
39	D		-6
41	E ♭		-5
44	E		-4
47	F		-3
49	G ♭		-2
52	G		-1
55	A ♭		0
58	A		1
62	B ♭		2
65	B		3
68	C		4
73	D ♭		5
77	D		6
81	E ♭		7
74	D ♭	High	-7
78	D		-6
82	E ♭		-5
88	E		-4
92	F		-3
98	G ♭		-2
104	G		-1
112	A ♭		0
117	A		1
125	B ♭		2
130	B		3
136	C		4
146	D ♭		5
154	D		6
163	E ♭		7

Tango/Piano Chords

Tempo	Tonic	High/Low	Pitch Shift
36	A ♭	Low	-7
38	A		-6
40	B ♭		-5
43	B		-4
45	C		-3
48	D ♭		-2
51	D		-1
54	E ♭		0
58	E		1
62	F		2
65	G ♭		3
69	G		4
72	A ♭		5
77	A		6
82	B ♭		7
74	A ♭	High	-7
77	A		-6
82	B ♭		-5
87	B		-4
32	C		-3
97	D ♭		-2
103	D		-1
110	E ♭		0
116	E		1
120	F		2
125	G ♭		3
131	G		4
146	A ♭		5
156	A		6
166	B ♭		7

Viennese Waltz/Accordion

Tempo	Tonic	High/Low	Pitch Shift
61	F	Low	-7
64	G ♭		-6
69	G		-5
72	A ♭		-4
77	A		-3
81	B ♭		-2
84	B		-1
90	C		0
96	D ♭		1
103	D		2
108	E ♭		3
113	E		4
119	F		5
126	G ♭		6
136	G		7
122	F	High	-7
128	G ♭		-6
138	G		-5
144	A ♭		-4
154	A		-3
162	B ♭		-2
168	B		-1
180	C		0
192	D ♭		1
206	D		2
216	E ♭		3
226	E		4
238	F		5
252	G ♭		6
272	G		7

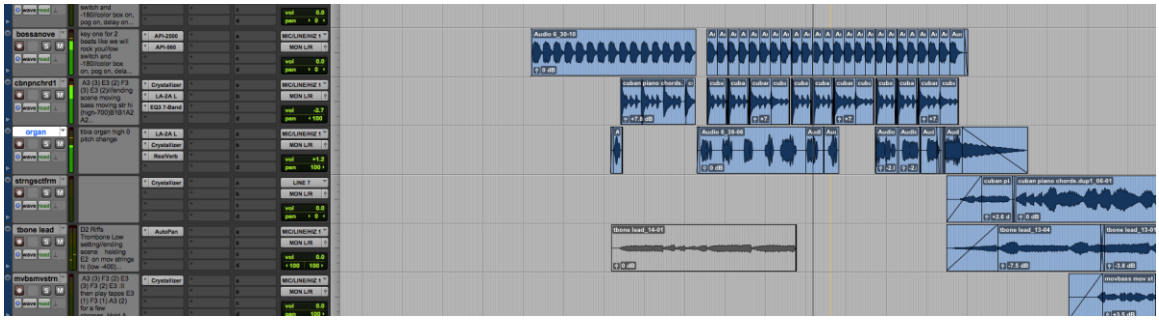
Slow Waltz/Guitar

Tempo	Tonic	High/Low	Pitch Shift
30	F	Low	-7
32	G ♭		-6
33	G		-5
34	A ♭		-4
37	A		-3
39	B ♭		-2
42	B		-1
45	C		0
46	D ♭		1
50	D		2
54	E ♭		3
57	E		4
62	F		5
65	G ♭		6
68	G		7
61	F	High	-7
63	G ♭		-6
65	G		-5
68	A ♭		-4
74	A		-3
78	B ♭		-2
84	B		-1
90	C		0
97	D ♭		1
105	D		2
109	E ♭		3
115	E		4
123	F		5
130	G ♭		6
136	G		7

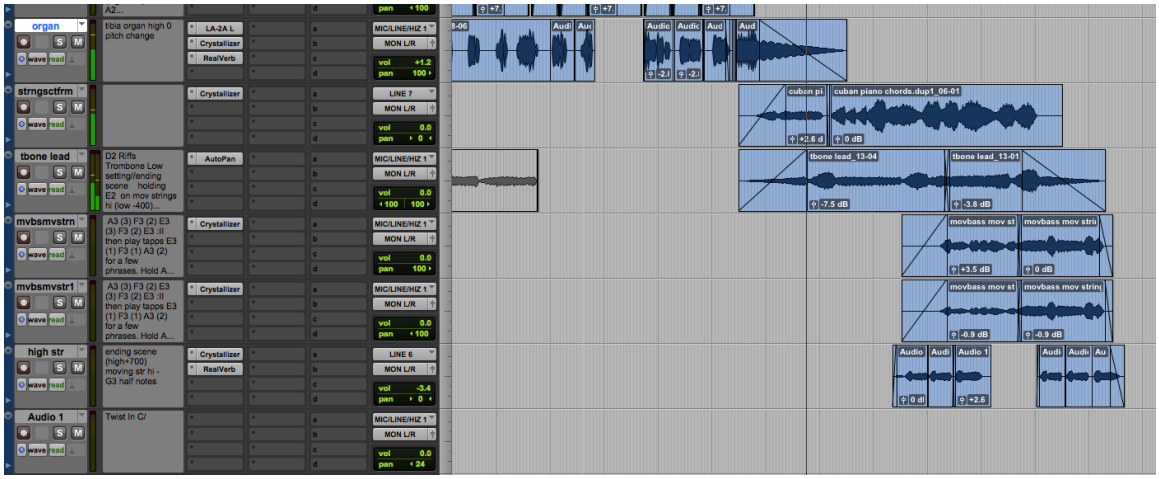
Appendix C: Pro Tools session visuals

1. Tango Piano

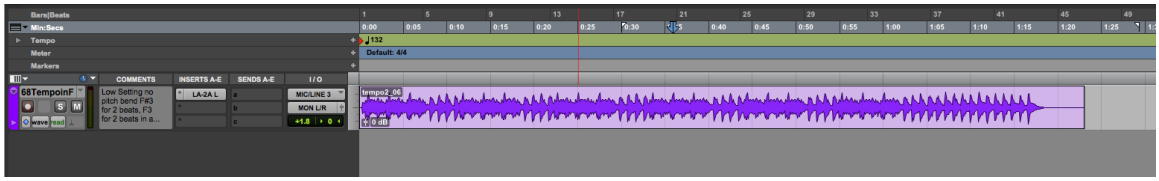
2. Outro



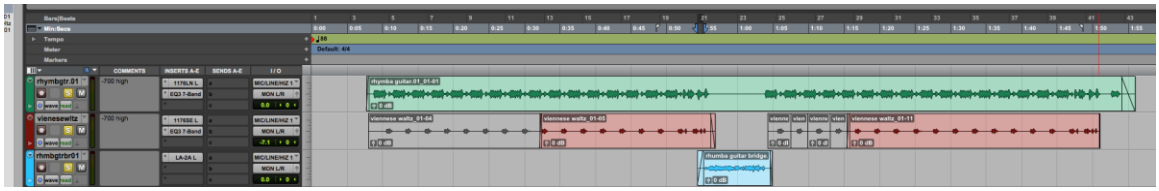
3. Romantic Strings



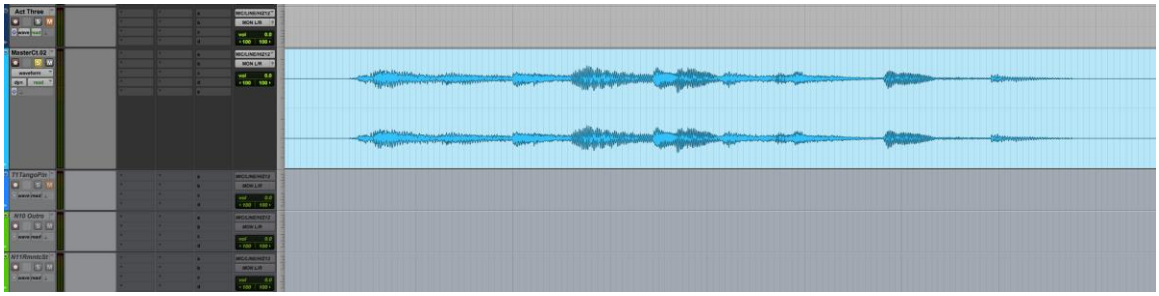
4. Schoolyard



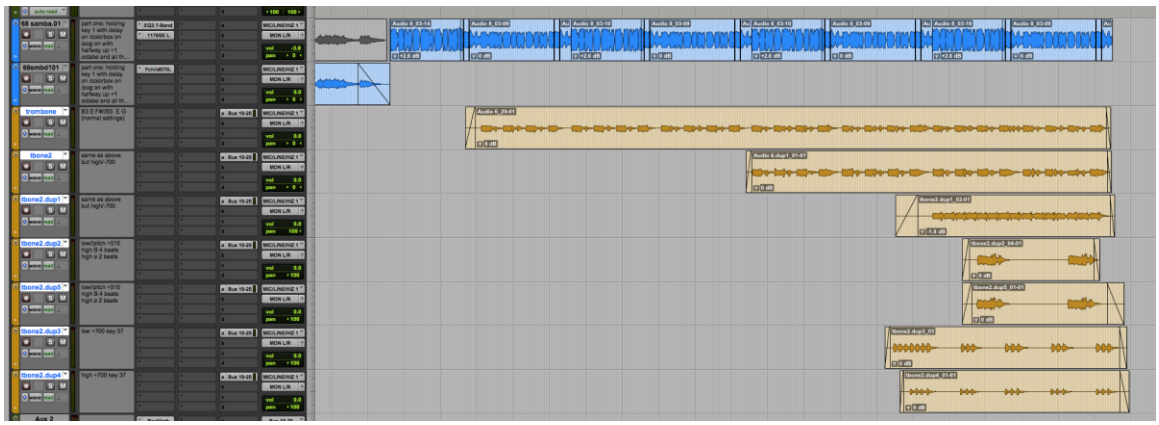
5. Dr. Feel Good



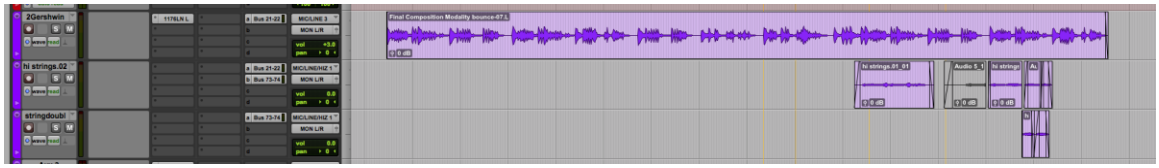
6. A Word From Our Sponsors



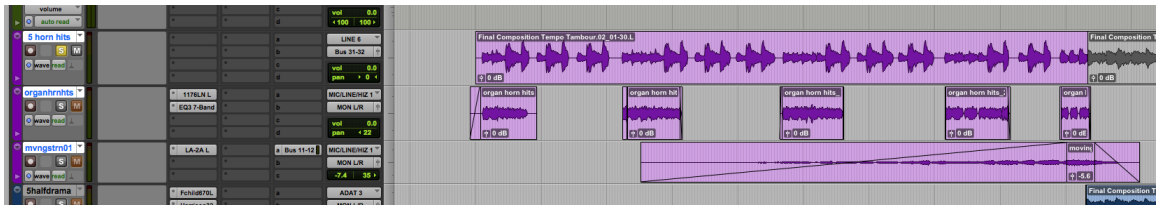
7. Horn Parade



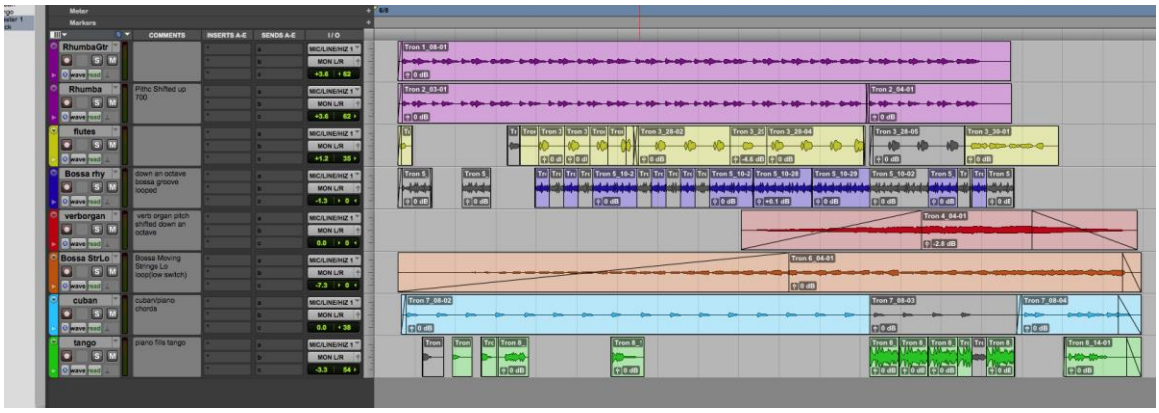
8. Gershwin



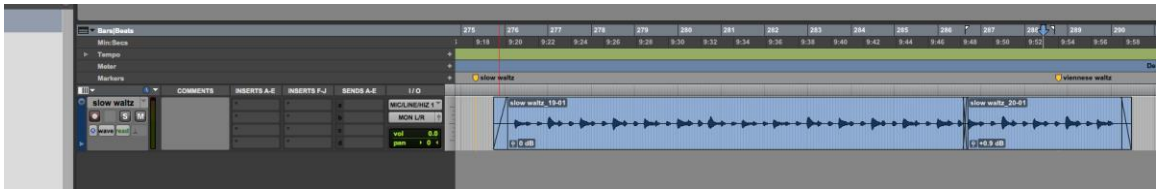
9. Espionage Smack



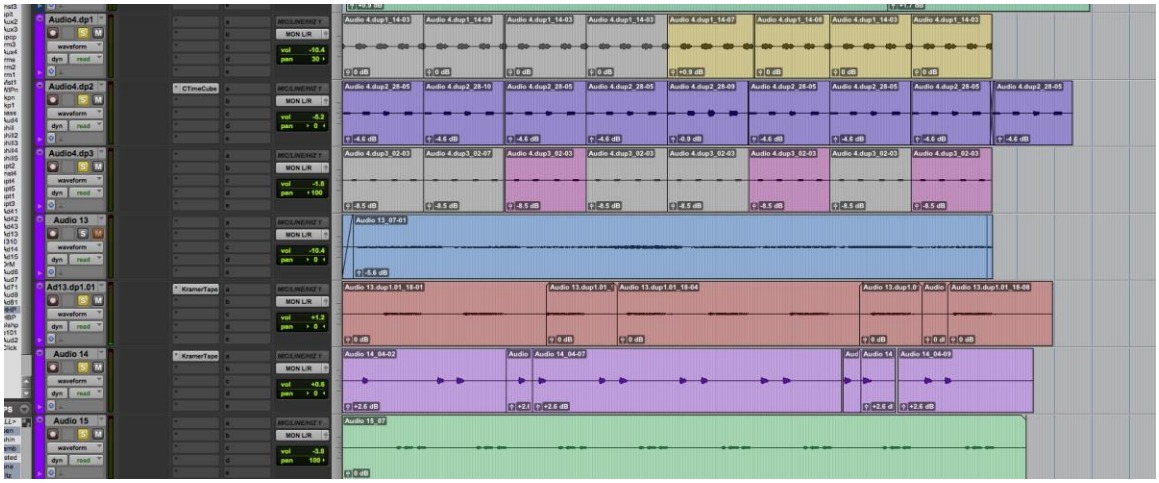
10. Post Apocalypse Liberace



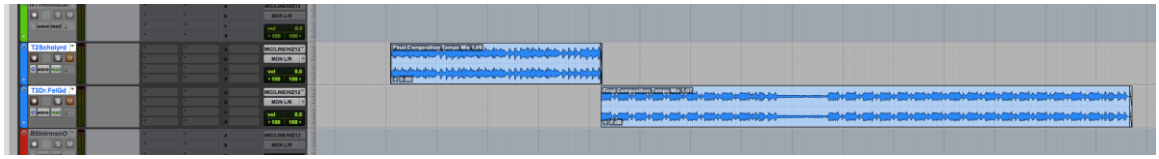
11. The Cat



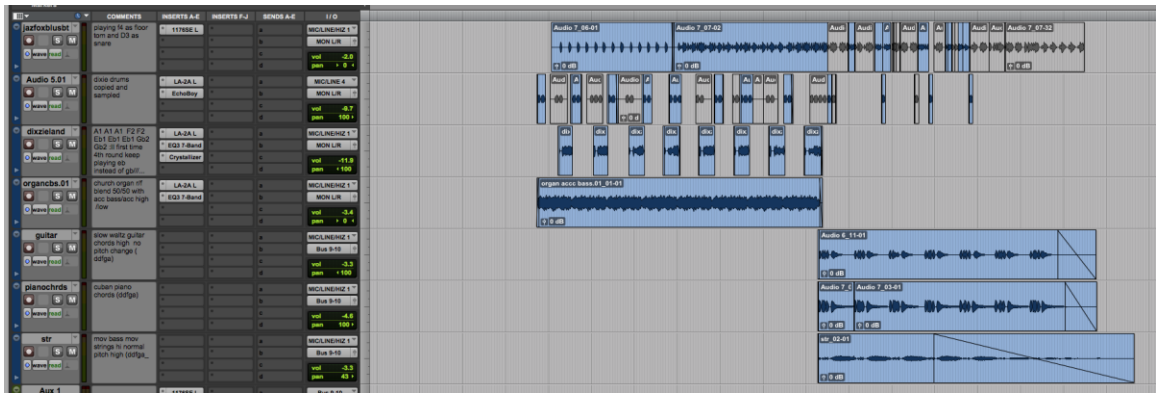
12. Firework Spectacle



13. Reprise



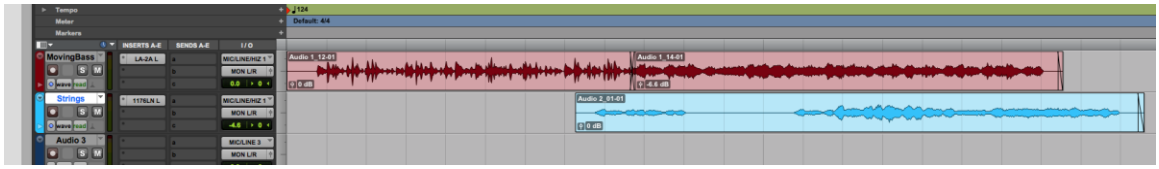
14. Rhino Fight



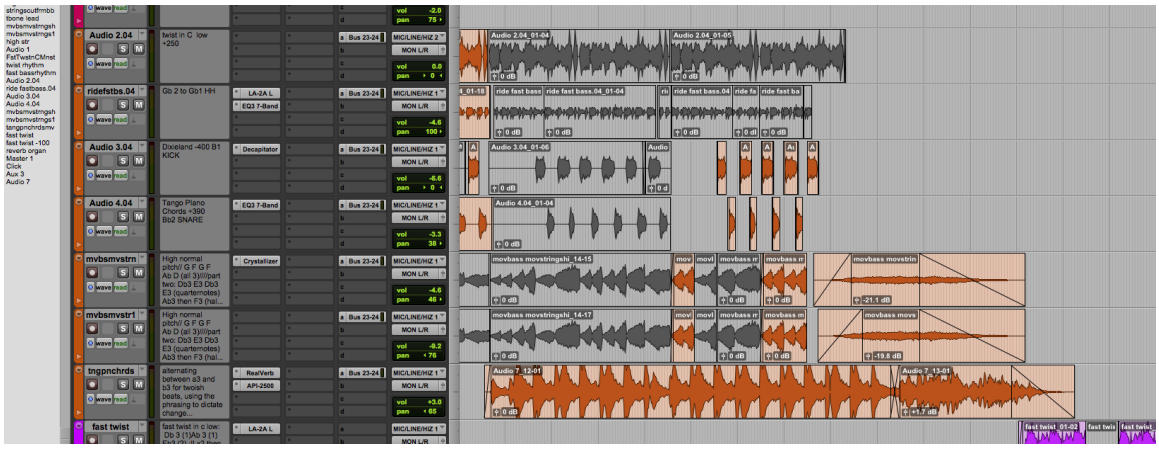
15. Carnival

16. Dream

17. The Champagne of Instruments (Intermission 2)

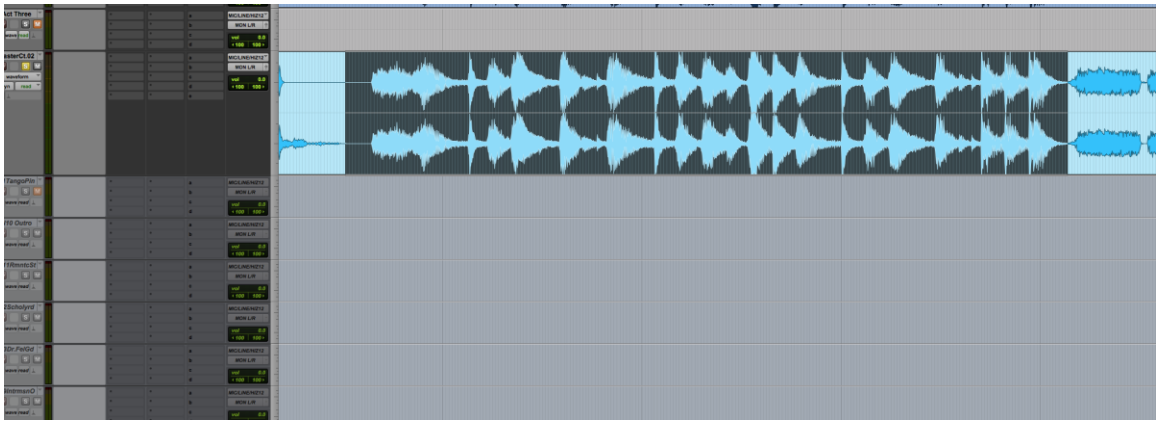


18. Royal Grand Procession

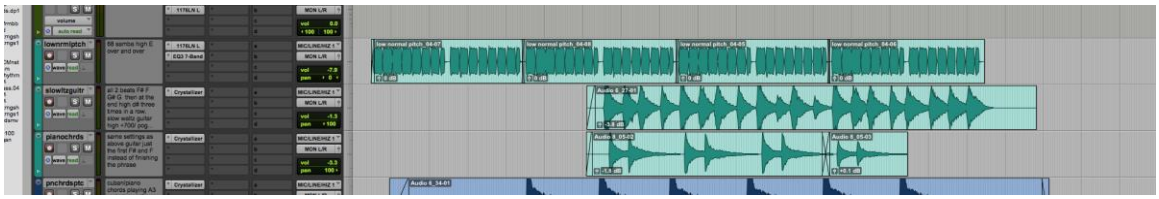


19. The Organizer

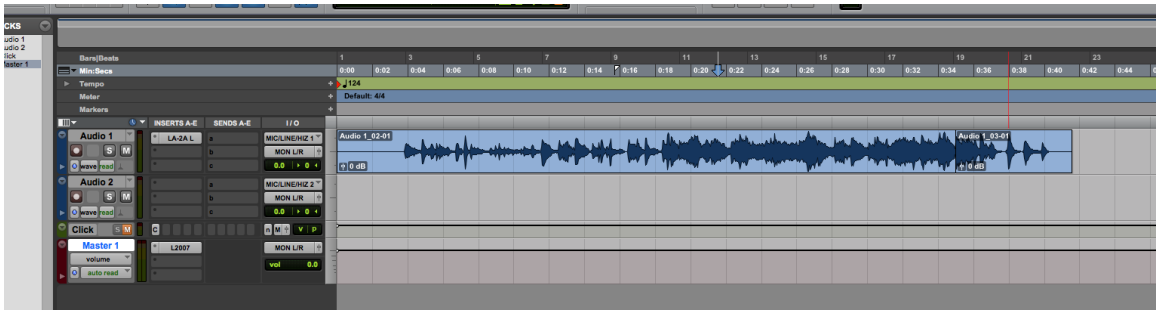
20. Introducing



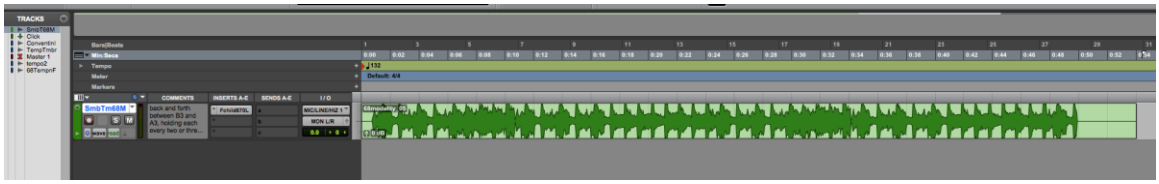
21. Moonwalk



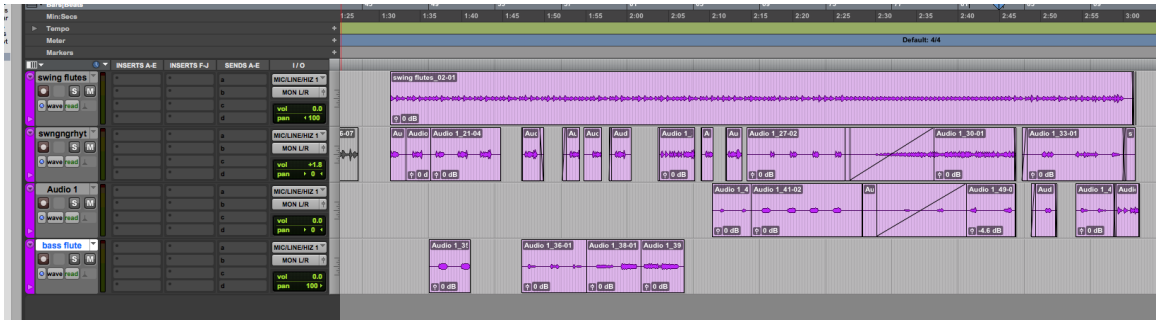
22. Slacks and Cadillacs



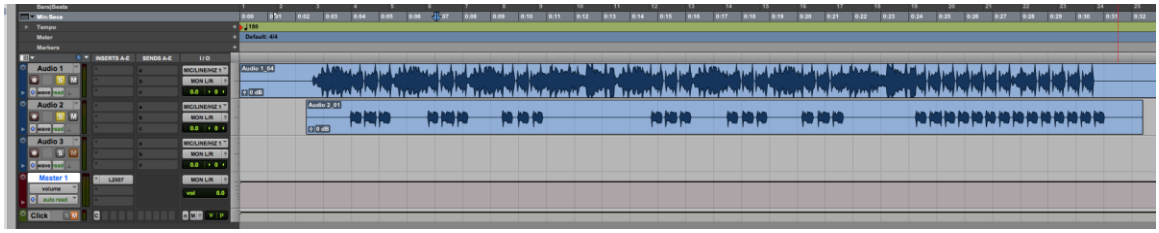
23. Time Zones



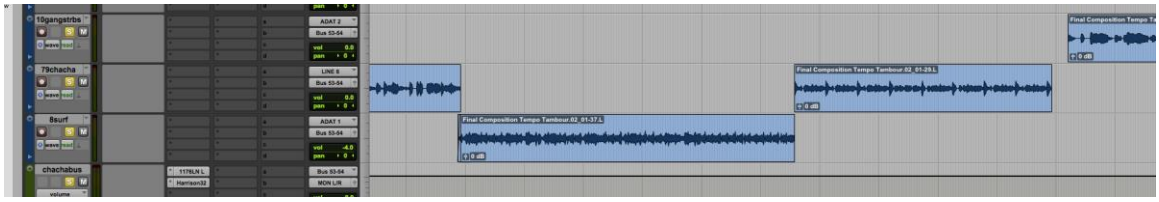
24. Cha Cha Champion



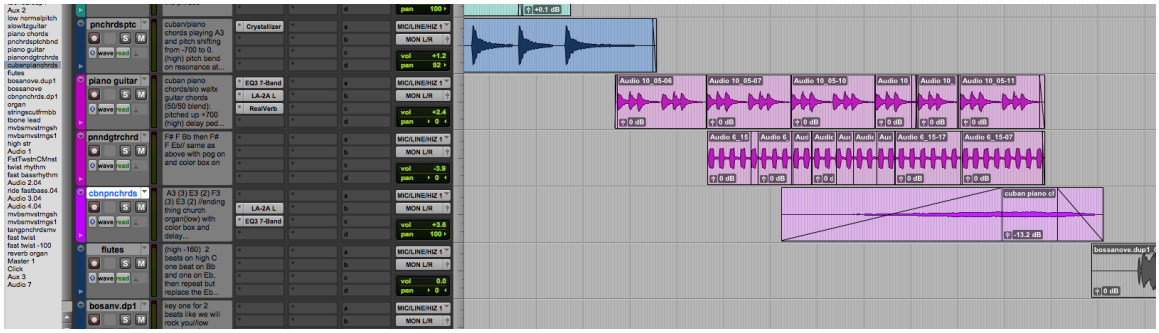
25. Shark



26. Bailar

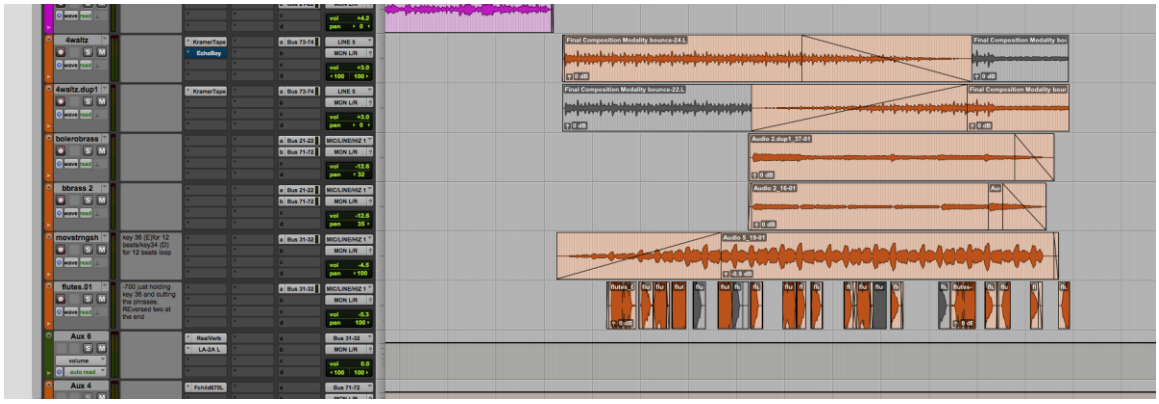


27. Vengeance Parlor

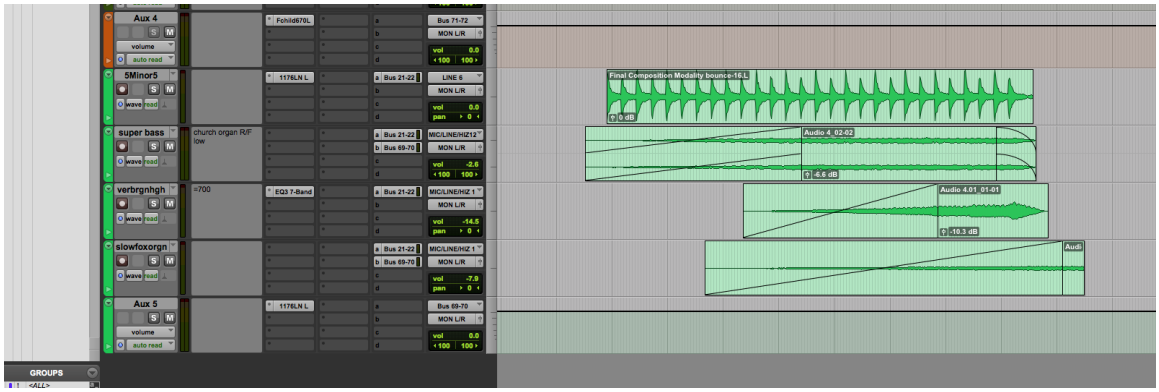


28. The Sleaze

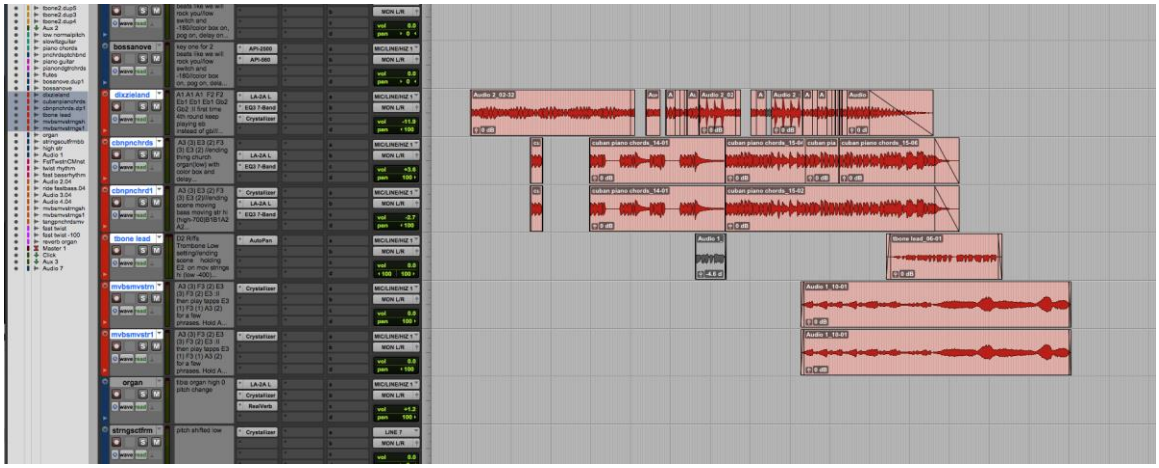
29. Fog Waltz



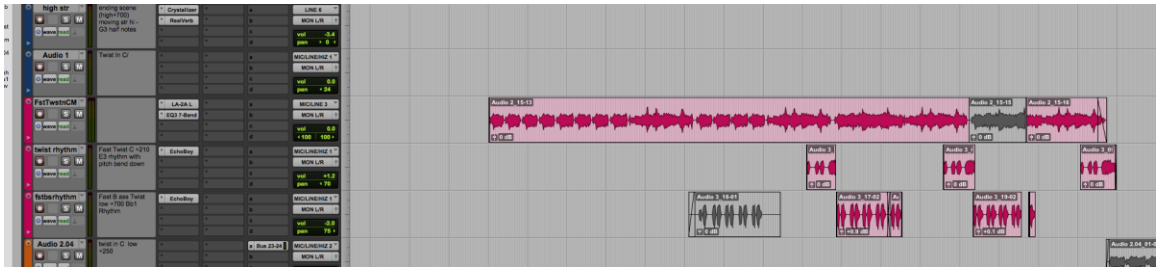
30. Minor 5



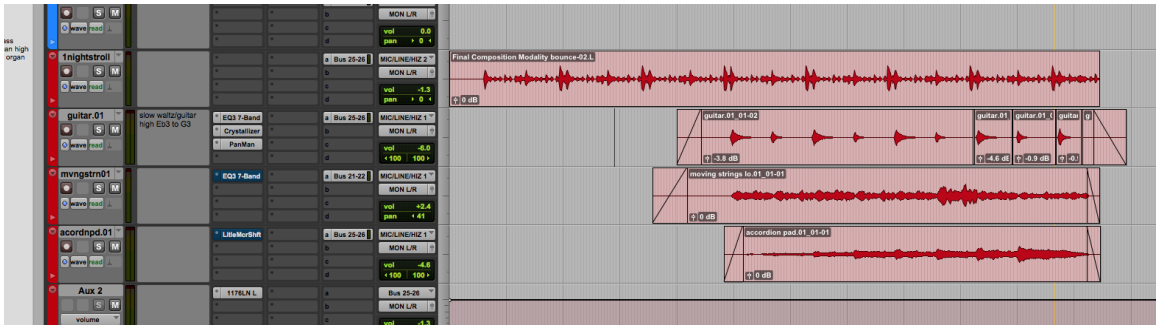
31. Piano Fire



32. TV Time



33. Night Stroll



34. Outro Reprise