TELE: USING VERNACULAR PERFORMANCE PRACTICES IN AN EIGHT-CHANNEL ENVIRONMENT

Chapman Welch, B.A.

Thesis Prepared for the Degree of

MASTER OF MUSIC

UNIVERSITY OF NORTH TEXAS

August 2003

APPROVED:
Joseph Rovan, Major Professor
Jon Christopher Nelson, Minor Professor
Joseph Klein, Committee Member and Head of the Music Composition Department

Welch, Chapman, *TELE:* USING VERNACULAR PERFORMANCE PRACTICES IN AN EIGHT-CHANNEL ENVIRONMENT. Master of Music, August 2003, 46 pp., 32 illustrations, reference, 24 titles.

Examines the use of vernacular, country guitar styles in an electro-acoustic environment. Special attention is given to performance practices and explanation of techniques. Electro-acoustic techniques—including sound design and spatialization—are given with sonogram analyses and excerpts from the score. Compositional considerations are contrasted with those of Mario Davidovsky and Jean-Claude Risset with special emphasis on electro-acoustic approaches. Contextualization of the piece in reference to other contemporary, electric guitar music is shown with reference to George Crumb and Chiel Meijering.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

TELE was completed from August to October of 2002 at the Center for Experimental Music and Intermedia (CEMI) at the University of North Texas. Preliminary work, gathering of source materials, and sound design were completed from Fall 2001 through October 2002 both at home and in the CEMI studios.

The majority of the tape part for the piece was assembled using ProTools[1] with occasional use of Nuendo[2] for the creation of multi-voice chords and other multi-track sounds. The sounds that were processed to make the tape part of the piece were recorded electric guitar sounds, sine tones, noise, and sampled bass drum sounds. Generation of sine tones and noise phrases was done using Max/MSP[3] and Csound.[4] The sounds used in the piece were processed using Sound Hack,[5] Peak LE,[6] GRM Tools,[7] Csound, Audioscuplt,[8] and various VST Plugins in ProTools and Nuendo. Sound editing was done using Peak LE.

TELE was written as an homage to the late, great, Telecaster[9] player Danny Gatton, who committed suicide in 1994. Though written as a tribute to Gatton, the pieceês material is generated from many Telecaster styles, both old and new, and represents techniques that Gatton used but did not originate. These techniques include

---

[1] www.digidesign.com
[2] www.steinberg.net
[3] www.cycling74.com
[4] www.csounds.com
[5] www.soundhack.com
[6] www.bias-inc.com
[7] www.steinberg.net
[8] www.ircam.fr
[9] www.fender.com

double and triple stops, open-string rolls, hammer on/rocking techniques, forward rolls, and pedal steel effects. These techniques can only be found in the form in which they appear in the piece in American country, rockabilly, and bluegrass music. These techniques are highly specialized and require years of study and practice to achieve mastery. This level of technical sophistication is in stark contrast with the usual rhythmic and harmonic simplicity of bluegrass and country music, but if one considers the extremely fast tempi of the music and the limitations of traditional techniques,[10] it comes as no surprise that these techniques would be cultivated to meet the demands of the music. In order to discuss these techniques fully, it is imperative to trace their origin and their major contributors and innovators.

[10] With some tempi approaching the 280 bpm mark, it was necessary for the player to use one or more fingers in addition to the standard flatpick in order to achieve certain effects that would be impossible with the pick alone.

CHAPTER II

BLUEGRASS AND THE BIRTH OF CHICKEN PICKING

During the early part of the twentieth century, the American South's music scene played host to large numbers of traveling acts. These acts took the form of large, big band ensembles such as Bob Wills and his Texas Playboys or more intimate groups such as the Hank Williams Sr. Band. In either case, southern blues, gospel, and folk music found its way into the popular country music of the time. On July 6th, 1954 Scotty Moore, Bill Black, and Elvis Presley recorded *That's Alright Mama* with a then obscure B-side of the now classic *Blue Moon of Kentucky*[11] by Bill Monroe. The success of Elvis's version brought national attention to Monroe who was at that time relatively unknown outside the American South. This new attention sparked the curiosity of music fans, and the bluegrass phenomenon began.

Though regarded as the 'Father of Bluegrass Music', Monroe was neither the originator nor the sole innovator in the genre. Bluegrass music is rooted in the American 'fiddle' tunes of the south which Monroe learned from his Uncle Pen.[12] Thus Monroe's distinction as the 'Father' of the genre is due to his popularization of the term 'bluegrass' as well as his unprecedented success. Other innovators include Lester Flatt, the Carter Family, and Earl Scruggs whose virtuosic picking style revolutionized the five string banjo and inspired generations of players, most notably the jazz fusion giant Bela Fleck.[13]

---

[11] Rual Yarbrough. Personal interview. April 21st, 2003. Rual Yarbrough was a longtime musician in Monroe's band. Rual recounted that when Monroe was asked by Presley for permission to record *Blue Moon of Kentucky,* Monroe, in his deluded but always confident manner, replied "I'll do anything I can to help the boy out."

[12] Yarbrough, Rual. This is apparent in Monroe's song *Uncle Pen* as well as his frequent recording of traditional fiddle tunes.

[13] Yarbrough, Rual.

giant Bela Fleck.[13] This virtuosity, coupled with unheard of commercial success, broke down the social barriers that had until then made Bluegrass music a regional commodity and also helped to legitimize the genre.

During this time of musical innovation, progress was also being made in the realm of commercial instrument building. In 1950 Leo Fender applied for a patent for the Fender electric Spanish guitar[14] which was probably inspired by the guitar built in 1947 by Paul Bigsby for Merle Travis.[15] The Fender Esquire appeared in 1950, followed by the Broadcaster which, due to a copyright dispute with Gretsch instruments,[16] would ultimately become the Telecaster.[17]

The Telecaster's success was immediate and the instrument soon found a lasting home in Country and Western music. The Telecaster's success in this genre was due in great part to its solid-body construction which allowed the instrument to be heavily amplified without feedback. This appealed to the country musicians of the time who had up until this point been limited to the acoustic instruments and hollow-body electric instruments of the previous decades. The creation of the solid-body Telecaster, as well as advances in amplification, allowed the country guitarist an unparalleled range of dynamics and expressivity. This new expressivity caused a shift in the guitar's function within the traditional country music ensemble, and soon electric guitar virtuosos would begin to fill the melodic roles previously occupied by the violin, mandolin, and lap steel guitars.

---

[13] Yarbrough, Rual.
[14] A.R. Duchossoir. *The Fender Telecaster: The Detailed Story of Americaês Senior Solid Body Electric Guitar*. (Milwaukee, Wisconsin: Hal Leonard, 1991), pg. 8.
[15] Merle Travis was one of the most influential guitarists of the past century. His style influenced countless numbers of players including Chet Atkins, Doc Watson, and Danny Gatton.
[16] This copyright infringement resulted in the now priceless Fender Nocaster.
[17] Duchossoir, pg. 12.

The first Telecaster virtuoso was the relatively obscure solo artist Jimmy Bryant, but players such as Don Rich,[18] James Burton,[19] Roy Buchanan,[20] and Danny Gatton[21] would in the next fifty years create a technique and style of playing that drew from the bluegrass, five-string banjo paradigm while utilizing the distinctive timbre of the instrument. Named for its resemblance to the clucking of a chicken, 'chicken pickin' would become one of the most complicated and refined styles in the canon of the modern electric guitar.

[18] Guitarist for Buck Owens
[19] Guitarist for Ricky Nelson, Elvis Presley, and Emmylou Harris
[20] Guitarist for Emmylou Harris
[21] Solo artist. Guitarist for Chris Isaac and Roger Miller

CHAPTER III

PERFORMANCE PRACTICE OVERVIEW

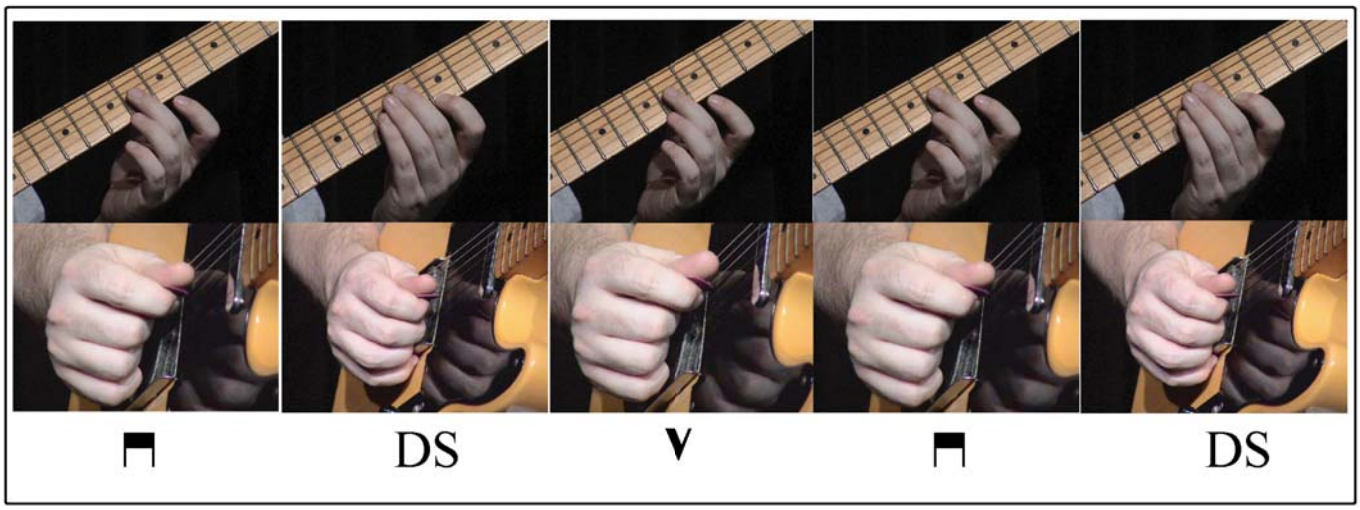
The following performance techniques represent some of the most common techniques used in the chicken picking genre. Since each technique lends itself to infinite variation, a complete list of techniques is not given for practical purposes. It should also be noted that these techniques can be used in any imaginable combination (for example, the advanced open string roll shown on page 10 is simply the combination of the open string roll on page 9 with the forward roll on page 8). Examples show photographs of fingerings with techniques below each fingering, the traditional phrase that accompanies each photograph set, and the example of the technique as used in *TELE*.

The legend for these performance examples is given below. As a codified technical approach to these techniques does not exist, the term double stop in the legend is used to denote any note or notes to be played with the middle or ring finger of the right hand. This allows students to find the combination that feels most natural to them.

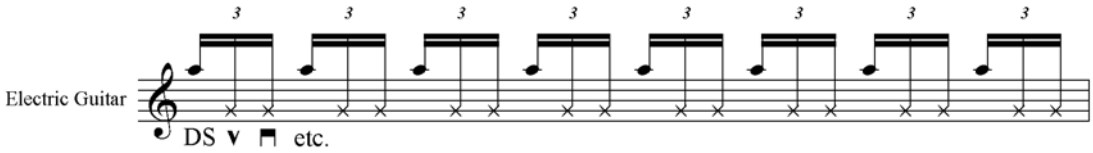
LEGEND

Slide....|	=	slide pitch with single attack
H On....|	=	hammer on (single attack on first note, then press down, hammer on, the next note without an attack)
⊓	=	downstroke with pick
∨	=	upstroke with pick
DS	=	pitch to be played by the right hand with the middle finger, ring finger, or both

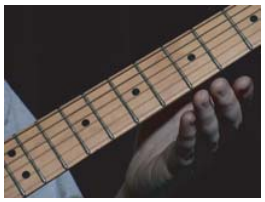
BASIC CHICKEN PICKING TECHNIQUE

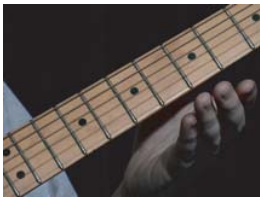


This is the basic chicken picking lick. Though it was not used in this form in TELE, it is necessary to master this technique in order to move to the more advanced licks that follow. The accent lies on the plucked notes with the muted notes acting as percussive, background hits. The passage can be played in any rhythmic pattern (sixteenth notes, eighth-note triplets, etc.), and can be started anywhere in the pattern. Therefore, the accent may lie on any part of the beat.



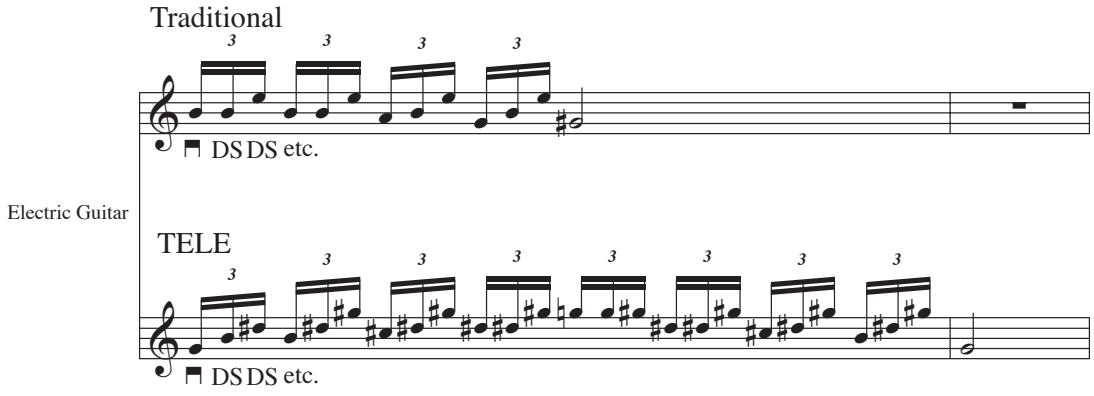
FORWARD ROLL



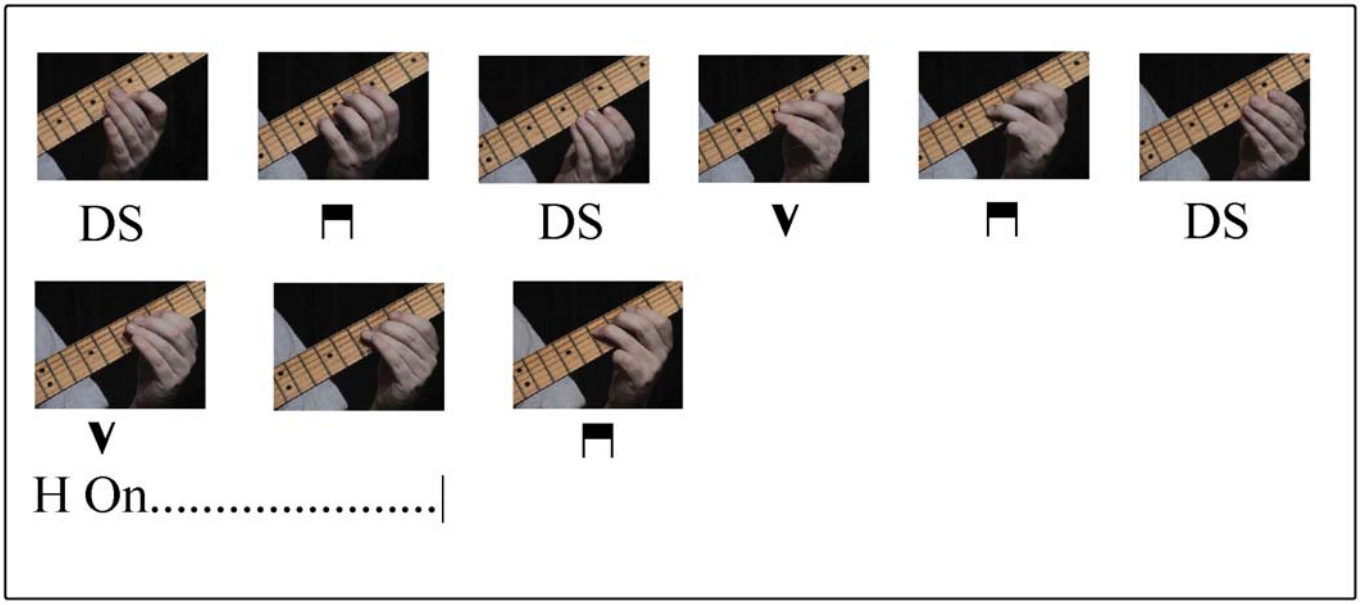


⬒ DS DS

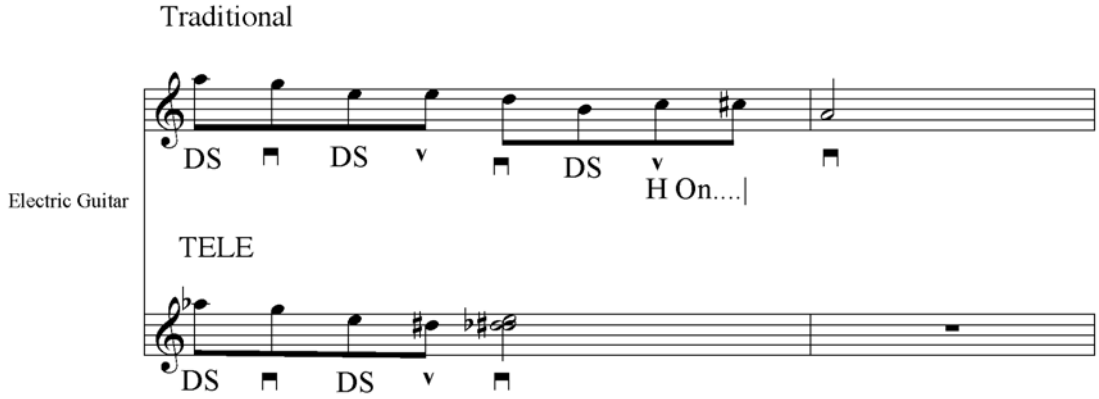
This roll is used by banjo players in numerous contexts, and is one of the basic patterns of "Scruggs style" playing. This pattern is used to produce cascading lines with the melody occurring on the downstroke or can be used to create fast, triplet arpeggios. A hammer on is often added to the first downstroke note to create banjo-like passages.



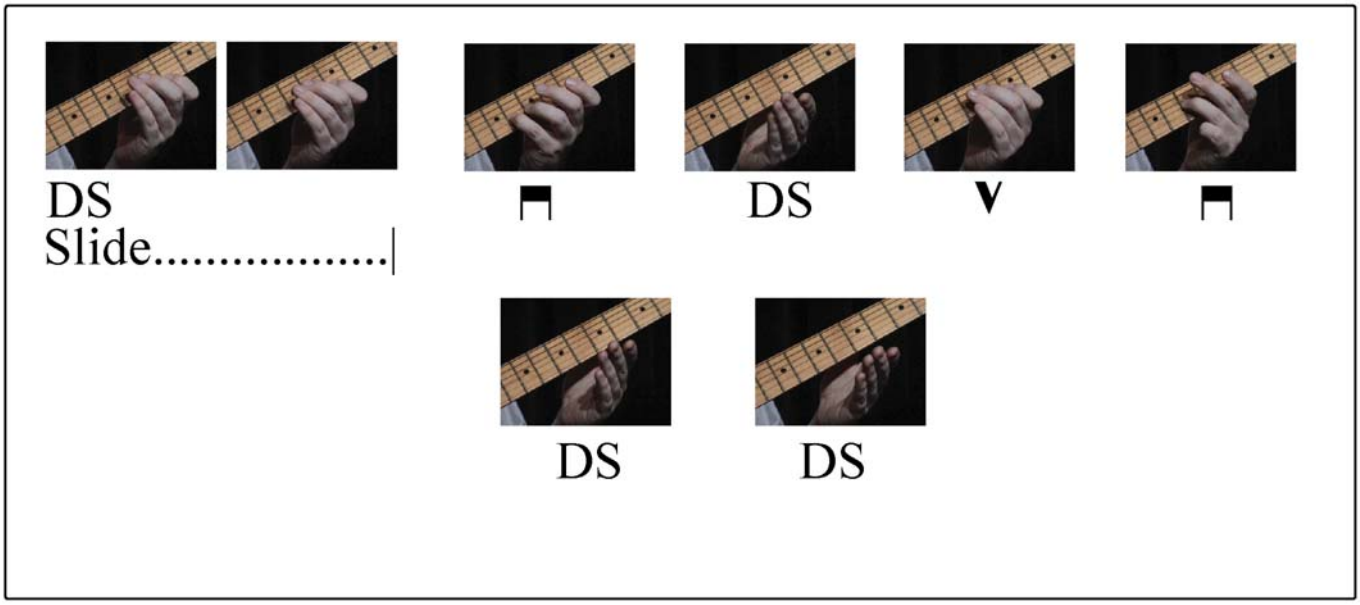
OPEN STRING ROLL



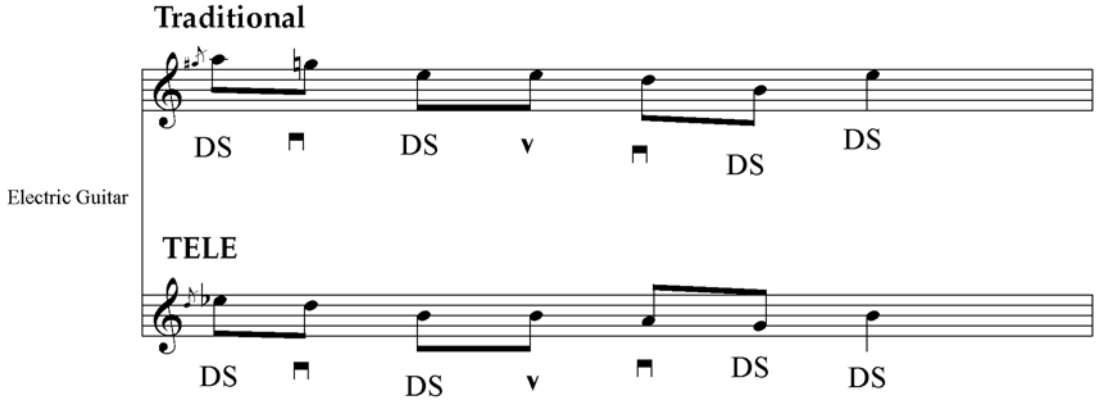
This pattern is usually used to conclude a melodic passage and most resembles the techniques used in banjo performance. It has a definite conclusion and is usually not repeated for both technical and melodic reasons. The version of the pattern used in TELE was shortened for melodic reasons.



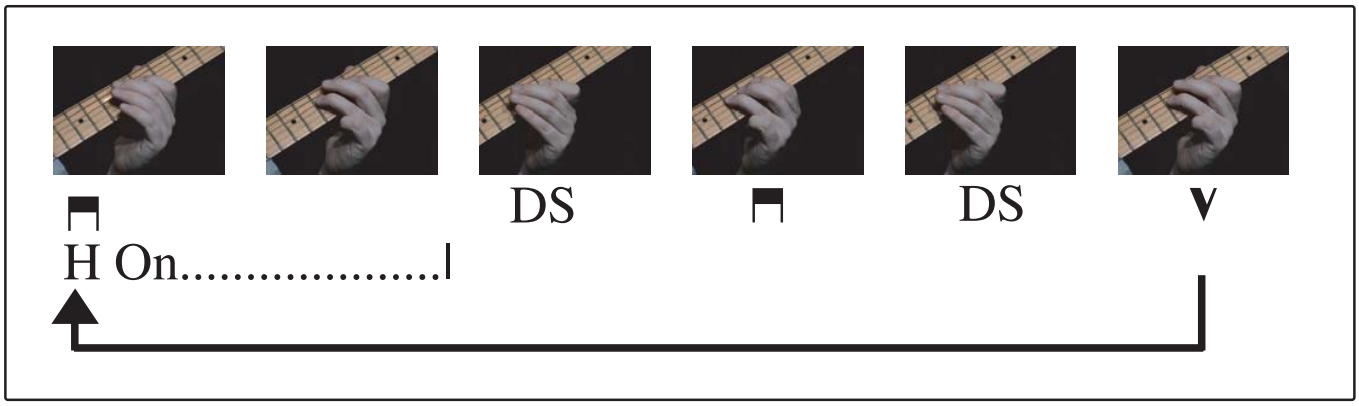
ADVANCED OPEN STRING ROLL



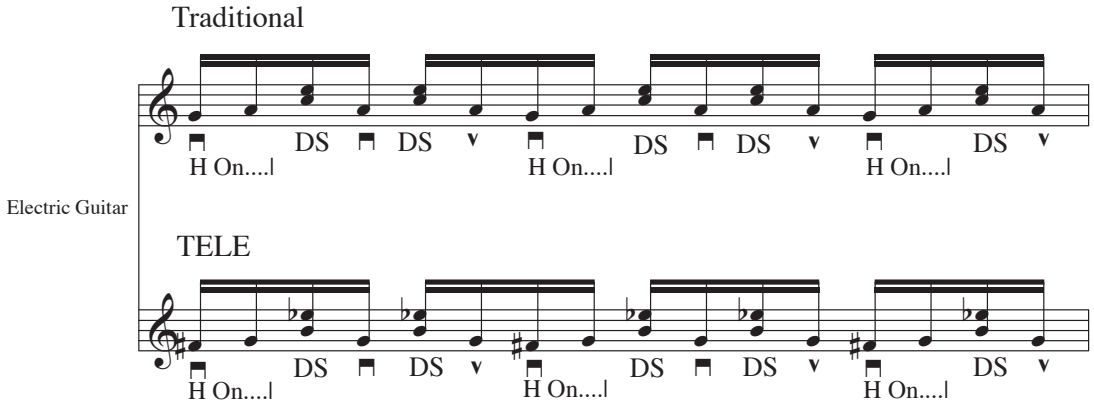
This lick is considered advanced due to its use of both the standard open string lick and the forward roll. It can be played very quickly in repetition giving the player the option of an extended, virtuosic passage.



HAMMER ON/ROCKING TECHNIQUE



This pattern is used to produce fast, virtuosic chord patterns that can be repeated indefinitely. As a result, the accent lies on the double stopped chords. It requires an extra upstroke at the end of the passage in order to guarantee consistent repetition.

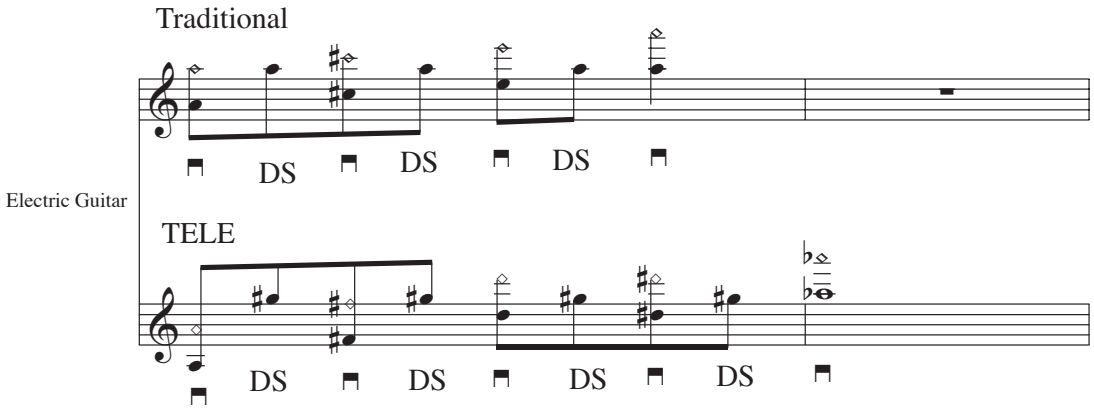


PICK/FINGER HARMONICS




DS

This pattern is used to create cascading, bell-like passages as well as melodic, chord passages. The technique uses the index finger of the right hand to stop the string at the octave, or any other resonant part of the string, while picking the stopped string and also uses the ring finger of the right hand to play natural notes. This is done in an alternating pattern, but, in the case of the chord passages, they may be done together. This pattern requires that the pick be placed between the thumb and middle finger so a few seconds are required to make the transition. This technique is not used exclusively in chicken picking- guitarists such as Chet Atkins and Lenny Breau have used them on numerous recordings- but it is used by Telecaster players to create pedal steel effects. Pedal steel effects can also be attained by striking a note and using the volume pot to crescendo to the desired volume, but these effects, though useful, do not retain the shimmering quality achieved by both the pick and the fingers.



CHAPTER IV

THE ELECTRO-ACOUSTIC APPROACH

As was stated earlier, *TELE* was composed using recorded guitar sounds, sine tones, noise, and sampled bass drums. Though these are common elements in many electro-acoustic pieces, their manipulation and usage in this work is both conventional and unique in *TELE*. In order to express the varied approaches used in *TELE*, it will be necessary to refer to sonogram analyses of the resultant material, general approaches to the manipulation of the material, and musical examples. These materials can be broken into five categories:

1. 'Behind the nut' chords
2. Slightly processed chords
3. Constructed chords
4. Sine tone usage
5. Noise usage

BEHIND THE NUT CHORDS

Initial recording of the 'behind the nut' chords was done using a Fender Telecaster and a Line 6 POD[22] amplifier simulator. These recordings were made by strumming behind the nut of the instrument, the space near the tuning pegs, and were recorded without any processing besides the slight color added by the amplifier

[22] www.line6.com

simulator. The recording was then subjected to numerous processes, among which were multi-tracking the recording to fuse various levels of the pure recording into the manipulated audio, pitch shifting the audio, and time stretching the audio. All pitch shifts were used to lower the pitch of the original material. This was due to the extreme high end that is present in the source material. Transpositions followed no prescribed order and were done to achieve various timbral mutations. Due to the large amounts of processing that each chord underwent, pitch material contained in each chord is often impossible to represent fully. Hence, the 'behind the nut' chord that occurs at 1'08" of the piece is reduced to Bb4 which is the most discernible pitch of the chord. The sonogram analysis of this pitch is given in **Figure 1**; in this and all subsequent sonogram analyses, time is given in seconds on the bottom of the sonogram while frequency is given on the right. Frequency is scaled between 0Hz and 22,000 Hz.

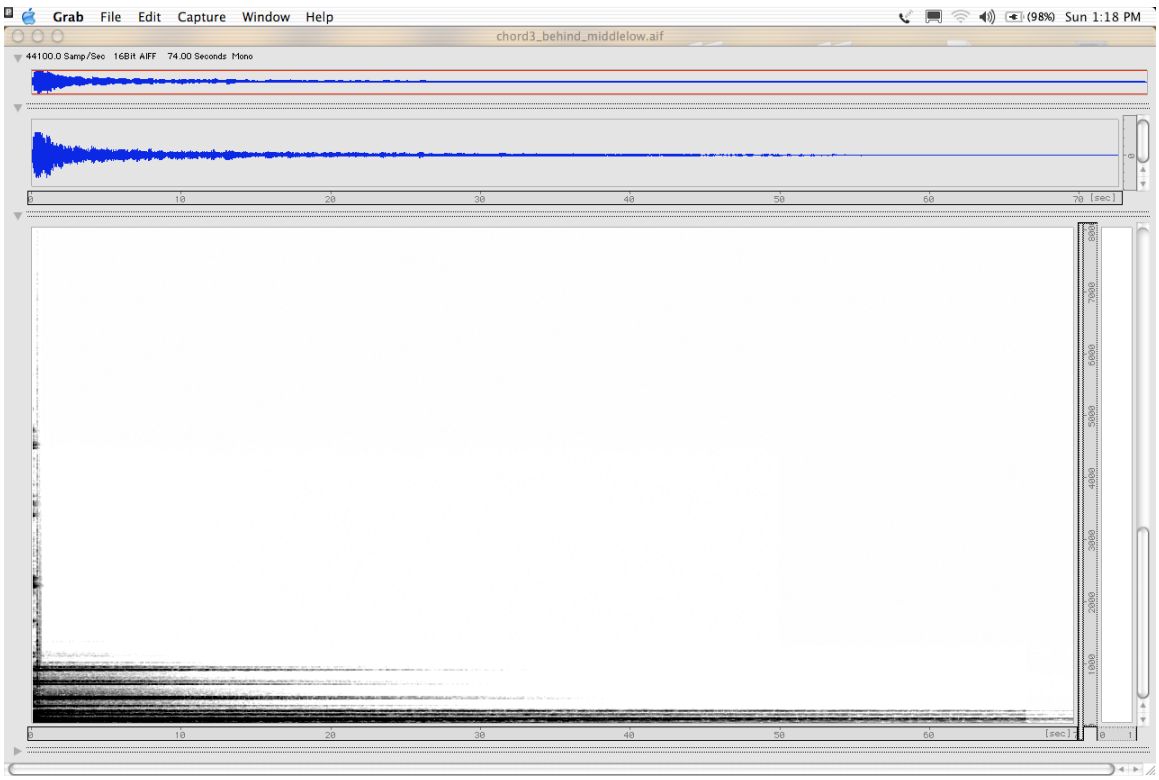


Figure 1 'Behind the nut' chord occurring at 1'08"

The ‘behind the nut’ chord that occurs at 0’09” is a combination of the source material and the chord shown in **Figure 1**. The Bb in **Fig. 1** is also present in this chord, but due to its placement in the piece and the complexity of the other material present in the tape part, the note is omitted from the score.

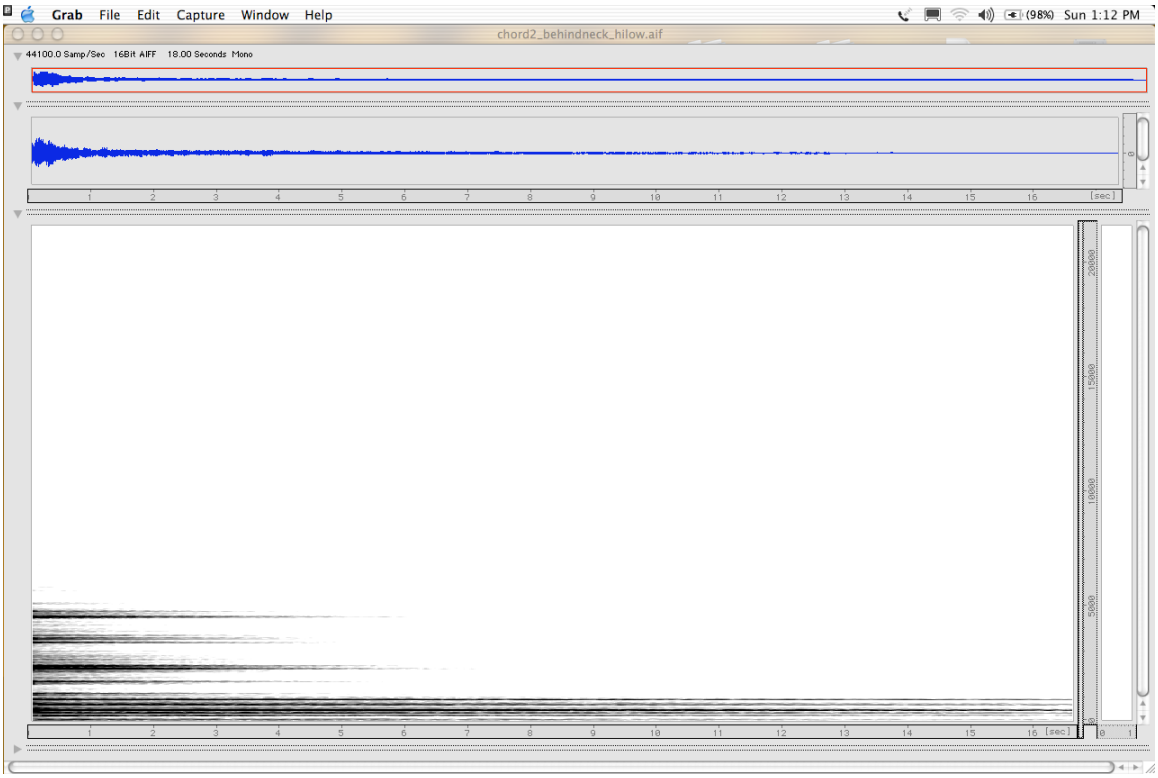


Figure 2 ‘Behind the nut’ chord occurring at 0’09”

The last ‘behind the nut’ chord occurs after the cadenza of the piece. Before the chord occurs, the guitarist plays four individual notes behind the nut of the instrument followed by a rolled chord behind the nut. The ‘behind the nut’ chord in the tape part at this point is the most similar to the original source material, with only the addition of a heavy reverb meant to lengthen the sound without obfuscating it. This is used to connect the guitarist with the tape in the most sonically obvious way.

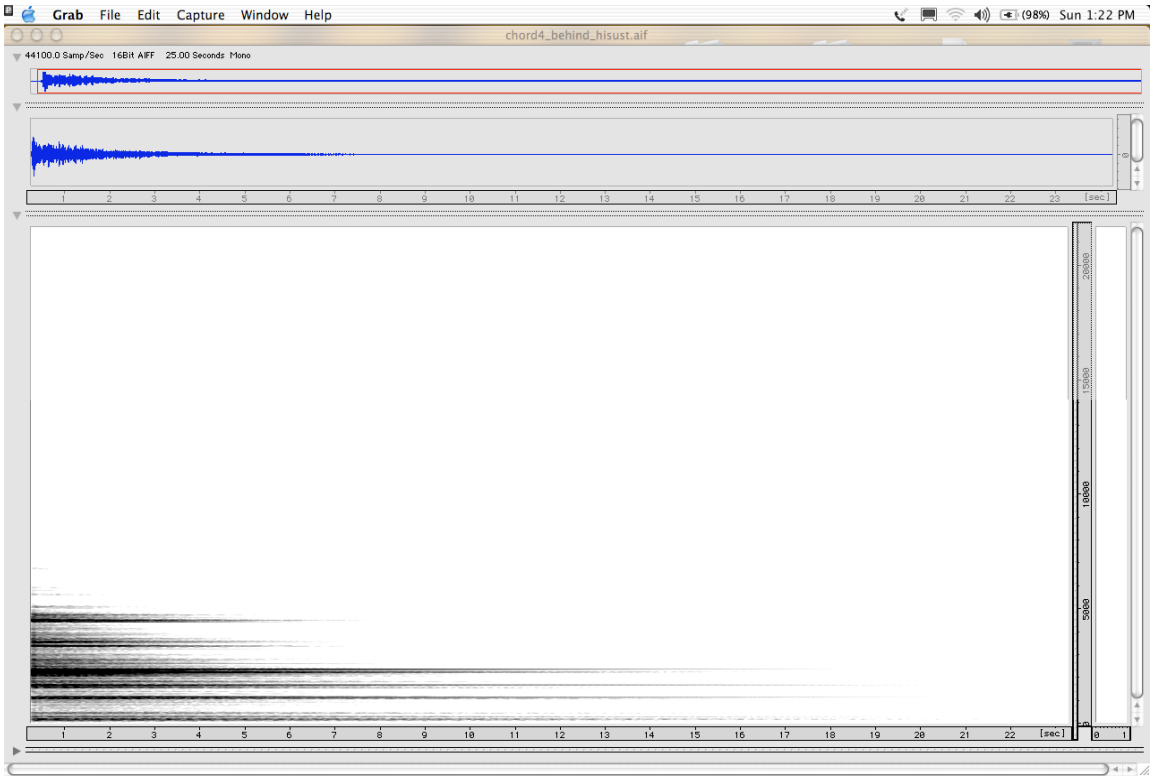


Figure 3 'Behind the nut chord' occurring after the cadenza

SLIGHTLY PROCESSED CHORDS

The chords used for the slide guitar section of *TELE* were recorded at CEMI using the POD amplifier modeler and ProTools. These chords are simply augmented triads that overlap at a random but seemingly familiar pattern. They act as a background for the slide guitar part improvised by the guitarist. The improvisational material is meant to cloud the blatant tonal implications of the chord ostinato while ultimately resolving this conflict in order to set up the resolution of the cadenza. The chords appear first in arpeggio form during the volume pot[23]/pedal steel effect section of the opening (0'22"

[23] The volume pot is the knob that controls the volume of the electric guitar.

through 0’40”). They are processed using a slight delay and a long reverb with the wet/dry mix at 75% dry.

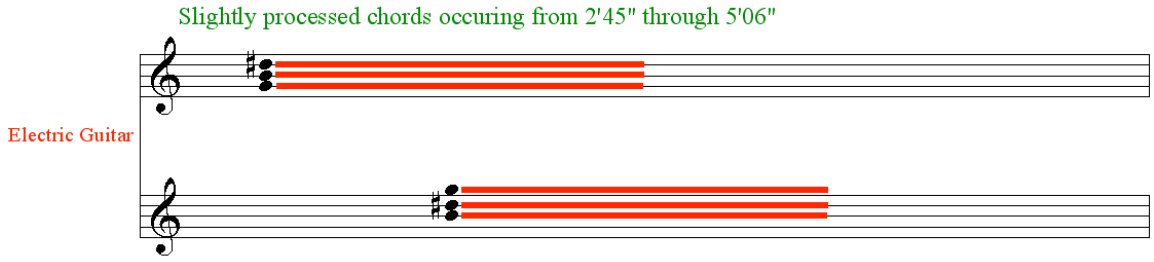


Figure 4 Slide guitar section chords

CONSTRUCTED CHORDS

The third type of material used in *TELE* is constructed chords. These were constructed by recording each note of the chord separately using the POD. Each note was recorded several times with distinct timbres, attacks, register, and vibrato. The initial recordings focused around altered F dominant chords that resembled the voicings found in modern jazz. However, with the wide range of timbres and voicings between each note of the chord, they created voicings that were both registrally and timbrally impossible. After the voicings were recorded and constructed, different processes were used to accentuate the discrepancies contained in the chords. These processes included varying granulation, reverb, delay, slight pitch shifting, resonant filters, and pitch accumulation. This yielded very distinct chords that were harmonically rich and easily recognizable. More than a dozen of these chords were created, but due to their overwhelming diversity, only one was used in the piece. This was a compositional decision that added more focus to the piece and attached a greater significance to the

chord. The chord's appearance at the beginning of the piece and before the cadenza help to unify the piece by giving the listener a recognizable sound as well as a sense of the underlying form of the piece. The following examples show the perceived pitches and the sonogram analysis of the chord.[24]

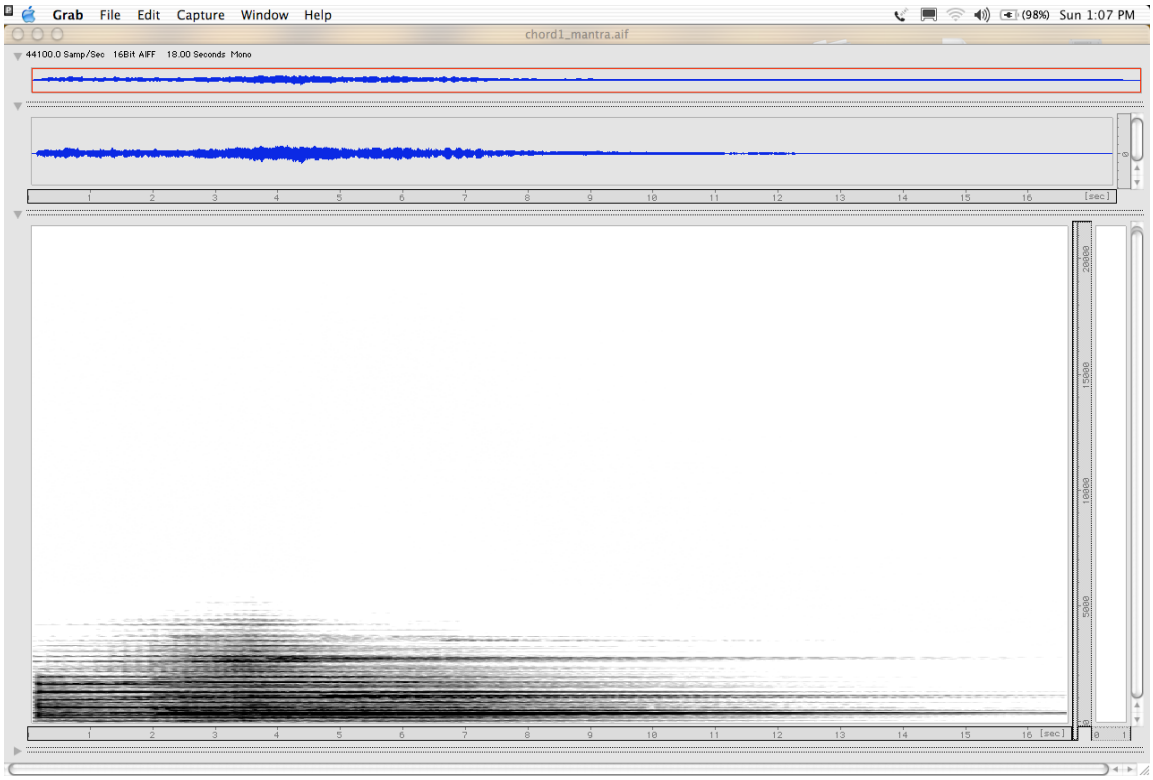


Figure 5 sonogram of constructed chord

[24] Like the rest of the constructed chords, this chord contains an F root, but due to the processing only the A and the E of the Fmaj7 chord are perceivable as static pitches.

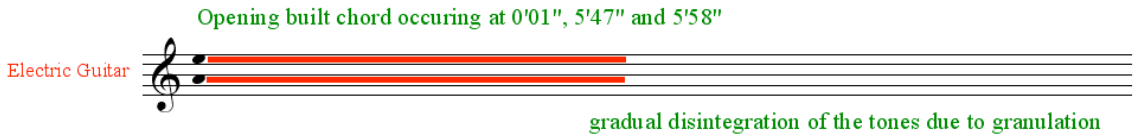


Figure 6 perceived pitches of constructed chord

SINE TONE USAGE

The enveloped sine tones used in *TELE* were created using MAX/MSP. They were used primarily to enhance sampled bass drum hits. This technique is common in rap albums, but is a simple way to enhance the presence of the bass tones in general. The sine tones in *TELE* were tuned to approximately 40-60Hz, recorded and imported in the ProTools session where they were placed to enhance the bass drum. These tones were generally single events, but a fast eighth-note sine tone pattern was added to section B of *TELE* in order to increase the intensity of the section and to give rhythmic continuity to what is a rather amorphous section. **Figure 7** shows the patch used to create these phrases.

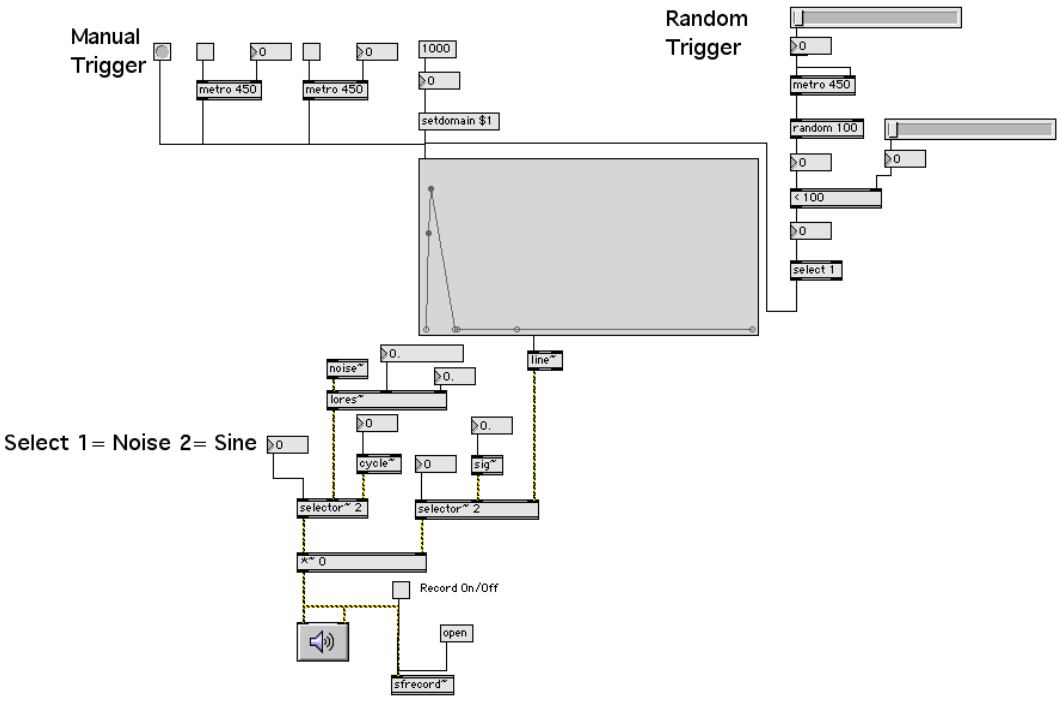


Figure 7 Patch used to create sine tones and noise phrases

NOISE USAGE

Noise was an extremely important part in the making of *TELE*. The patch shown in **Figure 7** was also used to create the numerous noise phrases that occur in the piece. Though there are many examples of filtered and enveloped noise throughout *TELE*, I will only discuss the most salient examples.

The first example occurs at 1'26" of the piece. During this section, short bursts of noise were generated randomly with a diffuse envelope. These phrases were then spread throughout the eight-channel environment in a pointillistic manner. As the dynamic and rhythmic intensity of the phrases increased, a steady noise crescendo was added to the section in order to shape the trajectory of the phrases toward a climax.

The second example of noise usage occurs at 5'42." This is the climax of the slide guitar section of the piece. MAX/MSP was used to create the snare drum rolls that occur at the climax by using low pass filtered noise, a sharp ADSR envelope, and the metro object. After the passage was recorded, multiple copies of the file were made and subjected to various processes. The files were manipulated using additional low pass filtering, transposition, and reverb. The resultant sounds were then placed together in ProTools slightly out of phase with each other. The intended effect was to create the impression of a battery of drummers playing single stroke rolls on enormous snare drums. The actual sound produced, due to the resonance of the filtering and the reverb, was more akin to a snare drum/timpani hybrid: the fast attacks emphasize the snare properties of the sounds while the conclusion of the phrase, the release, accentuates the timpani properties of the sounds.

The last use of noise in *TELE* was done using the convolution of an improvised guitar passage with pure white noise. The phrase beginning at 0'50" initially consisted of the improvised guitar phrase alone. However, this did not meet the climactic expectations of the chord occurring at 1'08." As a result, a convolution of the guitar phrase with white noise was done using SoundHack and placed in the track so that the climax of the phrase coincided with the introduction of the chord directly before section B. This gave the guitar/noise phrase a feeling of movement toward the chord and allowed the live guitar part the freedom to enhance the crescendo. Stated alternately, the climax of the phrase could occur without relying solely on the intensity of the live guitar passage.

EIGHT-CHANNEL TECHNIQUES

The eight-channel approach used in *TELE* did not follow an over-arching, diffusion schema. As a result, the use of the octaphonic system was done intuitively out of musical necessity in order to create similarity of diffusion between specific moments and to ensure diversity among phrases. In other words, certain diffusion patterns were constructed to allow the listener to make connections between like phrases while others were created to build intensity or create variation.

The first moment to be discussed occurs at 0'22." The intended effect of this moment was to create a crescendo in speakers 1 and 2 while speakers 7 and 8 were performing the same crescendo. At the peak of the crescendo, an abrupt hit in speakers 1 and 2 would result in a bell tone in speakers 7 and 8. Highly active material was also used in speakers 3, 4, 5, and 6 to add variety to the static crescendo occurring in the remaining speakers and to obfuscate the initial trajectory of the phrase. A diagram of this section is given below. Though the moments occur simultaneously, there are two diagrams shown in order to reduce confusion.

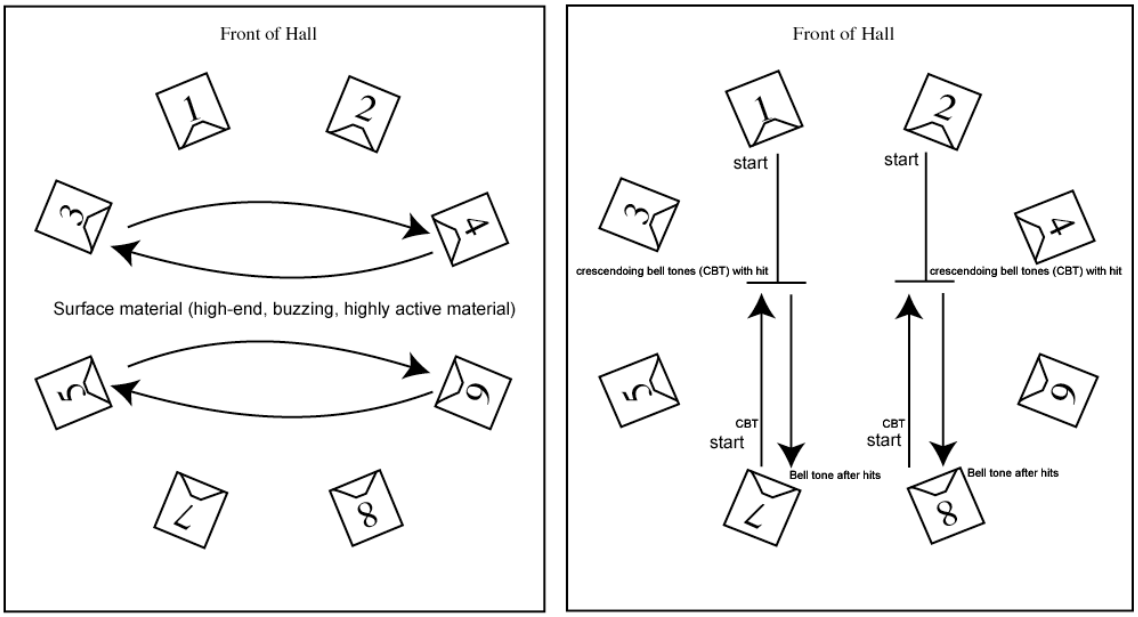


Figure 8 panning trajectory for the phrase occuring at 0'22"

The next moment to be discussed occurs in section B. During this section, prerecorded guitar phrases are introduced in various speakers while the guitarist plays both in unison and in response to the prerecorded material. This was done in order to give spatial variety to the relatively static phrases. During phrases seven and eight of the prerecorded material, the guitarist improvises a highly active, septuplet figure in contrast with the looping, sixteenth-note patterns of the prerecorded material. The material is broken up into phrases in the following diagram and is shown beneath each speaker.

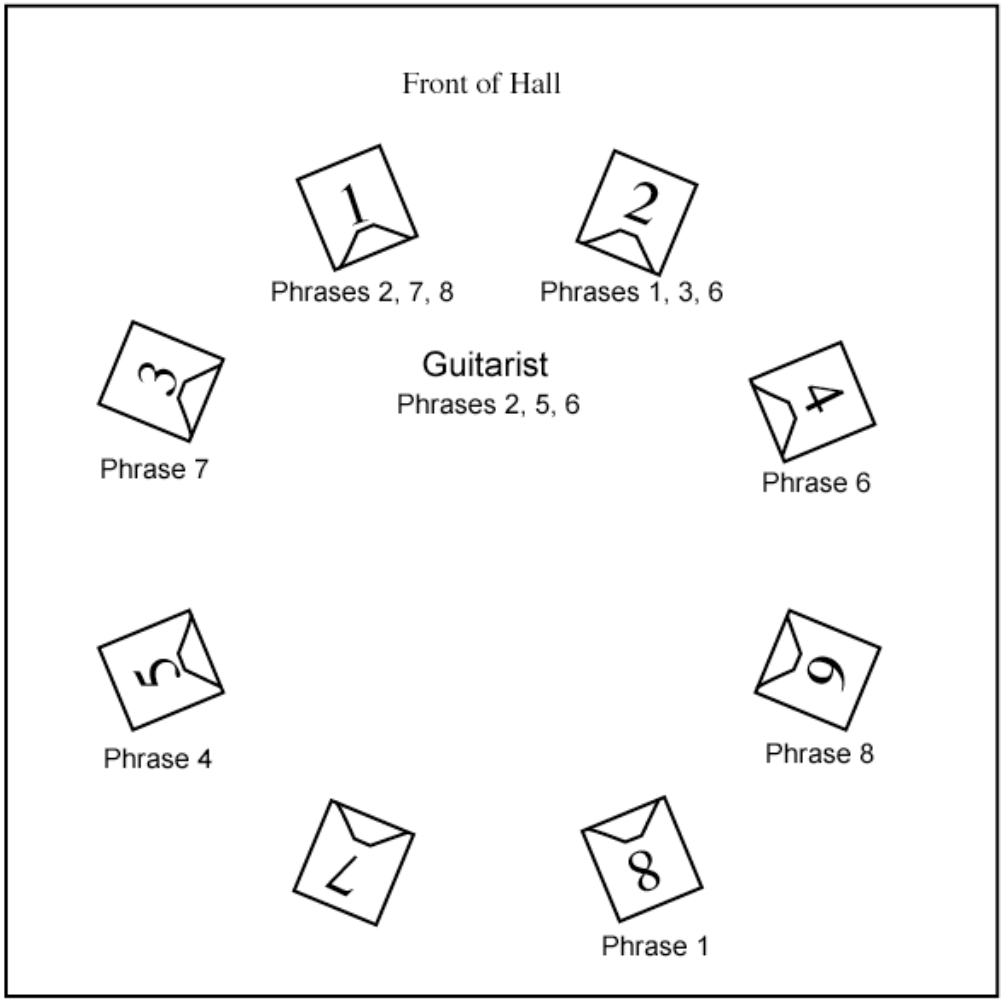


Figure 9 panning for phrases in section B

The last moments to be discussed occur from 5'11.5"—5'42." In order to construct this section, the hits that occur in the first eight-channel example were extracted and placed in all eight channels of the tape. They were placed in a loop that was shifted from 10-100ms in each track in order to create a very fast, rhythmic grid in all eight channels. This pattern was then altered by subtracting hits from each channel in order to build the intensity of the rhythm over time. This process is shown in the following example.

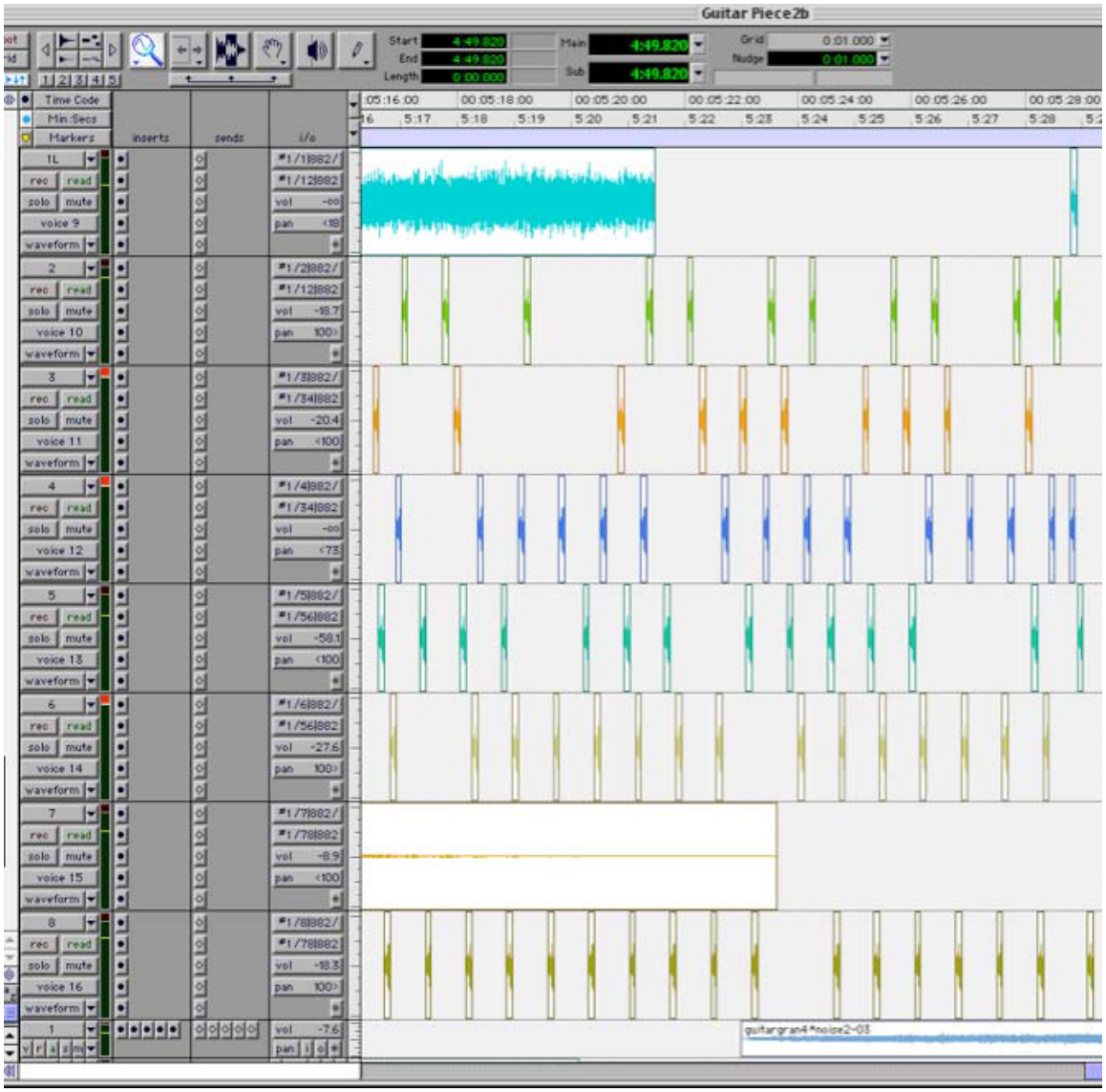
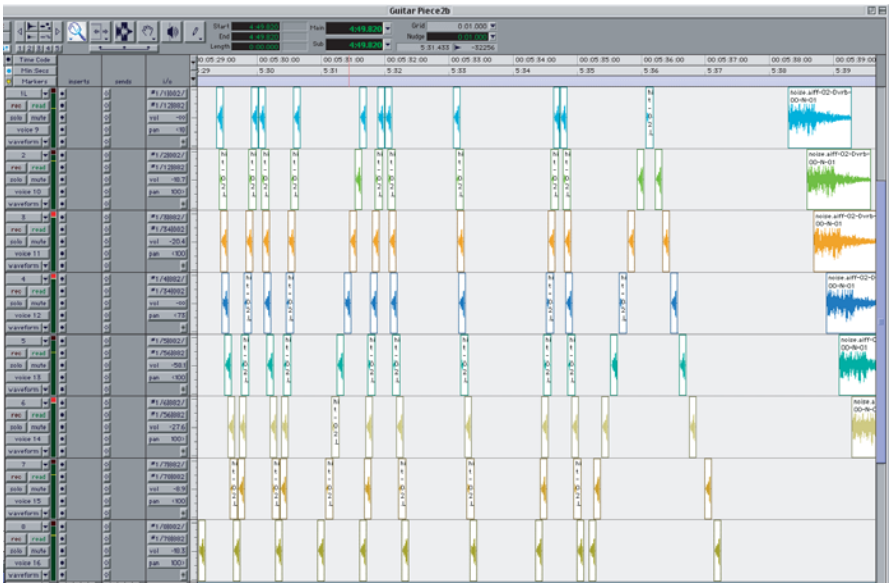


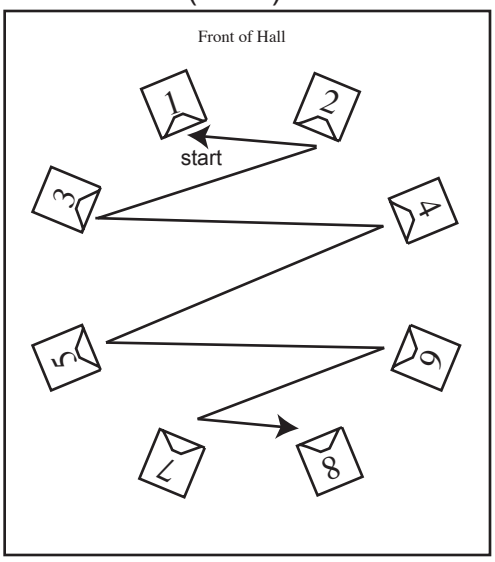
Figure 10 panning for subtractive hits

The climax of the subtractive rhythmic phrases occurs at 5'29". At this point, the quasi-random patterns previously used give way to more unequivocal, zigzag patterns moving through the eight-channel space. All of the patterns are similar in their trajectory, but each one is subjected to subtle changes in length and spatialization. The following chart gives the track information, spatialization, and length for each phrase.

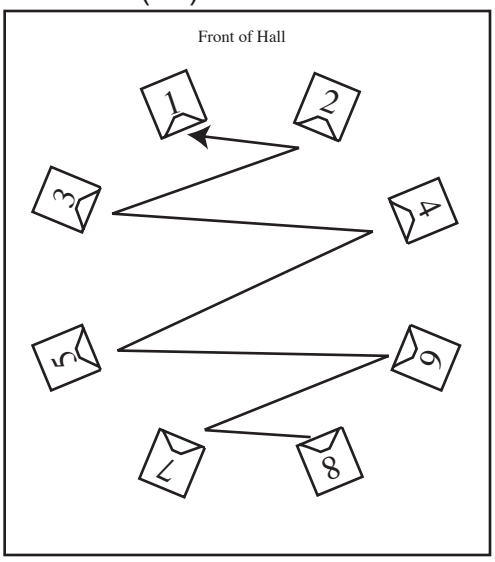
Panning phrases occuring from 5'29.36" through 5'37.24



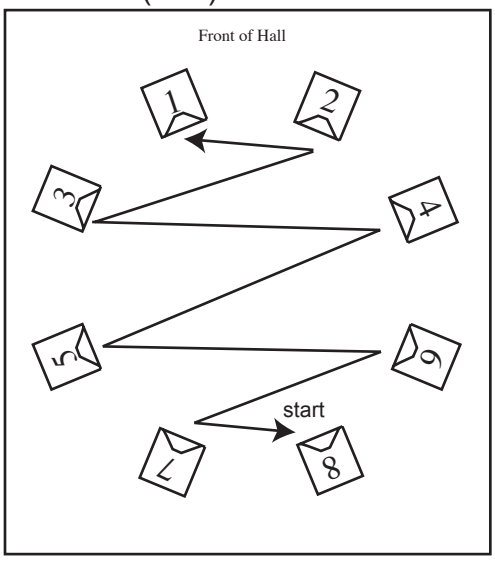
Phrase 1 x2 (1.32")



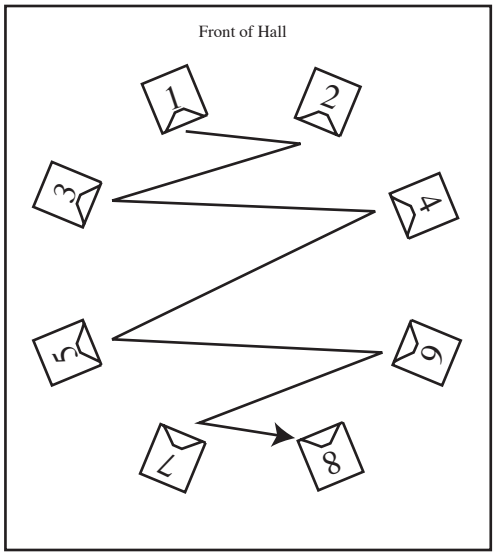
Phrase 2 (.7")



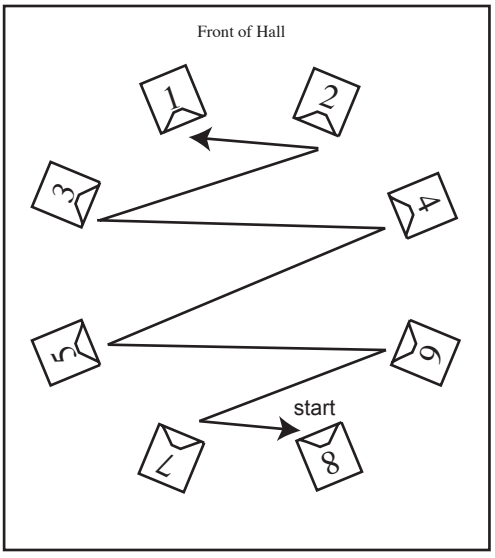
Phrase 3 (.78")



Phrase 4 (.37")



Phrase 5 (.76")



Phrase 6 (2.06")

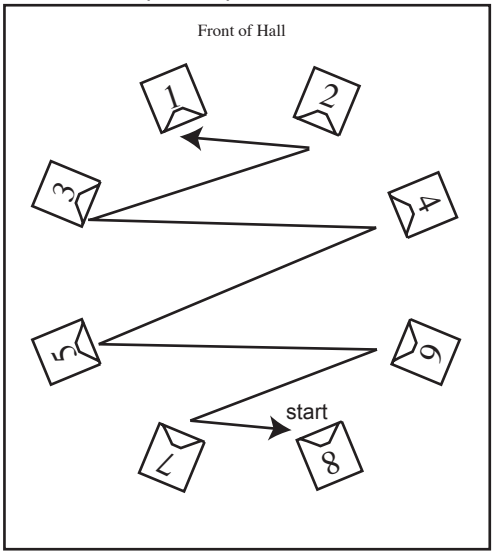


Figure 11 times and trajectories for the climax of the subtractive rhythm section

In summary, the electro-acoustic and spatialization techniques incorporated in *TELE* were created using a variety of approaches from sophisticated precompositional techniques to intuitive (though educated) plundering. Although common techniques were implemented, some of these were done in unique ways that are not often seen in the canon of contemporary, electro-acoustic music. For example, the use of constructed chords implements the common practice of multi-tracking but uses this technique to create a recognizable guitar sonority rather than an unrecognizable timbre. Also, the use of sine tones and noise, though common in less recent compositions, are used both to strengthen phrases as well as to stand alone as gestures in themselves. This is done to show the expressivity of the basest materials while contrasting the more modern electro-acoustic techniques and timbres. As a result, the approach used in *TELE* implements some of the most recent developments in electro-acoustic music while paying tribute to the techniques used by the originators of the genre.

CHAPTER V

COMPOSITIONAL CONSIDERATIONS

SERIAL VERSUS TIMBRAL MODELS

In order to discuss the compositional procedures that were considered in *TELE*, it is necessary to examine two highly varying approaches to the creation and performance of electro-acoustic music. These approaches are the serialist approach exhibited in the works of Mario Davidovsky and the acousmatic approach used in the works of Jean-Claude Risset. It is true that neither approach lies solely on either side of the spectrum, but for the sake of discussion this division is necessary and will allow the reader to understand the differences as well as the similarities between these approaches.

When considering the methods that a composer uses to create a piece, we often find that the intention of the composer and the reality of the resultant work create a complex network of connections and disassociations. In other words, the intention of the composer is often at odds with the piece produced. Having said this, however, we may still make causal and consequential relationships between the composer's intention and the music created. Stated alternately, we may make generalizations based on the intention of the composer. The following discussion of Mario Davidovsky's music will make use of the previously established paradigm: connections may be made between the composer's intentions and the extant music even if some of these connections appear to be at odds with the over-arching structure and material of the piece.

Mario Davidovsky's approach to electro-acoustic music relies as heavily on the use of incongruous juxtapositions of tape and live instrument as it does on the connections of these materials. The inevitability of this dichotomy becomes apparent when we examine Davidovsky's interest in the idiosyncrasies of the electronic medium. In an interview in *The Art of Electronic Music*, Davidovsky states that

> The aspects of electronic music that are idiosyncratic to the medium are of interest to me: the very precise ways that dynamic can be controlled, the articulation of notes with very rapidly varying levels, the production of short sounds in rapid succession, the designing of envelopes, and so on. In fact, the shaping of envelopes is equivalent to performance for me. It is the most important aspect of my composition, enabling me to make phrases that are vital, alive, and elegant. I am also interested in the timbral aspects of electronic music, but only to make long sounds interesting.[25]

Davidovsky later states that he generally uses the "tape medium to build filigree-like textures of short, carefully shaped sounds".[26] These uses of 'filigree-like' material as well as the careful shaping of envelopes are the key components in understanding Davidovsky's approach.

For example, in *Synchronisms 1-6* Davidovsky is concerned with the manipulation of the listener's perception of the differences between the tape and the live instruments. As a result, the pieces are primarily concerned with the creation of pitch similarities between the tape and the instrumentalists with only tangential connections being made between the various timbres. The formal structures created by Davidovsky serve to strengthen the timbral disassociation between the tape and the instruments. Or as stated in *Electronic and Computer Music* by Peter Manning, "the constant changes in format from instrumental sounds alone, to instrumental sounds plus tape, or to tape alone highlight the wide variety of natural and artificial timbres obtainable from these resources

[25] Tom Darter. *The Art of Electronic Music*. ed. Greg Armbruster. (New York: William Morrow, 1984), p. 154.
[26] Darter, p. 154.

through the processes of juxtaposition".[27] To further show Davidovsky's penchant for dichotomy through juxtaposition, the following formal chart of *Synchronisms 1-3* is given.

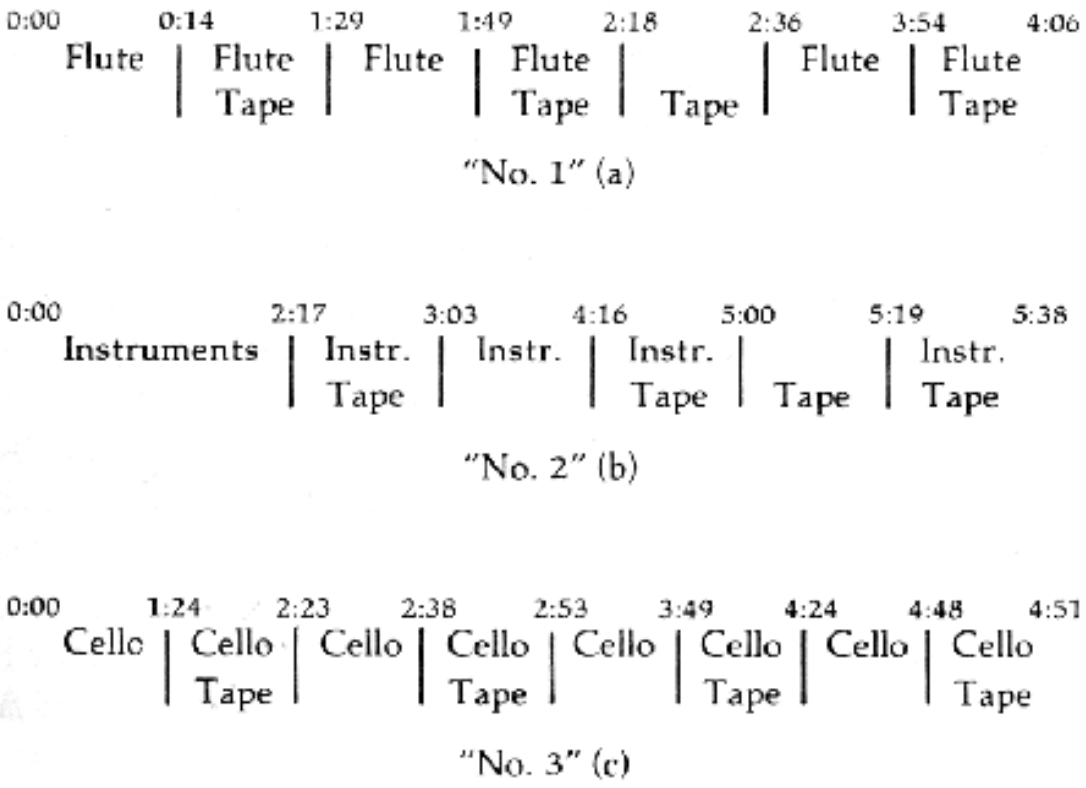


Figure 12 Formal structure of *Synchronisms 1-3*[28]

This use of juxtaposition helps to magnify the division of the instrument and tape. As a result, the listener is fully aware of this division and makes little or no attempt to make timbral associations between the tape and the performer. It is true that some middle ground can be found between the tape and instrument in the *Synchronisms*. This is most

[27] Peter Manning. *Electronic and Computer Music*. 2nd ed., (Oxford: Clarendon Press, 1993), p. 177.
[28] David Ernst. *The Evolution of Electronic Music*. (London: Schirmer Books, 1977), p. 129.

noticeable in *Synchronism 3 for Cello and Tape* where an "abundance of such special effects within the cello part, such as col legno, sul tasto, pizzicato, glissandi, sul ponticello, and harmonics, result in quasi-electronic sonorities, thereby establishing reciprocal timbre structures between the cello and the tape".[29] This connection between the tape and the instrument is increased by the fact that the tape solos found in *Synchronisms 1 and 2* are not present in the piece. However, Davidovsky's use of 'quasi-electronic sonorities' does not occlude the prevalence of pitch relationships between the tape and the cello part. Also, this use of timbre relationships does not mark a shift in Davidovsky's overall approach as can be seen in *Synchronisms 9 and 10* where a return to pitch relationships rather than timbral relationships is apparent. Given that *Synchronisms 9 and 10* were written for tape plus violin and guitar, respectively, the omission of extended techniques in pieces written for instruments that can produce these effects easily is a telltale sign of Davidovsky's preoccupation with pitch. Thus, it may be seen in the majority of Davidovsky's electro-acoustic work that pitch and phrasing rather than timbre is the key element in the reciprocal elements of the tape and instrument parts.[30]

In stark contrast to Davidovsky's approach, the music of Jean-Claude Risset relies almost solely on timbral unification between the tape and the performer. His approach, due to his extensive studies in mathematics and physics, is more concerned with the component elements of individual sounds and their integration with and transformation to and from each other; or as Charles Dodge states in *Computer Music*, "Risset has shown an ability to find sonically interesting textures that can be realized uniquely by digital

[29] Ernst, p. 129.
[30] It is true that *Synchronisms 5-6* implement a more homogenous approach to the instrument and tape parts, but, as was stated earlier, this discussion is not meant to find differences within Davidovsky's complete body of work but rather stylistic inclinations that can be used for contrast.

synthesis. Risset then builds compositions around these techniques in such a way that the compositional structure and sonic surface are inseparably intertwined".[31] Risset's fusion of sound is made possible by studying the spectral components of individual sounds. The use and manipulation of spectral data results in Risset's music having a more organic structural flow than the music of Davidovsky due to the fundamental sonic similarities found in the music.

The use of these spectral techniques can be easily seen in Risset's *Mutations I* in which pitch and timbre have a sonically perceivable relationship. Or as Risset explains,

> In the transformation of chords into inharmonic spectra, the relationship is very close. The timbre of the gong-like clang is a kind of shadow, a prolongation of the harmony of the chord. Although one cannot hear the components of the clang, the relationship of the components to the chord is immediately clear to the ear.[32]

The following diagram helps to elucidate Risset's use of component elements to create a perceivable whole.

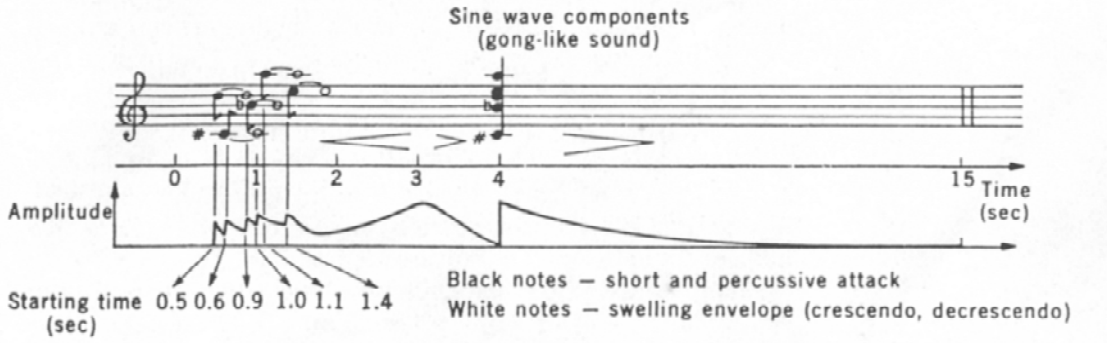


Figure 13 Components and resultant 'clang' from Risset's *Mutations*[33]

[31] Charles Dodge and Thomas A. Jerse. *Computer Music: Synthesis, Composition, and Performance*. 2nd ed. (New York: Schirmer Books, 1997), p. 108.
[32] Barry Schrader. *Introduction to Electro-Acoustic Music*. (Englewood Cliffs, New Jersey: Prentice-Hall, 1982), p. 196.
[33] Schrader, p. 197.

The use of fundamental sonic components in Risset's music allows the listener to make connections between material strictly through the use of timbral perception rather than resorting to the strict repetition of pitch material. As a result, his music focuses on various "processes of sonic transformation and development"[34] instead of forthright pitch manipulation.

Risset's use of 'sonic transformation' also permeates his works for instrument and tape. For example, in his piece *Inharmonique for soprano and tape* "sound emerges from noise, then the voice emerges from the tape sounds, flourishes, and is eventually sent far away and buried under the tape sounds".[35] Risset states that the "title *Inharmonique* refers to the systemic use of synthetic tones made up of precisely controlled inharmonic partials. Such tones are composed like chords, and they can either fuse into pitched clangs or be diffracted into fluid textures".[36] By using this approach, Risset is able to make connections between the performer and the tape through complex manipulations of the partial structures present in the tape thereby allowing the performer to emerge from or fuse into the fixed tape material.

The timbral/textural paradigm of *Inharmonique* has remained as the basic approach for much of Risset's instrument and tape works. In reference to his compositional approach, Risset has stated that his "compositional style has evolved rather than drastically changed".[37] As a result, his compositional approach remains both consistent and distinctive. Due to his consistent use of the timbral/textural paradigm, his

[34] Thomas Licata. *Electro-Acoustic Music: Analytical Perspectives*. (Westport, Connecticut: Greenwood Press, 2002), p. 151.
[35] Dodge, p. 109.
[36] Dodge, p. 109.
[37] Schrader, p. 199.

music for tape and instruments deals with the "intertwining of instruments and tape"[38] into pieces where the "tape prolongates the instruments or emanates from their timbres".[39] Therefore, though his approach is highly scientific, it may be determined that the success of this paradigm relies on the listener to make unscientific, perceptual connections between reccurring timbres in both the instrumental and tape parts.

The preceding examples were discussed in order to better explain the compositional approach to the combination of instrument and tape that was used in *TELE*. This approach does not lie solely on either side of the previously discussed approaches, but rather incorporates ideas from both approaches.

There were two basic types of material used in the composition of the instrument part of *TELE*:

1. Timbral material that could integrate wholly with the tape;
2. Pitch material that could be echoed or reinforced by the tape.

The timbral material was used to find common ground between the tape and the instrumentalist. This material was constructed intuitively, often improvised, by attempting to replicate various tape sounds with the guitar. These improvisations were then examined to determine which phrases best matched the timbre of the tape. Though there are numerous examples of this technique throughout *TELE*, in order to show the approach it is only necessary to discuss two prominent examples.

The first example occurs at 1'08." At this point, the guitarist is using the basic chicken picking roll discussed in chapter III in order to create a fast, sixteenth-note triplet pattern alternating between single notes and double stops. After the desired velocity has

[38] Schrader, p. 199.
[39] Schrader, p. 199.

been reached, the guitarist uses a looping delay pedal in order to capture the pattern. Once the passage is recorded to the loop, the guitarist fades the pattern out using a volume pedal while attempting to match the highly active, granulated, guitar pattern present in the tape. The example below shows the passage in standard notation.

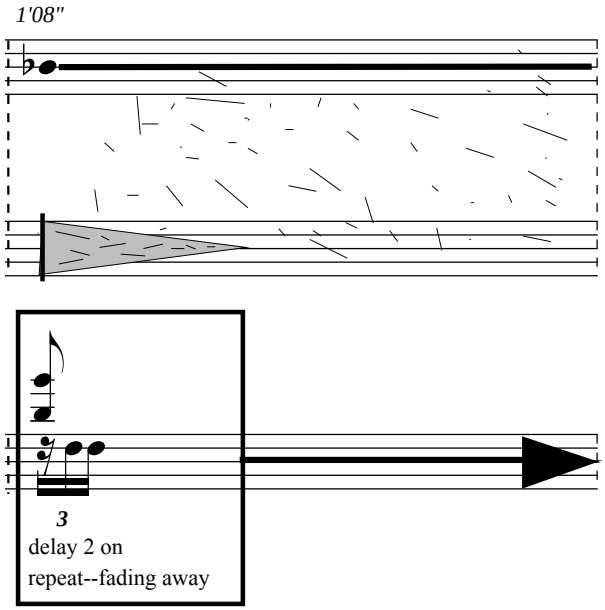


Figure 14 timbral shift occuring at 1'08" of *TELE*

The effect of this passage is that the guitarist, having reached a point of high virtuosity, is suddenly integrated into the supporting role of the tape part. This is done in order to shift the audience's perception of the material from the hyper-virtuosic to the ambient.

The next examples to be discussed occur at 2'41" and 2'45." These moments require less performance explanation than the previous examples as they were created without the need for timbral modification. During these phrases, the sine-like bells occur in the tape part amidst a cloud of granulated guitar and frequently occurring, abrupt hits. The guitar part during these moments was intended to both match and extend the timbral implications of the sine bells. Due to the slight quarter-tone modulation of pitch present

in the bell sounds, string bends were introduced into the guitar part. These were notated as half-step bends in the guitar part. However, due to the fact that three strings were being bent at this moment and the impossibility of maintaining a consistent half-step bend across these strings, the guitar chords maintain the quarter-tone implications found in the bell tones. The example from the score is given below.

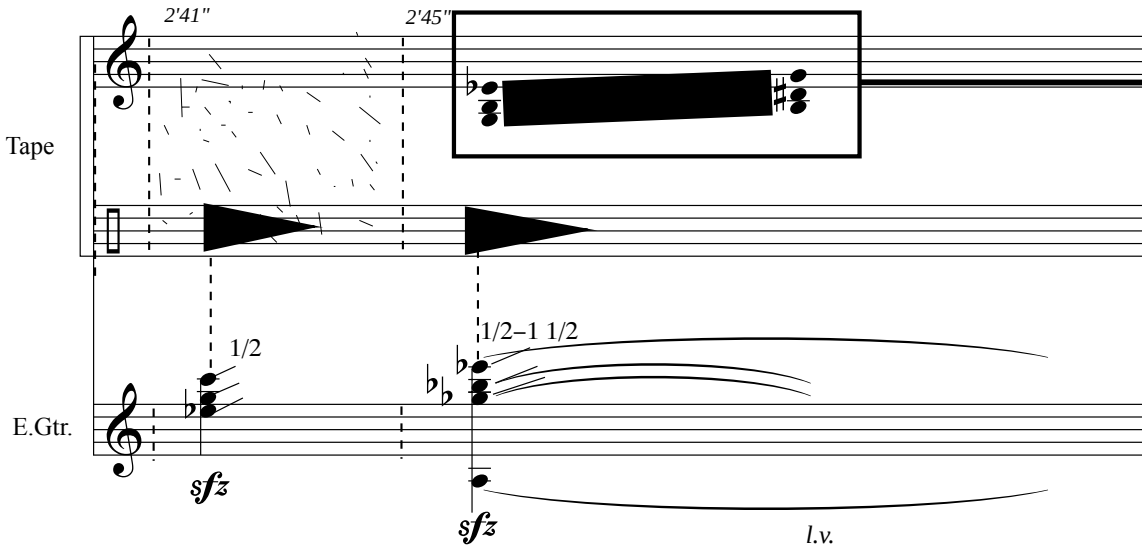


Figure 15 extension of guitar sonority at 2'41" and 2'45"

The notated example does not adequately represent the sounds occurring at these moments. However, due to the limitations of the instrument, this notation was used to avoid confusion. In other words, the notation would prompt the guitarist to achieve the desired effect without notating individual quarter-tones.

The pitch material used in *TELE* interacted with the tape in various ways. A great deal of the pitch material was constructed in order to change the audience's perception of the pitch material found in the tape. For example, during the opening a

perfect fifth sounds in the tape while the guitarist plays a passage ending on a perfect fifth transposed up by a tritone.[40] An example of this passage is given below.

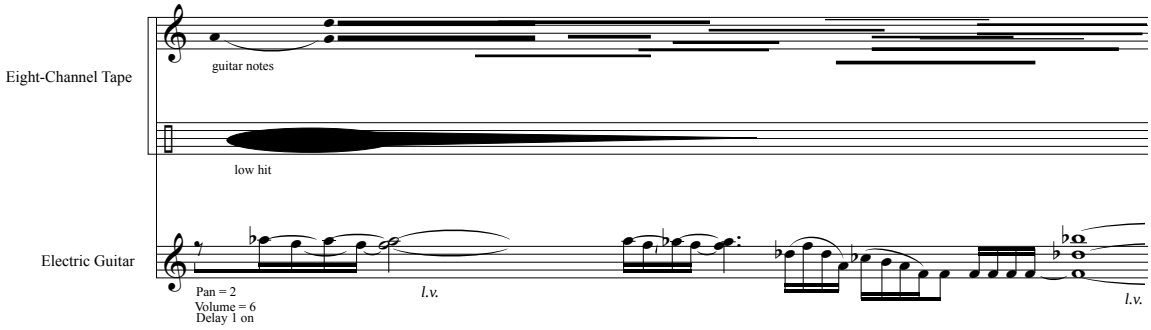


Figure 16 opening perfect fifth with guitar phrase from *TELE*

This passage creates the effect of an implied resolution and transposition of the tape opening. This is achieved by the recognition of the pitch material within the tape, the florid answer by the guitarist, and the resolution of both materials by the guitarist's final chord.

The next example of pitch material used in *TELE* is more straightforward than the implicative model of the preceding example. It occurs during section B of the piece, where guitar phrases are being passed between the guitarist and the tape. The phrases in the tape are harmonized, answered, and, in some cases, left alone. Examples from the score are given below.

[40] A G sounds with the fifth which makes the chord an Eb major chord, but, due to the voicing, the fifth retains its prominence.

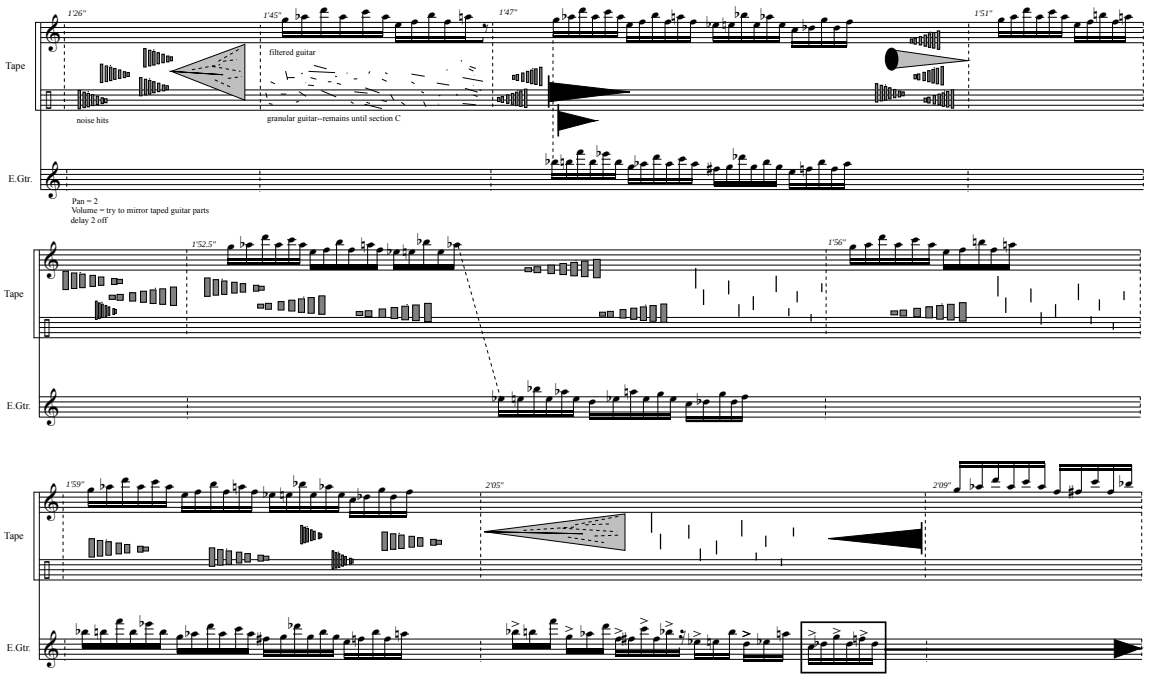


Figure 17 guitar and tape dialogue

This effect creates a recognizable connection between the guitar and tape. These passages also help to propel the section and give form to what would be the simple repetition of nondescript phrases by the guitarist.

The compositional approach used in *TELE* for dealing with the integration of instrumentalist and tape is by no means groundbreaking in regard to the genre's treatment in contemporary composition. However, it does break down certain imaginary barriers that exist between the serialist and timbral approaches. For example, the use of the tape material both to extend the perceived possibilities of the instrument and to maintain pitch connections with the guitarist creates a pitch focus with timbral implications. Also, timbral methods are used to create transitions between sections by shifting the emphasis from the instrumentalist's pitch material to the resultant timbre of the pitch material. Stated alternately, the same material that was seen as virtuosic filigree is immediately transformed into textural material (as seen in **Figure 14**). By changing the audience's

perception of the material through different contextual frameworks, the composition is able to maintain its formal trajectory without the addition of superfluous transitional material.

This approach is not to be taken as an example of how one 'should' compose pieces for instrument and tape. It is also not to be seen as a refutation of either the serial or timbral models found in the music of Davidovsky and Risset, respectively. However, the approach does offer the composer an opportunity to work in the medium without the limitations introduced by more doctrinaire pursuits.

CONTEXTUALIZATION

When a composer begins to write for an instrument, a certain level of familiarity with the particular strengths and weaknesses of that instrument is important. Due to the many distinct and varied approaches to the electric guitar, the necessity for the composer to gain familiarity with the instrument and the intended instrumentalist is inescapable. However, in the canon of modern classical electric guitar writing, the steps toward familiarity are often not taken. This lack of preparation often leads to pieces that would be better suited for performance by other string instruments. Even normally thorough composers such as George Crumb have shown a certain level of naiveté when dealing with the instrument. For example, in *La Guitatta* from his *Songs, Drones and Refrains of Death,* Crumb asks that the guitarist play in a Quasi-Flamenco style. This is an unnatural and ineffective request to be made from an instrument that does not respond in a Flamenco fashion (see the example below).

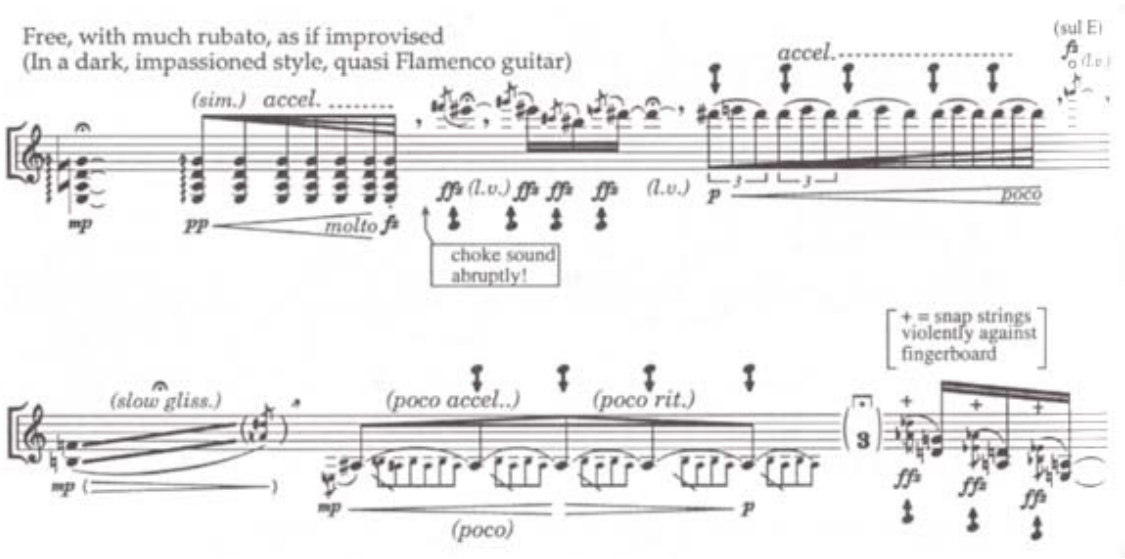


Figure 18 excerpt from *La Guittata* from Crumb's *Songs, Drones and Refrains of Death*[41]

The Crumb example is unique in that the guitarist is part of an ensemble and is usually not given soloist passages. However, some composers who are obviously inexperienced with the instrument have written concerti that utilize little or no electric guitar techniques. This is a tragic miscalculation due to the general expectations one has when listening to a concerto: that extreme levels of virtuosity will be presented. In order to show these inadequacies, it will be necessary to discuss a few basic electric guitar techniques and an example of music in which they are lacking.

To compose for electric guitar it is necessary to take numerous parameters into consideration. The unique timbre of the individual instrument[42] and amplifier, the numerous pedal effects that are available, and the performance practices that one chooses to implement must be carefully selected by the composer. A piece performed by a

[41] George Crumb. Copyright © 1971 by C.F. Peters Corporation. Reprinted from Alfred Blatter, *Instrumentation and Orchestration,* 2nd ed., (New York: Schirmer Books, 1997), p. 288.

[42] The timbral characteristics of an electric guitar is not universal. Each make and model has certain peculiarities that the composer must be aware of. The same holds true for amplifier selection.

guitarist using a Fender Stratocaster being amplified by a Mesa Boogie[43] amplifier will have certain timbral characteristics that cannot be replicated by any other combination of guitar and amplifier. Thus, if one simply specifies 'electric guitar' in the score, he/she should be willing to accept an infinite number of timbral outcomes that, given the specificity of modern composition, are usually not the composer's intention.[44] The pedal or rack unit effects that are to be used should also be of great consideration to the composer. Since different models introduce varying degrees of noise, especially in distortion units, they should be chosen with this in mind. Also, the performance practices that the composer chooses to implement should be taken into consideration when choosing the performer. Since there is no codified electric guitar technique, one must be aware of the abilities that the performer possesses and should write for the player.

The previously stated considerations are not often pursued by the modern electric guitar composer. As a result, ineffective and naive music is often produced. For instance, in Chiel Meijering's electric guitar concerto *The world in a man of war,* the composer simply specifies electric guitar with no indication of make or model for either the amplifier or the guitar. Also, the indications for 'clean guitar' and 'distorted guitar' are misleading and impossible to predict. Guitarists have varying views of what a clean or distorted tone is. So to simply demand 'clean' and 'distorted' will undoubtedly lend itself to varying degrees of interpretation. Also, the performance practice that Meijering chooses to implement is one firmly rooted in the classical guitar tradition. This is a no win situation for either side of the guitar performance continuum. For a classical guitarist will be forced to use an instrument that he is not accustomed to while the electric guitarist will be expected to perform in a tradition unfamiliar to him. Were this an ensemble piece

[43] www.mesaboogie.com
[44] An alternate solution to this problem would be to describe the sound that is wanted in detail. Even then, the outcome could not be easily predicted.

with an innocuous electric guitar part, these transgressions could be forgiven. However, since the piece is a concerto, which in itself implies virtuosic specificity, to withhold this information is to immediately marginalize the composer's ability to realize true virtuosity. The cadenza from *The world in a man of war* also shows signs of misunderstanding of the instrument. The cadenza uses sixteenth-note triplet patterns exclusively which, though a markedly 'guitar' type of phrase, creates a type of caricature of guitar playing rather than a virtuosic expression. While it is true that not all concerti are virtuosic in the traditional, Romantic sense, Ligeti's *Cello Concerto* for instance, but Meijering's piece is unequivocally virtuosic through much of the work. Since most electric guitarists come from an improvisational background, it would suit the piece better for the guitarist to improvise the cadenza. Though uncertainty as to the guitarist's realization of the cadenza would become an issue, it would be greatly superior to composing a vapid and trivial excursion into a world that one knows nothing about. The cadenza from Meijering's concerto is given below.

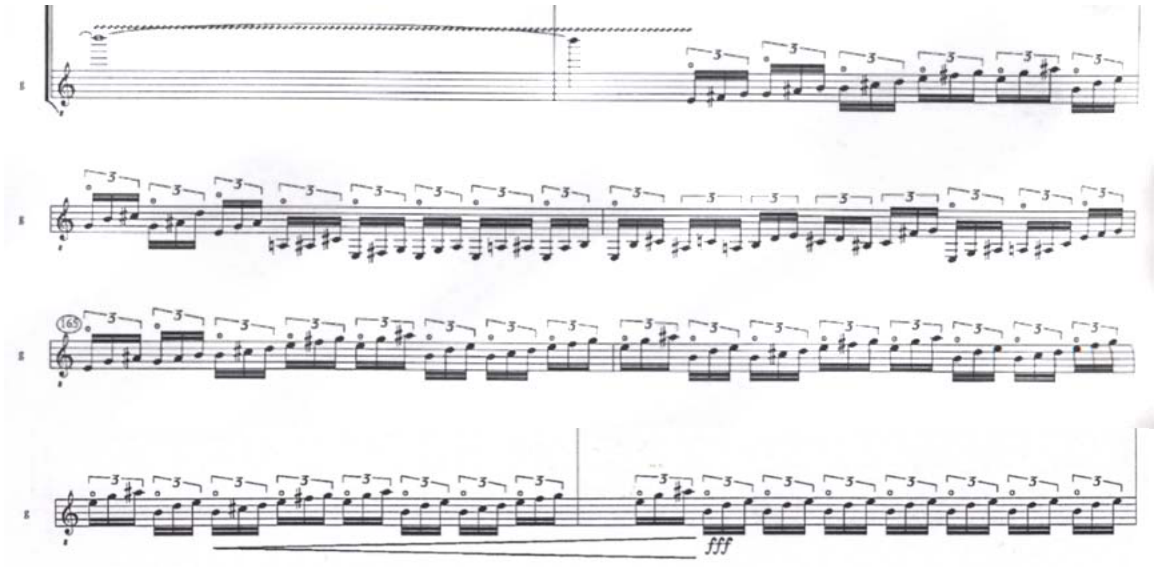


Figure 19 cadenza from Meijering's *The world in a man of war*[45]

[45] Chiel Meijering. Copyright © 1998 by Donemus, Amsterdam.

Some composers are well acquainted with these subtleties and have used the instrumentês various idiosyncrasies to their advantage. Steve Mackey, for example, has composed a large amount of work for the instrument. Being a virtuoso guitarist himself, Mackey has constructed pieces that utilize every available technique from the rock vernacular in order to create music that is truly written for the electric guitar. However, Mackey's inspiration for these pieces comes from an idiom that was short lived and, at the present, dead: heavy metal.[46] Mackey's pieces draw from the gunslinger mentality that was prevalent during the 1980ês. This attitude spawned a generation of technically advanced yet musically challenged guitarists who used technical ability to hide their lack of musical invention. This is not to say that Mackey's music is not without merit. His album *Lost and Found*[47] exhibits tremendous virtuosic prowess and a true intimacy with the instrument. However, the pieces produced are either pop-fusion similar to Steve Vai's *Flexable*[48] album or virtuosic displays reminiscent of Eddie Van Halen's *Eruption,*[49] which makes the music seem more of an amalgamation of various, tested formulas rather than a unique artistic statement.

To determine how *TELE* fits into the canon of modern, electric guitar music, we may use the same criteria that were used in the previous discussions. In *TELE* the performance notes and technical requirements are specific (the guitar must be a Fender Telecaster, the effects pedals and their settings are specified, the slide must be glass, etc.). This will assure a similarity in tone from performer to performer. Also, the performance practices are from a specific style of electric guitar playing which ensures that only performers capable of chicken picking will be able to perform the techniques. The use of

[46] It could be argued that that the roots of heavy metal can be traced back to American blues music, but since the genre bears no perceivable relationships to the blues, this is strictly pedantic.
[47] Steve Mackey. *Lost and Found*. Bridge,1996.
[48] Steve Vai. *Flexable*. Epic,1988.
[49] Eddie Van Halen. çEruptioné. *Van Halen*. Warner Brothers,1980.

the improvised cadenza shows a sympathetic position towards the guitar player. This is because all advanced chicken picking guitarists are consummate improvisers. The genre itself grows from the improvisations of its proponents. Thus, to write a cadenza for others to learn would effectively emasculate the improvisational character of the genre. Also, since the Telecaster tradition[50] is still spawning countless numbers of virtuosi, the ideas used in the piece will be attainable by a large number of guitarists given they have a penchant for electro-acoustic music. It is hoped that, *TELE* will be a relevant statement of both electric guitar techniques and electro-acoustic music for generations of curious instrumentalists yet to come.

[50] This tradition can be traced to the folk music and blues of the early twentieth-century, with which it shares perceivable common characteristics even today.

REFERENCE LIST

ProTools, www.digidesign.com.

Nuendo, www.steinberg.net.

MAX/MSP, www.cycling74.com.

Csound, www.csounds.com.

Soundhack, www.soundhack.com.

PeakLE, www.bias-inc.com.

GRMTools, www.steinberg.net.

Audiosculpt, www.ircam.fr.

Fender Guitars, www.fender.com.

Yarbrough, Rual. Personal interview. April 21st, 2003.

Duchossoir, A.R., *The Fender Telecaster: The Detailed Story of America's Senior Solid Body Electric Guitar*. (Milwaukee, Wisconsin: Hal Leonard, 1991).

POD Amplifier Simulator, www.line6.com.

Darter, Tom, *The Art of Electronic Music*. ed. Greg Armbruster. (New York: William Morrow, 1984).

Manning, Peter, *Electronic and Computer Music*. 2nd ed., (Oxford: Clarendon Press, 1993).

Ernst, David *The Evolution of Electronic Music*. (London: Schirmer Books, 1977).

Dodge, Charles and Jerse, Thomas A. *Computer Music: Synthesis, Composition, and Performance*. 2nd ed. (New York: Schirmer Books, 1997).

Scrader, Barry. *Introduction to Electro-Acoustic Music*. (Englewood Cliffs, New Jersey: Prentice-Hall, 1982).

Licata, Thomas. *Electro-Acoustic Music: Analytical Perspectives*. (Westport, Connecticut: Greenwood Press, 2002).

Stockhausen, Karlheinz. *Kontakte: Nr. 12 für elektronische Klänge, Klavier und Schlagzeug*. (London: T. Presser, 1966).

Davidovsky, Mario. *Synchronisms 1-3*. (New York: McGinnis & Marx, 1966).

Crumb, George. *Songs, Drones and Refrains of Death*. Copyright © 1971 by C.F. Peters Corporation. Reprinted from Alfred Blatter, *Instrumentation and Orchestration,* 2nd ed., (New York: Schirmer Books, 1997).

Mesa Boogie Amplifier, www.mesaboogie.com.

Meijering, Chiel. *The world in a man of war*. Copyright © 1998 by Donemus, Amsterdam.

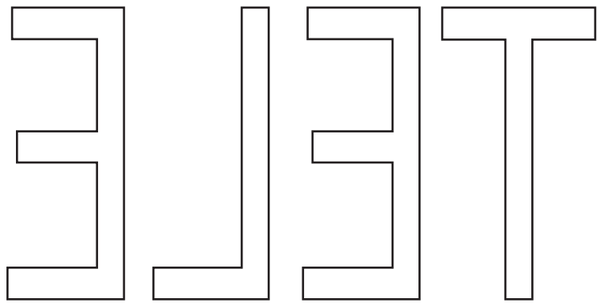
Mackey, Steve. *Lost and Found*. Bridge,1996.

Vai, Steve. *Flexable*. Epic, 1988.

Van Halen, Eddie. "Eruption". *Van Halen*. Warner Brothers, 1980.

TELE

for electric guitar, eight-channel tape
and live electronics



chapman welch, 2002

Notes to the Performer

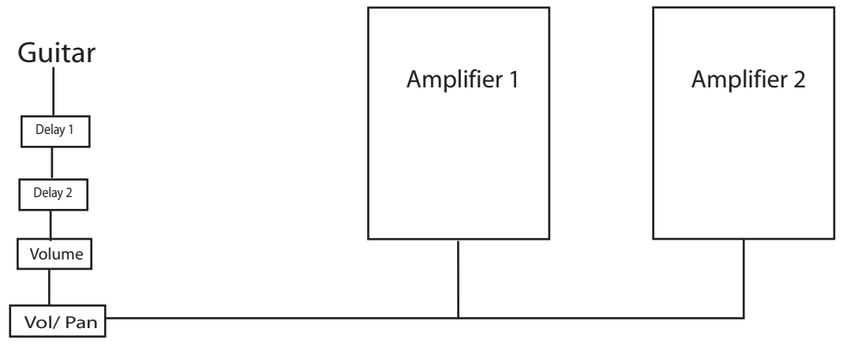
Tele is to be played with a Fender Telecaster guitar. Approximations using other guitars or effects processors are not allowed. Sections A and B are to be played with extreme precision. Sections C and D are to be played with freedom while maintaining the overall structure of the piece. For example, Section C should be played with adequate space or silence between gestures while increasing density of gestures towards the eventual climax---the beginning of Section D.

Technical Requirements for *Tele*

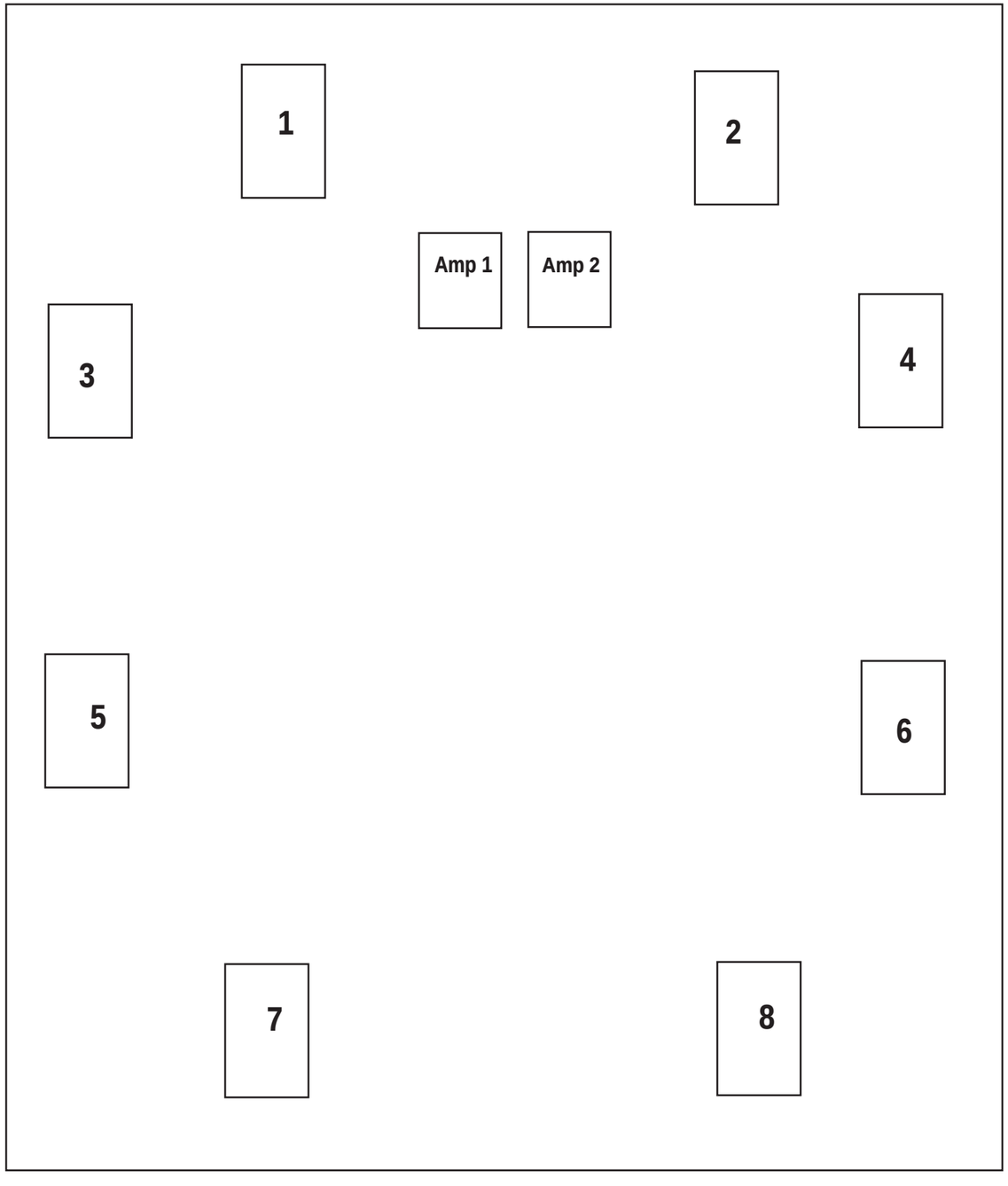
The performer will need the following:

1. Two amplifiers--one set to a clean setting and one set to an extremely dirty setting.
2. Two delay pedals or rackmount units--one with a short slapback delay (10-30ms) with a single repeat and one with a longer sustained delay (100-500ms) with ca. 100 ms tap duration.
3. One volume pedal (volume represented as 1-10 in the score).
4. One Pan/Volume pedal (pan from clean to dirty represented as 1-10 respectively in the score).
5. A guitar slide--preferably glass.
6. An ADAT player for eight-channel performances or a CD player for stereo performances.

The following is the preferred amplifier setup.



Speaker and Stage setup for *Tele*



TELE

A

0'09"

Eight-Channel Tape

guitar notes

low hit

high, behind the nut, chord

bell-tone swell

Electric Guitar

Pan = 2
Volume = 6
Delay 1 on

l.v.

l.v.

0'22"

0'34"

0'40"

Tape

hit with bell-tone

random noises, rustling

noise-swell with hits

E.Gtr.

molto vib.

ord.

0'41"

0'42"

0'43"

1'08"

Tape

noise--moving, swirling

noise swell

ff

bass drum

mf

1'06.5"

Sul E, A, and D

**

E.Gtr.

delay 2 on
repeat--fading away

* Scrape strings with edge of pick--imitate the taped sounds

** Play boxed figures in any order. Figures may be transposed chromatically and/or by minor thirds. Transposition may take place any number of times.

B

1'26"

1'45"

1'47"

1'51"

Tape

filtered guitar

noise hits

granular guitar--remains until section C

E.Gtr.

Pan = 2
Volume = try to mirror taped guitar parts
delay 2 off

1'52.5"

1'56"

Tape

E.Gtr.

1'59"

2'05"

2'09"

Tape

E.Gtr.

Tape

2'10.5"

2'37"

etc.

E.Gtr.

3 3

3 3 3 3

molto vib.

sfz

C

Tape

2'41"

2'45"

2'53"

noise--brush sounds

etc.

E.Gtr.

Ω

Ω-1Ω

sfz

sfz

l.v.

Tape

ca. 3'35"

ca. 3'54"

granular guitar

noise swell

ord.

E.Gtr.

*

with slide

l.v.

l.v.

Pan = 8
Volume = 4

* Figure may be transposed chromatically and by minor thirds

Tape

ca. 4'17" *ca. 4'26"* *ca. 4'42"*

E.Gtr.

3 5:4

Tape

ca. 4'50" *ca. 5'01"* *5'06"*

noise-swell with hit

E.Gtr.

molto vib.

l.v. *l.v.*

Tape

5'11.5" *5'16"* *5'30.5"* *5'42"*

noise--snare hits

E.Gtr.

slide off

Pan = 10
Volume = 10

3 3 3
Play in any order

* Ad lib using these pitches in any register
** Figure may be transposed chromatically and by minor thirds

D

5'47"

5'58"

6'20"

6'21"

7'16"

Tape

etc.

breath-like

bass drum--long reverb

Tape paused until cue

Cadenza*

E.Gtr.

Pan = 2
Volume = 6

l.v.

3 3 3

n

l.v.

7'22"

7'30.5"

7'32.5"

Tape

reverse hit

reverse hit

high, behind the nut, chord

bell tone, brush sounds

random hits, reverb tails, etc.

n

Cue when striking chord

E.Gtr.

** *sempre l.v.*

Behind the nut

l.v.

* Cadenza 1-2 minutes--using material and techniques from the piece
** Continue holding chord until tape stops