Keyed Up

PIANO

Matrix THEORY

STRAIGHT ANSWERS TO THE MOST UNANSWERED QUESTIONS IN MUSIC

by Joseph Pingel

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Please direct all inquiries regarding this book, distribution, affiliation, improvements, suggestions and anything of interest to Joseph Pingel.

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I wanted to be a rock star when I was a kid. I was good on the guitar at an early age and used guitar-chord knowledge to teach myself piano (after a couple years of lessons).

That changeover from one instrument to another drove home some music theory concepts that rocked my musical world. I made an unobvious discovery; a discovery missed by most musicians out there. That’s what this book is about.

No matter your musical skills, you will either acknowledge and recognize the rare insights I share here or aspire to understand them better.

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“I myself figured out the peculiar form of mathematics and harmonies that was strange to all the world but me.”

Jelly Roll Morton

Introduction

Matrix theory is advanced thinking that deals with the conceptual side of music theory. After searching through books and reading many college texts, you may learn the facts, but facts alone do not give you valuable insight into how to use that information or the depth of it's importance.

When you realize the introspective answers you seek are not available anywhere, it's frustrating because it's not easy to figure out those answers on your own. This book fills in those elusive musical gaps and resolves any confusion that may stand in your way.

More Than Just The Facts

The facts you learn in school or through lessons, rarely reveal how those facts can make you a better piano player. You get the tools without instructions on how to use them and harness their power. Sadly, the most ***basic*** theories are all but ignored and discarded as being too *obvious* to be worth much study when, in fact, those are the theories with the greatest power, that need the most clarification.

Once learned, sight-reading, improvisation and playing by ear are all skills that are greatly increased as a result.

Experience Before Your Time

If you could learn those insights of experience up front, just imagine the affect it would have on your ability to excel more quickly. You wouldn't spend a lifetime looking for answers and you'd realize an instant advantage.

Perhaps you doubt this, but what if it's true; that there's far more to music theory than what meets the eye? I urge you to not close the door to learning something exciting and new. No matter your experience level, allow yourself the "chance" curiosity to discover some-astounding details you may have overlooked for a long time. Details the will make you a better sight reader, composer and play by ear master

Are You Ready?

Don't skim over the information because you think you already know it. Some things cannot be expanded upon without first laying the groundwork explained in The Science of Music. Matrix Theory takes that theory to the next level and answers all those nagging questions that seem to have no answers. However, if you don't understand the basics, you'll probably get lost.

The pages that follow will change you. If not, then it is only because you are not ready.

"Music is the arithmetic of sounds as optics is the geometry of light."
Claude Debussy

7 Facts To Understanding Matrix Theory

- There Are Only 12 Keys and No More. Okay, technically there are more but for most people, 12 keys are enough for now. While each key has its own scale tones, mathematically they are all the same. Once you understand the concepts behind one key, you understand them all.

- There Are Only 8 Notes That Govern Major and Minor Scales. If you can count to 8 and you know what to count and why you need to count it, you can figure out just about anything in music.

- Knowing How to Read Music Is a Requirement. Reading music is the application of putting musical mathematics to work. Matrix Theory is the key to sight-reading with authority.

- You Have to Know How to Count Music. Counting is perhaps the number one skill to being a top musician. There are only 5 sizes of notes that you can actually count and there are only two ways to count them.

- You Must Understand The Math of **Key** Signatures. This information is explained in Principle 7 of The Science of Music. When you understand "The Machine," you understand the most difficult aspect of music theory.

- There is a Mathematical Science to Building Chords. This process is used for so many things in music outside of chords alone. Chord building is the basis of understanding numbers in music.

- 1-4-5 Dominates Music Numerology. All styles of music -rock & roll to classical music alike- are structured around these chords. They are the home base chords of any key and the root of playing by ear.

"I know there are twelve notes in each octave and the variety of rhythm offer me opportunities that all of human genius will never exhaust." **Igor Stravinsky**

7 Hidden Concepts of Matrix Theory

- Infinity In Music. There are a zillion songs that can be written using just a basic 3-chord progression. The key to understanding music is to focus on the finite rules that are used to control the overwhelming concept of infinity.

- Major and Minor Key Signatures Are The Same. This is partly false but mostly true. It is the true side of the equation that is most important. Combining the two types of key signatures is one of the most misunderstood aspects of music theory and a major part of playing by ear.

- Any Time Signature Can Be Used to Write Any Song. No kidding. You can write a 4/4 ballad in 3/4, 2/4, 2/2, 6/8 or any time signature you want.

- Think Numbers, Not Alpha Tones. Using numbers (1-8) you can keep track of note intervals, chord structures, scale tones, chord progressions and much more. You cannot count using alpha tones (A-G).

- To Read Music Well You Must Think Like a Composer. The goal of writing is to show music in its most obvious form. There are many clues and tips a composer "infers" but you've got to know what to look for.

- Playing By Ear is Mostly Playing By Science. Granted, there is a certain amount of ear training and experience involved but beyond that, playing by ear is applying your best-known mathematical options.

- Poetry Is a **Major** Force In Music. When you have questions about why a certain counting scheme or time signature is used, the answer is almost always the result of fusing poetry to music.

Chapter 1: Combining Key Signatures

Making sense of major and minor key signatures concepts is very important to playing by ear. There is a major degree of enlightenment you attain when you see clearly how the two concepts are related.

- **A song is major if it begins and ends on a major chord.**
- **A song is minor if it begins and ends on a minor chord.**

Both of these statements only tell half the story.

Musicians tend to have the impression that major or minor keys are singular to themselves. They are not! Both are interchangeable with one another. A minor key can include major chords and a major key can include minors. Labeling a song as one or the other is "relatively" unimportant to musicians who understand the missing link.

Ironic as it may seem, the *missing link* is actually the *common link* between two opposite forces. Major and minor are opposites as are the concepts of day and night. In comparison, both concepts literally explain the same thing; harmony.

Day and Night

You accept the concepts of night and day as a fact of light as well as time (a.m. and p.m.). During the flow of the 24-hour period, light and dark gradually melt into each other. Except for the absence of light, night and day have *everything* in common.

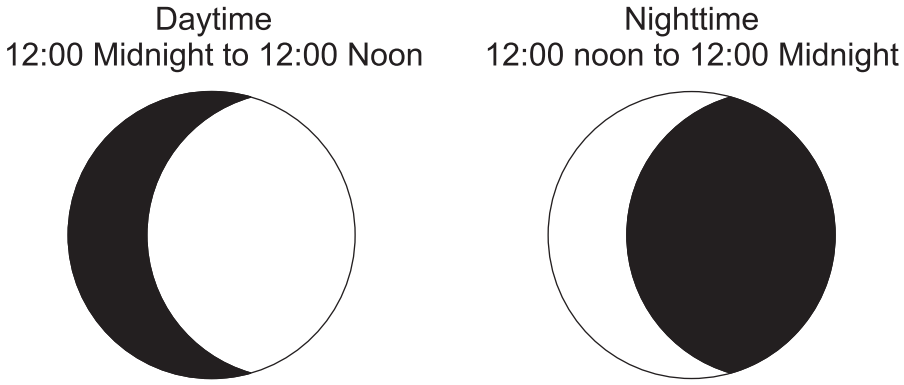
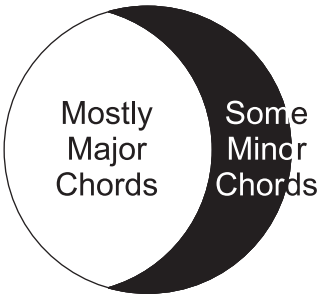
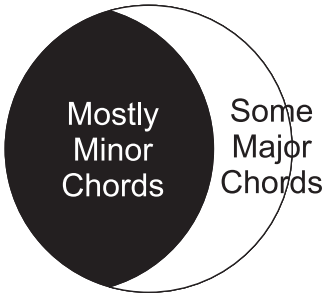


Figure 9.1 Daytime and Nighttime are the same, yet opposite

If you wake in the middle of the night, you may have technically woken up in the daytime (if it is past 12:00; midnight). This is a matter of semantics. You perceive it as being night because of the darkness. However, the facts say that

a.m. begins at 12:00 midnight - when it is dark - and p.m. begins at 12:00 noon - when it is light. Neither time period is totally dark or light. Diametrically they are the same, yet opposite.





This exact, same concept applies to relative major and minor key signatures. A composition may be labeled “mostly major” or “mostly minor.” Either type of key can use major or minor chords.

Both major and minor keys *share the same key signature*. They are one in the same. Night and day literally conveys the exact same kind of understanding of harmony. Let’s take it further and explore a point by point comparison of the two concepts.

Major and Minor	Night and Day
The staff is a medium for notes.	The earth is the medium for night and day.
Relative major and minor keys share one common key signature	Night and day share one common earth.
Each major key (or chord) has a relative minor.	Each day has a night.
Major and minor chords share the exact same note configurations.	Night and day share the same times only differentiated by a.m and p.m.
There are 12 major chords.	There are 12 hours of a.m.
There are 12 minor chords.	There are 12 hours of p.m.
There are 12 keys to the circle of 5ths	There are 12 months in a year.
Each key has a different name.	Each month has a different name.

This comparison lays out the groundwork that shows harmony between similar but opposite concepts. The day/night comparison is a powerful metaphor and hopefully has effectively helped you grasp the relativity concept. You accept night and day as a given without putting too much thought into it. You must relax into the harmony of major and minor in the same way.

"How do you use this information to become a better piano player?"

Keys are Biological in Nature

If we could somehow transform keys into people, they'd have different names, builds, hair styles, complexions and temperaments. However, beyond physical characteristics and preferences, they would first and foremost be biological human beings. We may individually have our own appearances and styles, but put under an x-ray machine or a surgeon's knife, we're all pretty much the same.

Likewise, keys are biological in nature. Rid yourself of the perception that the 12 keys are singular to themselves. Yes, they have different sharps, flats, tones and alpha names which are the characteristics and preferences of their personalities but "biologically," they are all made up of 8 notes in a common, distinct order. That is how we "doctors of music" must view them; as 8-note numerical entities. **YOU'VE GOT TO THINK IN NUMBERS!**

We could use any specimen of a key to examine the "relative" concept, but the Key of C is the easiest to understand because it is the template for all keys. To understand one key is to understand them all.

The Anatomy of a Key

Every key has 6 primary "guidepost" chords that serve as the skeleton that holds the key together. These chords are the basis of all playing by ear. Every key has their own guidepost chords and they are based on the same numerical scale order as the key of C.

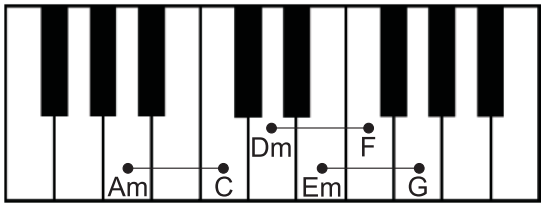
The 6 guidepost chords of any key are the 1st, 4th and 5th tones of both the major and minor scales of the single key signature. Don't be confused just because the two scales have different numerical orders. That's just how it is. Accept it as a given. What's more important is that they are represented by one single key signature.

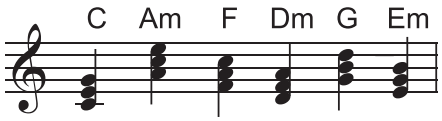
	1	4	5
Major Chords	C	F	G
Minor Chords	Am	Dm	Em
	1	4	5

Why Guidepost Chords are Significant To The Key

1. They share the same note/chord configurations on the staff.

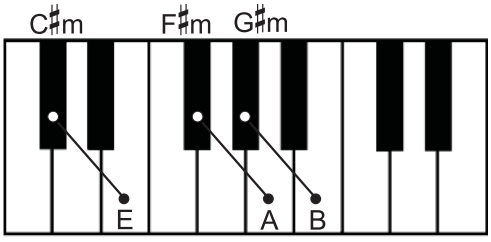
All 6 of the guidepost chords can be shown on the staff using the exact same chord configurations.

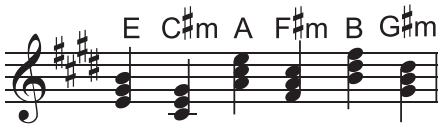




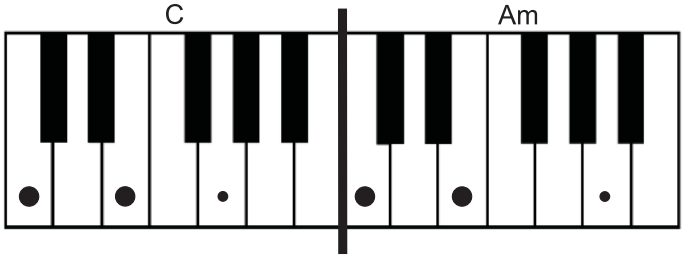
2. They can always be shown without using accidentals.

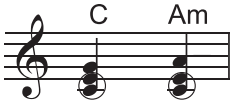
Not just the key of C as shown above. In ***any*** key, the basic 1-4-5 major and minor guideposts can be shown without accidentals.





3. Relative Major and Minor guidepost chords share <u>TWO</u> common notes.





What makes this understanding so awesome is that you can change a major chord into its relative Minor Seventh (m7) by simply changing the root note in the bass. This is a fabulous play-by-ear trick.

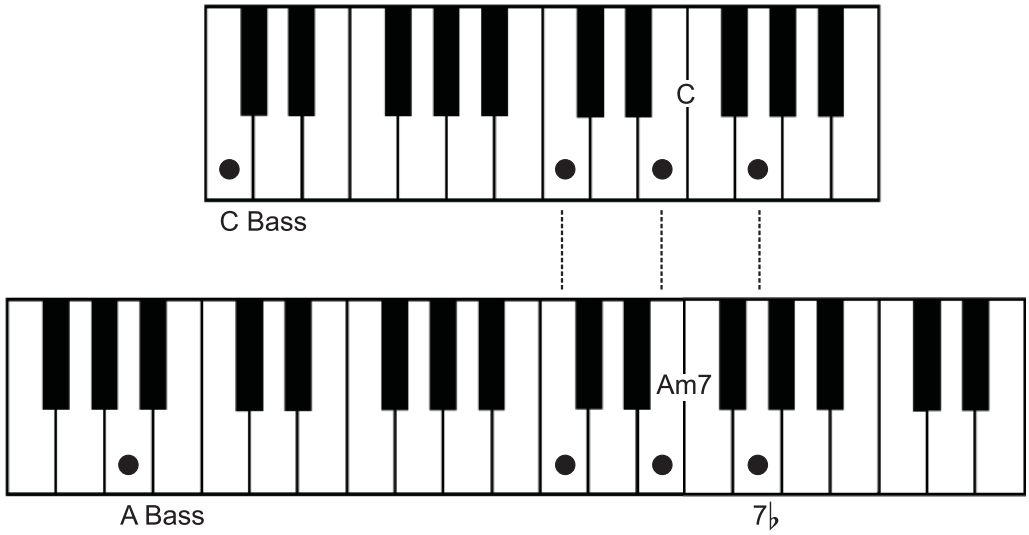


Figure 9.2
Change any major chord to its relative m7 by changing the root note in the bass.

4. These are the chords you use to play by ear.

Relative 1-4-5 major and minor chords should be your first consideration when trying to figure out a song by ear. All compositions (with rare exceptions) base their chord progressions on guidepost chords. Your ability to play by ear is greatly enhanced when you are quickly able to reduce the list of a possible 24 major and minor chords down to the most ***probable*** 6 you will be using.

In that regard, playing by ear is far easier when you know what chords you are going to play ahead of time. Granted, some songs are more complicated and modulate to chords other than the guideposts but overall, the majority of songs use these chords exclusively. Are you beginning to see why playing by ear may not be as complicated as you thought?

5. They sound good together.

This is the most obvious relativity that these chords share. We humans like the sound of 1-4-5 progressions (major or minor). Beethoven to the Beatles have used them effectively for hundreds of years without running out of tunes. In any order, the 6 guideposts will always sound good together.

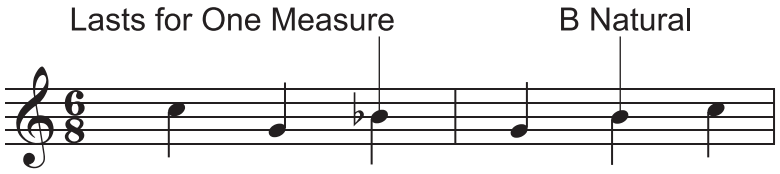
6. 1-4-5 is the greatest hit of all time.

It may seem hard to believe that music can be so predictable in form but it is. Most popular songs only have three to five chords in the arrangements. The odds are overwhelming that these chords will be the guideposts of the key.

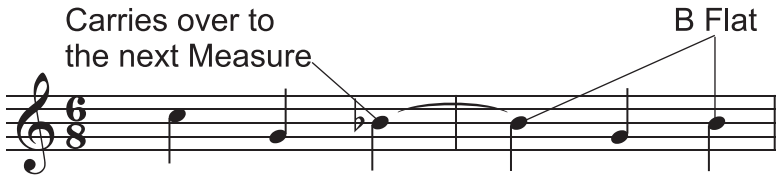
Chapter 2: Accidentals

Accidentals are exceptions to the rules laid out in the key signature. There are six (6) types of accidentals: the sharp (♯), flat (♭), natural (♮), double sharp (𝄪), double flat (𝄫) and double natural (♮♮).

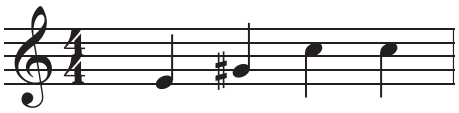
Accidentals apply to only one measure at a time and affect the same note anywhere in that measure.



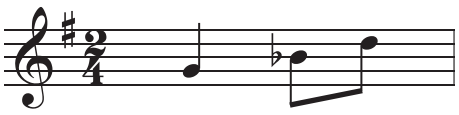
The only exception to the rule is a tied note extending into the next measure.



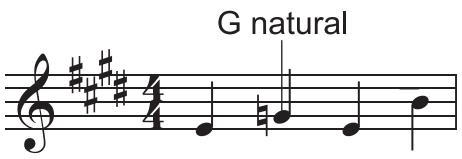
Usage



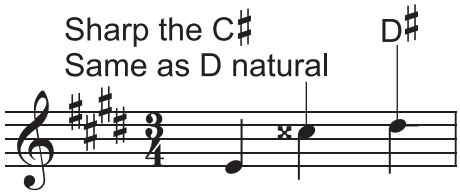
Sharp (♯): Placed on any natural line or space, this accidental indicates the note should be played sharp.



Flat (♭): Placed on any natural line or space, this accidental indicates the note should be played flat.

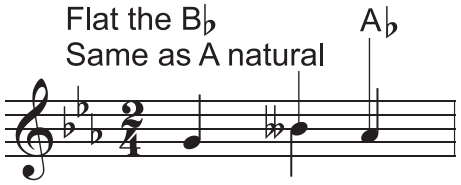


Natural sign (♮): Place this accidental on any line or space of the key signature or in front of any previously-sharped or flatted note to negate any previous accidental placement.



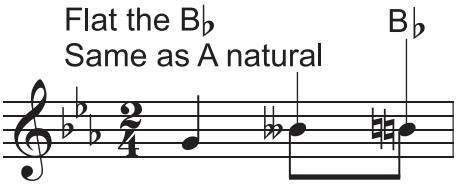
Double Sharp (×): A double sharp will sharp an already-sharped note.

Placing a single sharp on an already-sharped line or space is not sufficient notation as that might only indicate a previously-naturaled sharp note should again be played sharp. Or, in certain rare cases, a single sharp may just be a reminder.



Double Flat (𝄫): A double flat will flat an already-flatted note.

Placing a single flat on an already-flatted line or space is not sufficient notation as that might only indicate a previously-naturaled flat note should again be played flat. Or, in certain rare cases, a single flat on an already-flatted line or space may just be a reminder.



Double Natural (𝄮): A double natural sign will negate the affects of a double sharp or a double flat.

A double natural is kind of redundant because you don't see a lot of double accidental notations on a regular basis, much less double notations that need to be restored to a previous note in the same measure. Still, technically it can happen.

"You've got to keep working that talent."
Irving Berlin

Chapter 3: Inside Enharmonic Keys

Enharmonic keys share the same tones of a major scale but have different names. There are three naturally occurring enharmonic major scales; F♯ - G♭, C♯ - D♭, and B - C♭.

Although the root and scale tones share the same notes, they are not the same notes when written. One is notated with sharps and one with flats. The root notes are different as well.

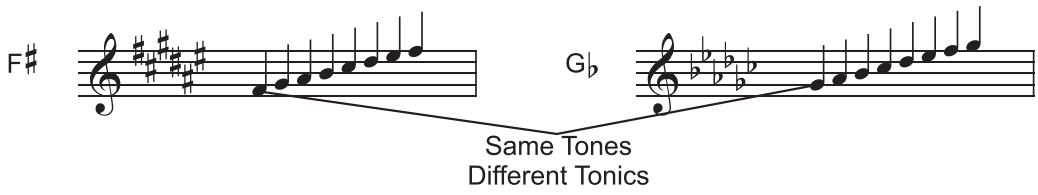


Figure 1.0 In the key of F#, the root begins on the F space. In the key of G♭, the root note begins on the G line.

"If two enharmonic keys represent the same tones, why confuse things by giving them two names?"

That question is the same as asking ***"Why do we give the black notes two different names?"*** On the surface that's an easy one. Black notes are sharp or flat relative to their position to other notes . Up or down; it's a viewpoint.

"Why do we need to have keys that are both sharp and flat? Why do we need both?"

We don't. In fact, you can write a song in any key (including flatted keys) using just sharps. Same with just flats. Any key can be represented on either side of the equation.

How can this be? There are more than the six (6) enharmonic keys to the Circle of 5ths. We only stop *figuring* enharmonic keys when the staff gets totally saturated with sharps or flats but that's not where enharmonics end.

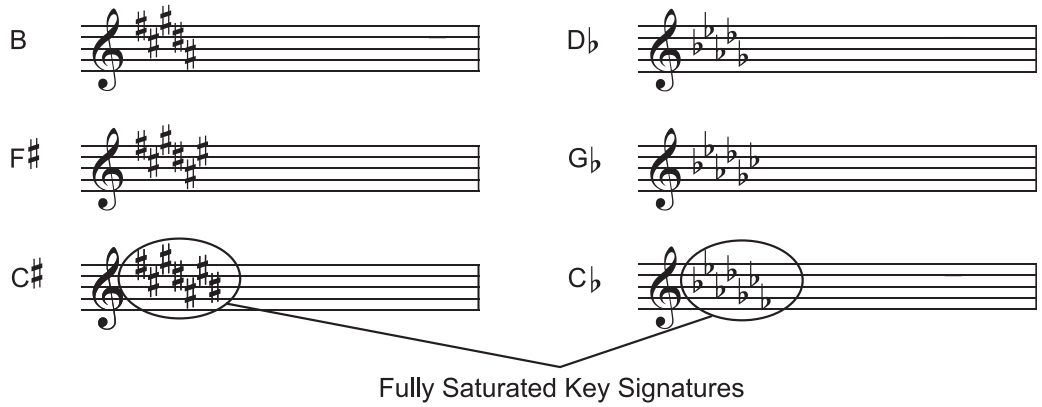
There are actually 22 enharmonic keys.

When the staff gets saturated with notation, the next possible notation can only be added to the key signature using accidentals (in this case either a double sharp (𝄪) or double flat (𝄫)).

A quick refresher, if you put a double sharp on the F♯ line, it changes that note to G. If you put a double flat on a B♭ line, it changes that note to A.

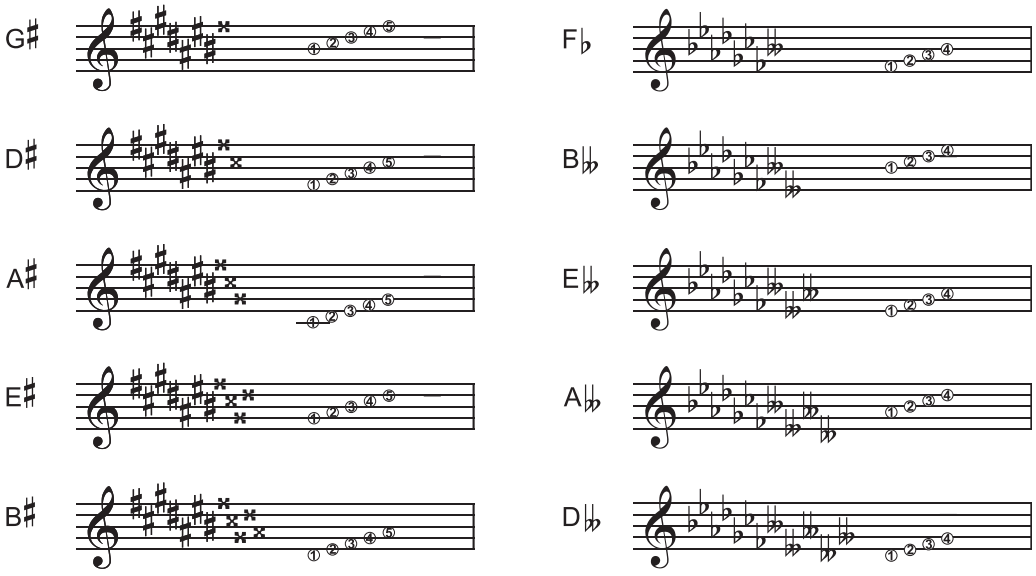
Saturation

The key signature is “saturated” when you can no longer add notation without doubling up on a line or space that already has notation. Taking the Circle of 4ths or 5ths to their saturated ends, six (6) keys are enharmonics.



Full Extension Of Enharmonic Keys

To show all 12 keys with just sharps or just flats, the key signatures would extend out with so much notation that it would be too confusing. You’d have 23 keys instead of 12 (the key of C plus 22 enharmonic keys).



Notice that both circles start on C and end on two harmonics of C (B# and Dbb).

The Full Circle of 4ths and 5ths

When sharp and flat concepts are combined, all 12 keys are covered without doubling up on any notation. That's why we need sharps and flats. Flats take over where sharps leave off and vice-versa.

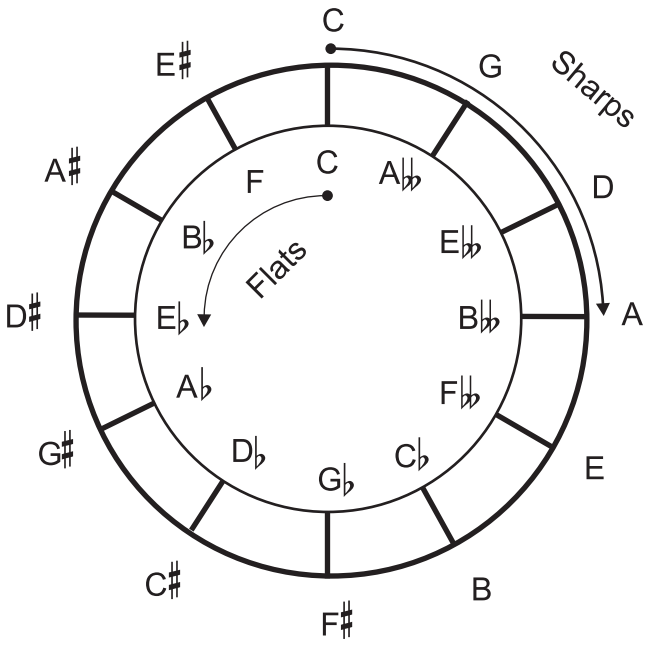


Figure 11.2 This Circle of 4ths and 5ths shows there is a single, pure key of C and 22 enharmonic keys.

“Life is a lot like jazz... it's best
when you improvise.”

George Gershwin

Chapter 4: Modulation

Some composers have a knack for intertwining different keys into a song; without changing the key signature. This is called modulation and it is yet another thing that produces endless, creative possibilities in composition.

Basically what happens is that the song will stray (or modulate) to another key for a bit and then stray back to the original key. Some composers will surprise you with outlandish changes that somehow seem to work. But in general, songs don't aimlessly wander without some kind of mathematical reason. Modulation usually follows the path of least resistance.

Modulating Between Similar Key Signatures

Modulating between two keys is usually accomplished by finding guidepost chords common to two different key signatures. It then uses those portal chords to stray between two keys seamlessly. Modulation is easiest when the modulating keys are close to each other in notation.

For example the key of A has three sharps (F,C & G) and the key of E has four sharps (F,C,G & D). These keys are very much alike in that they share three common sharps. So it is fairly easy for you to start out your song in A, modulate to E for a bit and then modulate back to A.

Basic, mathematical counting systems may also provide you insight into the workings of how modulation works. Study this example:

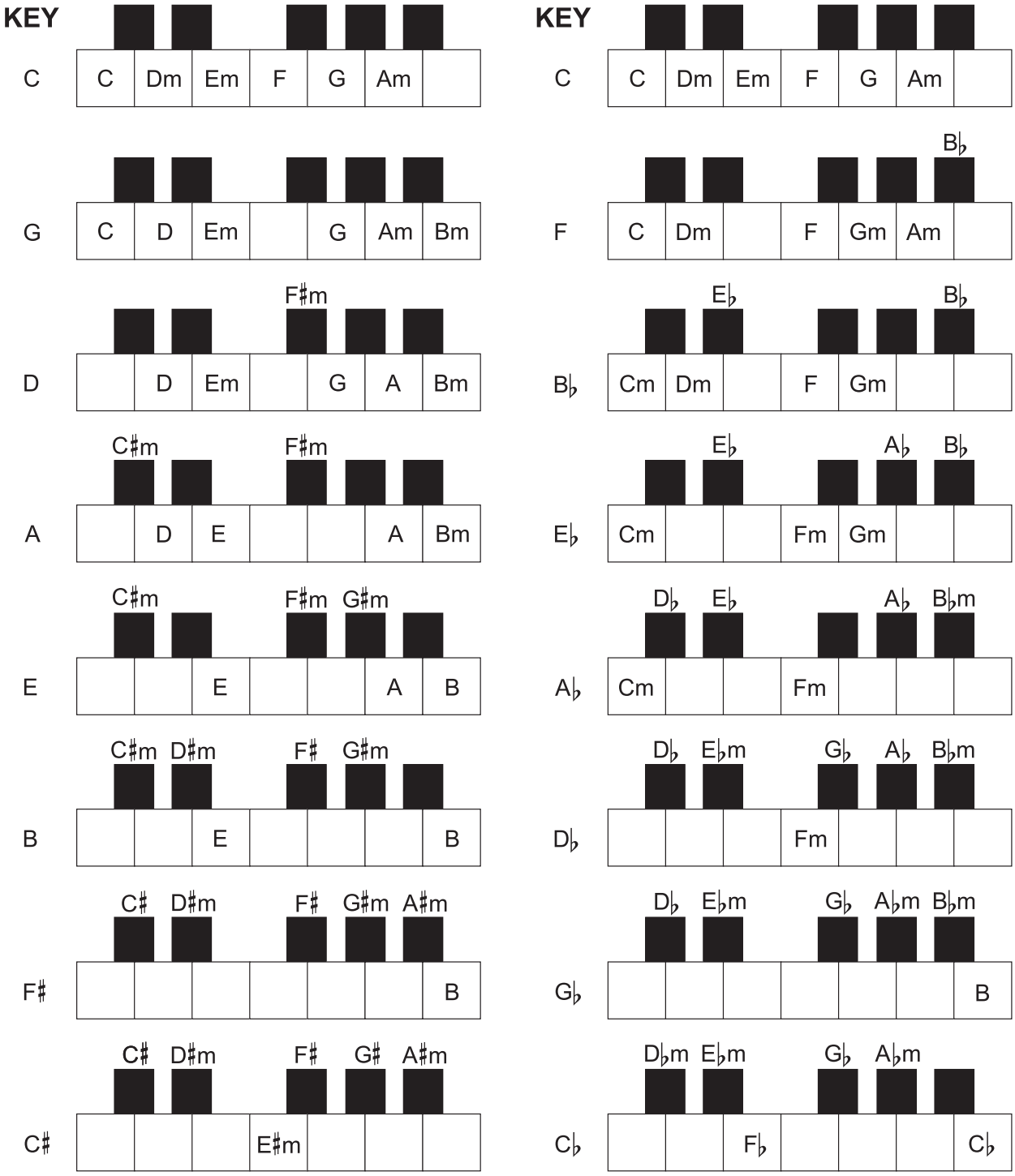
Counting by 2's:	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24
Counting by 3's:	3, 6, 9, 12, 15, 18, 21, 24
Counting by 4's:	4, 8, 12, 16, 20, 24

Each numbering system follows its own sequential order that is different from the other systems. Yet, between them there are some common numbers. If you apply the modulation concept to numbering systems, the common numbers are the portals.

The point of this counting lesson is to show that there are similarities to all counting systems (despite their differences). When counting by twos, it is not likely that a 7 will sneak its way into the order of numbers. It's the same thing with key signatures. If there are no common portal chords, modulation is far more difficult.

Modulation Chart

The following chart shows the major and minor guidepost chords for all 12 keys. When intermixing 2 or more keys, you must find common guideposts that will allow you to modulate back and forth in harmony.



Chapter 5: Objectives Of The Composer

Musical creativity is expressed through a structured medium. The medium is the staff. The structure is the meter. Put yourself in the place of a composer who wants to write down a creative melody.

Most Obvious Form

A composer, first and foremost, wants to show the composition in its "most obvious form" so that anyone can decipher and interpret its meaning. To meet the "obviousness" objective, a writer must meld musical concepts in such a way that they compliment each other and form a sense of unity within the set framework.

Four Criteria of Obviousness

1. Inferring tempo through the beat note.
2. Determining the best meter for the composition.
3. Determining a note size scale that is easy to count.
4. Capturing and conveying the feel of the poetic verse and melody.

These four things are not always in agreement with each other. They fight for dominance. The composer has to referee opposing disputes in logic and transcribe the song in a way that clearly conveys their musical intent. The final outcome should leave no doubt in a sight-reader's mind how to interpret the piece.

Inferring tempo through the beat note

A beat is a rhythmical unit of time that lasts (more or less) for the duration of about one second.

A composer must decide what size beat note will *infer* the proper sense of speed to the reader. Most people don't really understand what a beat is and a composer assumes this. So the first order of business is to use a beat-note size that "infers" the proper tempo the first time someone looks at a piece.

- If they use a half note, one might think the song is slow.
- If they use a quarter note, one might think the song is average in speed.
- If they use an 8th note, a reader might interpret the song as being fast.

The fact is, a song could be slow if written with 8th notes and fast if written with half notes. **The size of the beat note has nothing to do with the length of the beat duration.** A beat is always reasonably static. Whatever size is used, the beat note simply represents a reasonable time frame.

Determining The Best Meter For The Composition

This determination is a double-edged sword because the meter you decide on may be based on the poetic meter, the meter of the melodic measure or both. Some verses combine triple meter with music that is duple meter (or the other way around). You can write a 3/4 waltz in 4/4 (or any other time signature). With so much flexibility, meter takes on a whole new meaning and is a MAJOR consideration of the composer.

Determining a note size scale that relays the message clearly.

The beat note must infer speed with a size scale that is also easy to count. Any size scale of notes can be used to cram as many notes into a measure as you see fit. The goal is to deliver the right mathematical equation that conveys **a fact** that is easy to follow.

Capturing and conveying the feel of the poetic verse and melody.

A 3/4 waltz might convey the feel of a triple meter verse however using 4/4 might be used to say something completely different. There are so many choices of ways to say what you mean when combining poetic verse and music. The two combined make a totally new art form outside of just music or poetry alone.

Capturing the feel of a song

This is the final leg where a composer combines everything together and lays out the song in the most obvious manner. It's more than just figuring out the notes and plopping them down on paper in any old way.

A well-thought-out composition gels together just right with a lot of "in-fighting" and give-and-take between meter, scale size, counting and tempo. The song can be shown many different ways and the composer has to experiment to find the ultimate, right combination to say EXACTLY what he means.

Provided the pitches and durations are correct, **there is no absolute right or wrong way to write a song.** Music is an unbelievably flexible art form. Three musicians may write a song differently and thus state three different opinions of the same thing. It's the ultimate challenge. Chopin says it best:

> ***"Simplicity is the final achievement. After one has played a vast quantity of notes and more notes, it is simplicity that emerges as the crowning reward of art."*** **Frederic Chopin**

Chapter 6: Poetic Meter*

Poetry is a Major Force in Music

Poetry is an art of brevity which paints a descriptive picture of words.

Hickory dickory dock
The mouse ran up the clock
The clock struck twelve
And down he fell
Hickory dickory dock

In a more free-flow poetic way, this is what the poem above says.

The grandfather clock is made of hickory. it
makes a tickity-tockity-tock noise. At
midnight (or perhaps it was noon) a
mouse was climbing the cabinet. When the
chime struck and the mouse fell down
He climbed up again or maybe not.
At any rate, time will still go on.

The two poems may say the same thing but are definitely not equals. The free-flow poem does not have the same rhythm nor capture the brief, vivid imagery of the classic. The classic poem has a solid meter and would probably be written in 2/2 versus the free-flow poem in 4/4.

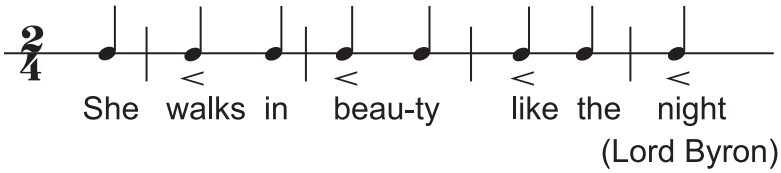
A MAJOR hidden concept is before you at this very moment. That concept is that ***50% (and probably more) of songs base their musical time signatures on the poetic meter of the lyric.*** If you question why a song is written in 2/2 versus 4/4, look at the rhythm of the verse and factor in the objectives of the composer.

Two Kinds of Poetic Meter

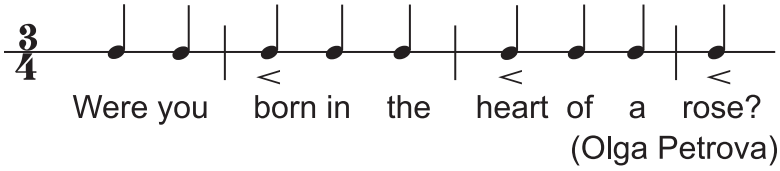
Poetic meter is measured in feet. One "foot" is a grouping of accented and unaccented syllables. When feet are combined into a phrase, the repeating accents form a steady rhythm. The two basic types of meter in poetry are duple and triple where accents fall in different places.

DUPLE-METER	**TRI-METER**
Iambic - / ; - / ; - /	Anapestic - - / ; - - /; - - /
Trochaic / - ; / - ; / -	Dactylic / - - ; / - -; / - -

When fusing poetry with music you only need to understand the difference between duple and trimeter. Whatever type of poetic meter it is, the most important thing is to be able to locate the repeating accent of words. Often, when writing a song the poetic and musical meters will be the same.

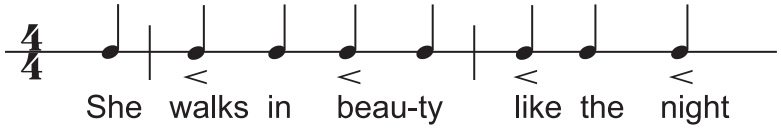


Duple Rhythm
Duple Verse



Trimeter Rhythm
Trimeter Verse

Or, the poetic meter may be compounded in a single measure:



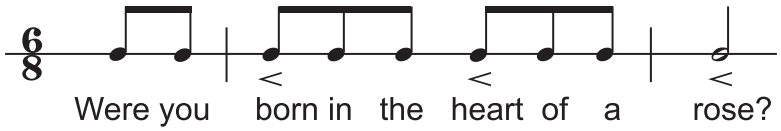


Figure 14.1 Poetic verse and the downbeat must always be in sync.

The Downbeat

In poetry there are two types of accented patterns. The first begins with an accent and the other doesn't. With poetry, the accent may fall anywhere in the phrase provided that the pattern is uniform throughout. However, music is more rigidly structured in its accent placement. Every measure always begins on an accent. That accent is called the ***downbeat***.

To combine music with poetry, **the accent of the poetic verse must shift to conform to the downbeat of the measure.** The two examples above begin on unaccented words. When the poetic verse shifts, notice how the first accented word of the verse conforms with the measure's downbeat. Music forces poetry to conform to music's set of rules when it comes to where the accent falls.

Pick Up Measures

Shifting the accented meter of the poetic verse to conform with the downbeat upsets the meter of the first and last measures of the music. These two measures are exceptions to the time signature. The pick up measure and the last measure of the song will equal the right number of beats shown in the time signature.

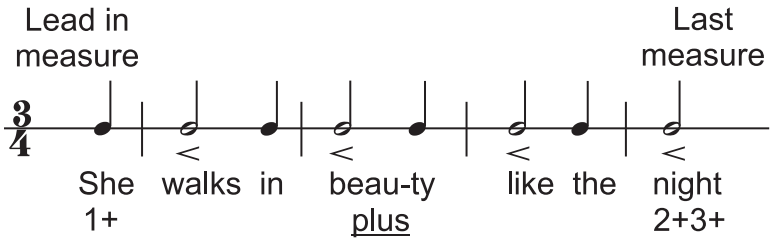
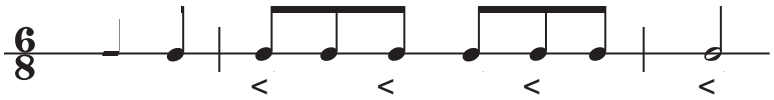


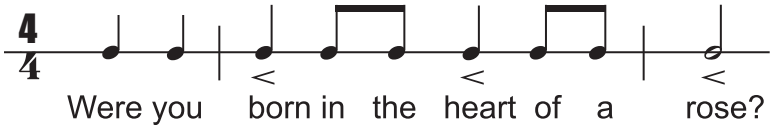
Figure 14.2 The pick up measure and last measure equal the value of the time signature.

Opposing Meters

Music adds another dimension to poetry. The rhythm of music can change the rhythm of the poetic verse without disturbing the accent. This is something that poetry cannot do by itself. The examples you have seen so far can just as easily be written using opposing types of meter:



Trimeter Rhythm
Duple Verse



Duple Rhythm
Trimeter Verse

Figuring Out the Meter

Some people have more difficulty than others in determining the meter of a song. Their sense of beat is not very attuned. It takes practice to find the accents and count the beats evenly. With experience, you will find it easier to determine when the meter is duple or triple. An easy way to resolve this question is to try and waltz to the tune. If you can waltz to it, it's trimeter (3/4, 6/8, etc...). If not, it is probably duple (2/4, 2/2, 4/4, etc...).

Footnote * Most of this chapter, including the examples, was derived from an excellent college music-theory textbook that I lost. My apologies that I am unable to give proper credit to the source. Any assistance identifying the source would be greatly appreciated.

Chapter 7: What Is a Beat?

Could there be any more of an obvious question than this? Some people may roll their eyes in disbelief of such a 101 concept. "A beat's a beat, alright?"

Okay, you may be on top of this but right now we can't assume anything. Let's delve into your full understanding and clarify a few things.

The Conversation

Me: "How long does a beat last?"
You: "It varies in speed. It depends . . ."

Me: "Depends on what?"
You: "How fast the song is."

Me: "How do you know how fast the song is?"
You: "I know the song. I've got the record."

Me: "What if you didn't know it? How would you know how fast to play it?"
You: "I suppose I'd guess."

Me: "Based on what?"
You: "I don't know . . . maybe the size of the beat note?"

Me: "Let's explore that. Comparatively, if the beat note is represented by a half, quarter or eight note (2/2, 4/4 or 6/8), which beat-note will be the fastest?

You: "The eighth note in 6/8."

Me: "Why do you say that?"
You: "It's a smaller note and just looks faster."

Me: "Okay, so, what's a beat?"
You: "I'm not sure I really know."

See how this non-clarified 101 concept is the cause of so much uncertainty? You cannot allow simple questions like this to go unchallenged. In no uncertain terms, you must understand what a beat is. But just try to get a straight answer somewhere. Here it is:

The 3 Things You Must Know

The Fact:

Regardless of the size of a beat note (2/2, 4/4 or 6/8) in our example above, they are all the same in duration. No one beat note is faster than the other. In this way, a beat is a beat. All beats are equal in time and space.

How Fast Is It?

A beat is a reasonable time frame that pulses evenly. 1/8th of a second is not a reasonable pulse nor is a 5-second delay. "Reasonable," as a benchmark of speed, is about 1 second. Forget about the note size or the time signature. A beat, as a concept, stands alone at approximately 1 second.

The Impression:

Your perception that the 8th note is to be played the fastest is not all wrong. You unwittingly may be picking up on something that's not so obvious. A composer that uses a lot of 8th and 16th notes in a song may be visually inferring to you that the song is to be played faster. With every piece of music you look at, the composer relays a subtle message regarding implied speed. Some do it better than others.

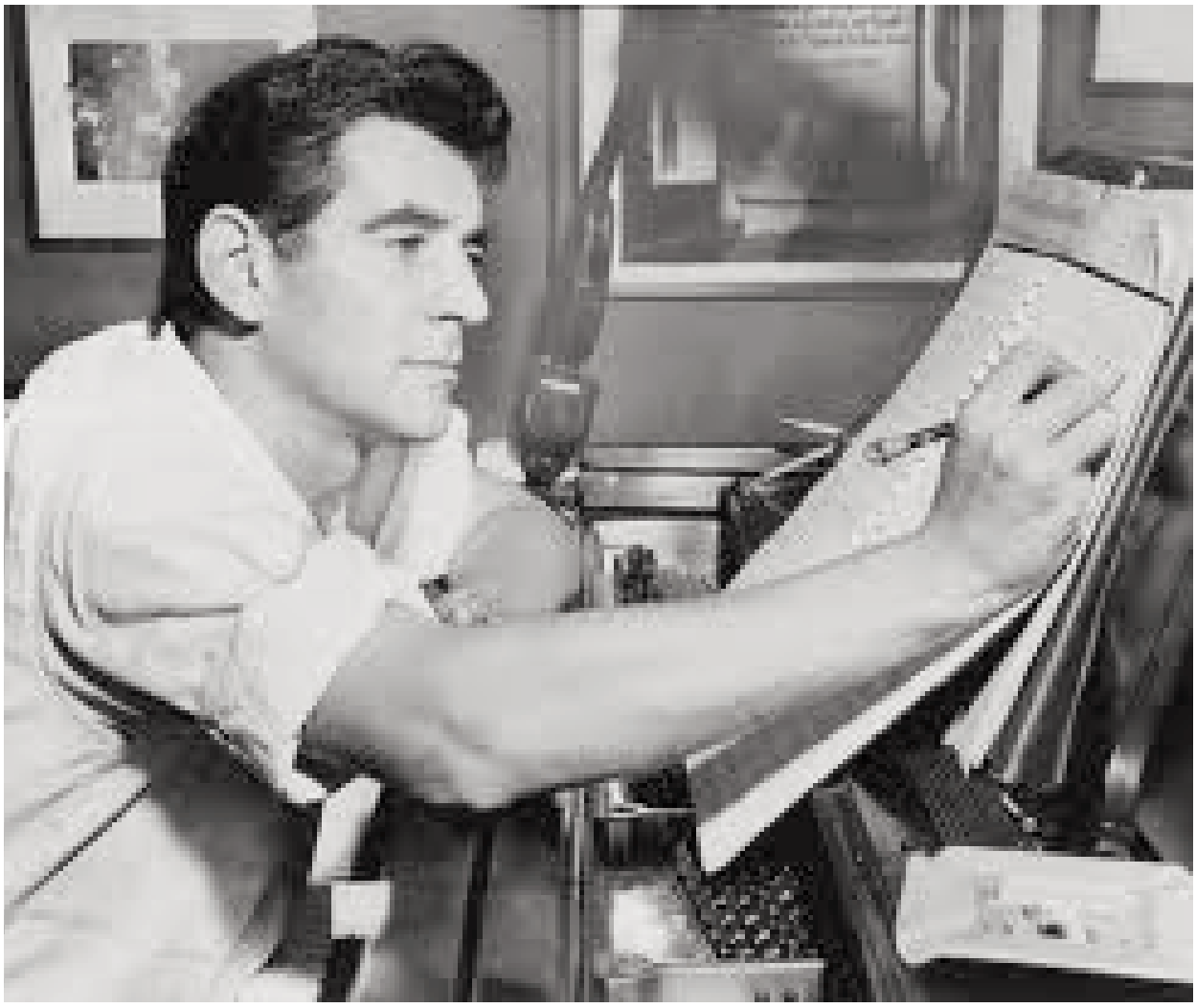
Examples:

- A song is written in 2/2 with a lot of half notes.
  Does this look fast or slow? Slow.

- A song is written in 6/8 and is black with 8th and 16th notes.
  Does it look fast or slow? Fast.

Conclusion:

When you consider what a beat is, you must temper your understanding between the fact that all beats are the same and your impression of speed that is being inferred by the composer. Between those two things you will find the optimum pulse on either side of 1 second.



“I'm not interested in having an orchestra sound like itself. I want it to sound like the composer.”

Leonard Bernstein

Chapter 8: Time Signature Secrets

When interpreting music, the time signature lays the ground rules for counting measures and individual notes. The top number states the number of beats that are in the measure and the bottom number identifies the beat note. Determining the right time signature is one of the most important decisions a composer makes in order to create a piece in its most obvious form.

First Impressions

If any song can be written with any time signature and say the same thing, why then is one better than another?

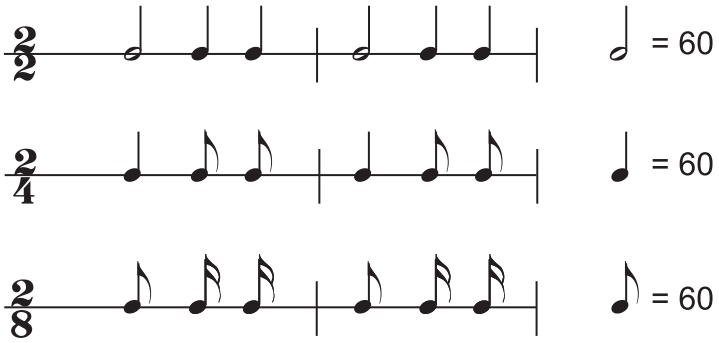


Figure 16.1 Different time signatures showing the exact same thing.

The top number of the examples in Figure 15.1 shows there are 2 beats per measure. The bottom number shows a beat note which represents a size scale. Assuming that you are reading an unfamiliar piece for the first time, which one of the shown examples is faster?

None of them. In each case the beat note is equal to 1 second. Regardless that the scale sizes of the notes are different, they are counted exactly the same.

A major part of "obviousness" in writing involves this perceptual "first impression." We naturally interpret the small 2/8 size scale as being faster because it *looks* faster. You can never summarily judge a book by its cover. In all cases, you must remember that a beat is a just a beat no matter what note is used to represent it. A beat does not speed up or slow down based on the size scale of the note. It stays the same.

Why is this understanding so important?

Because while composers don't really think you understand what a beat is, they have to write their music like they assume you do. When they decide on a particular beat note size scale, it might be because they want to infer something to the sight reader. If a composer uses the 2/8 example above, they are inferring that the piece should be played fast even though mathematically it says something else.

Comparatively, each time signature in Figure 15.1 states the same meter and duration of time (about 2 seconds per measure). Since the meter is clearly stated in all examples, any one of these signatures can be used to write the song.

So which size scale is the best?

It depends. The beat note should be visually easy to read as well as easy to count. Figure 15.2 changes notes to words to make it clearer.

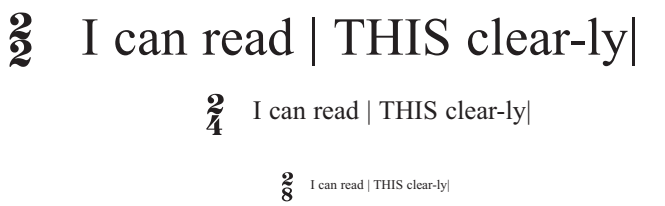


Figure 16.2 This shows beat note size scales replaced with words.

Comparatively, the *words* say the same thing however, 2/2 is twice as big as 2/4, and 2/4 is twice as big as 2/8. The time signature shows the size scale in relation to the size of a whole note.

= 1	The equivalent of a whole note can be shown in a measure.
= ½	The equivalent of a half note can be shown in a measure.
= 1/4	The equivalent of a quarter note can be shown in a measure.

If you want to write down a tune in your head, the best way to make it obvious is to use 2/2 time, right?

Not necessarily. Whereas 2/8 may be a size scale that is too small for clarity, 2/2 can just as easily be a size scale that is too big.

Compare this to where you decide to park your car at a drive-in movie. Your intentions may have as much to do with the location as well as your perspective.

The Drive In

If you park in front of the screen, you will see the movie but miss a lot of detail because you are too close. However, that may be your best choice if the bathrooms or concession stand is up front and that is important to you for one reason or another. *Your intent is comfort.*

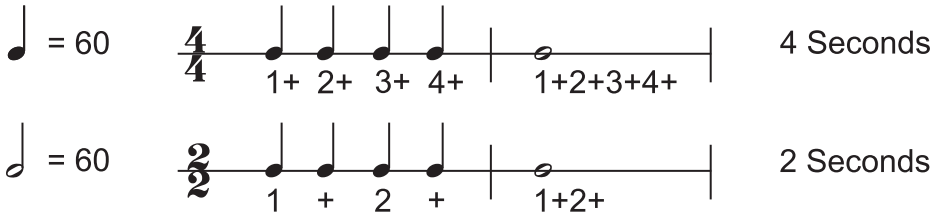
If you park in the back of the lot, you'll see the detail better than sitting up front but you will still miss a lot because the size of the projection will be smaller. However, you may not care if your goal is to make out with your favorite squeeze. In that case, *your intent is privacy.*

If you park in the middle, this comfortable viewing range will ensure you see the movie without missing much of the detail. At this distance, clarity may be "just right." That's where most people want to be. In this case, *your intent is perspective viewing.*

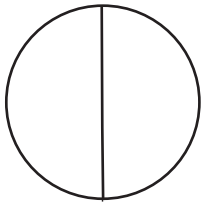
Just like the drive in, rhythmical patterns of notes show the detail of a measure. Depending on the composer's intent, the notes will be easy to read and count. Determining the scale size of notes is a judgment call that must be balanced with other considerations that are also important to clarity.

Size Scale Comparison of 2/2 and 4/4

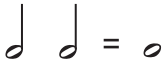
If a time signature is a numerical fraction that represents a percentage of a whole note, then 2/2 and 4/4 appear to be the same. 2/2 and 4/4 both = 1. Although the values of the beat notes are the same, the counting systems of the two time signatures are different.



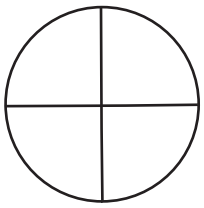
Look at this geometrically.



2 Halves



2/2 divides a measure into 2 halves.



4 Quarters

4/4 divides a measure into 4 quarters

If a beat is equal to one second in duration, 2/2 is twice as fast as 4/4 (a beat is a uniform time frame). Therefore, two measures of 2/2 must be used to show the same time span as one measure of 4/4.

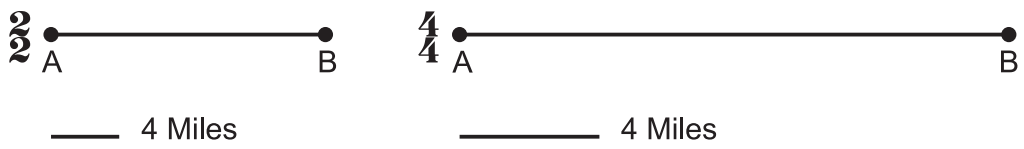
This is a major consideration for a composer to decide.

Will doubling the number of measures enhance the composition or hinder it? It generally depends upon the poetic verse's meter and accent. The composer wants to show relative speed, phrasing of notes and poetic meter together.

Can the musical phrase stand alone and represent the poetic meter clearly in 2 beats, or should it be strung out over 4 beats to get the point across?

Sometimes it is a hard decision to make.

Map Example of 2/2 and 4/4



These two maps above chart the same 16 mile distance between two points. The maps are to scale. Map #1 represents 2/2 time and is half the size of map #2 which represents 4/4. At the bottom of each map is a legend which shows the relative distance equal to 4 miles. Both maps show the exact same uniform distance. If you are to journey from point A to point B, **the smaller map will not get you there any faster**.

Suppose you are the surveyor of this distance. How do you decide what scale size to use to draw the map? You must consider who is going to use the map and how much detail they will need to see. If there are 6 towns between points A and B, either size scale (2/2 or 4/4) can be used to comfortably chart the locations. In that case, either size scale will work just fine.

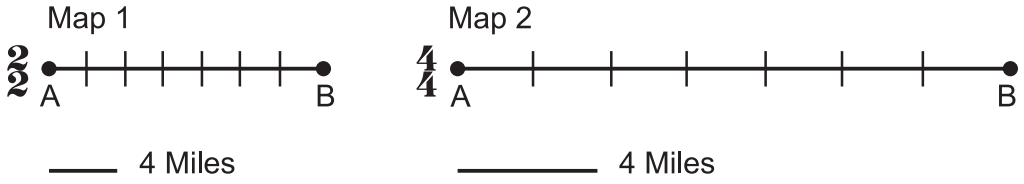


Figure 16.3 When detail is not an issue, any size map can be used.

But what if there are 14 towns between points A and B? Though you may be able to squeeze those 14 towns on the smaller map, the scale is not conducive to clarity. In that case, a bigger map (4/4) will be easier to read and give a better indication of the distance from one town to the next.

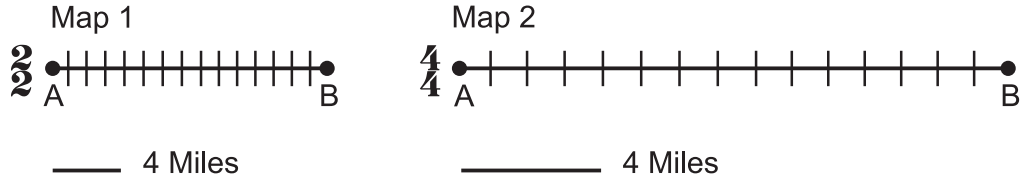
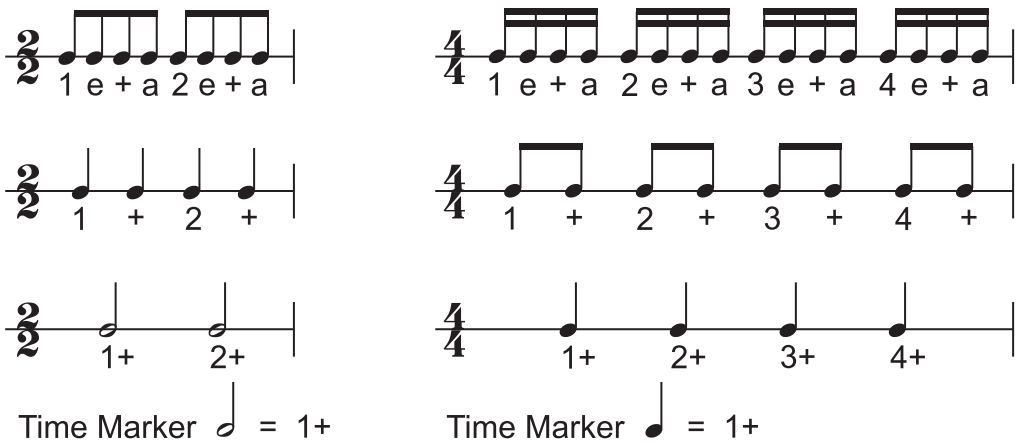


Figure 16.4 The greater the detail, the bigger the map must be.

4/4 time represents a map scale twice as big as 2/2. In 4/4 time you can comfortably chart 16 notes. In 2/2 time you can only chart 8 notes comfortably.



When figuring the meter of a song, you must decide which scale size best fits the composition.

- 16th notes can be comfortably charted in 4/4 or ?/4 (1e+a).
- 8th notes can be comfortably charted in 2/2 (1e+ or a) or 4/4 (1 or +).

8-To-The-Bar

Freddie Slack the great boogie woogie pianist in the 30's is credited with coming up with the term "eight to the bar." The style was always earmarked by a driving, syncopated grouping of 8 notes per measure in the bass (usually 8th notes). It was often notated in 4/4 time to simplify counting but the 2/2 time signature is a better representation of that kind of music.

The problem with using 2/2 time with 8-to-the-bar is that occasionally one had a need to slip in a 16th note to spice up the syncopated bass or the right hand licks. When this happens it creates a confusing situation because one cannot count a 16th note in 2/2 time. The smallest countable note in 2/2 is an 8th note. This type of counting is called "half time."

Half Time Counting

When you see this kind of redundancy in music, the best way to handle it is to count out the measures in 4/4 and play it twice as fast. Play the one-note melody line over and over again until you get a good feel for how the song goes. Half-time counting usually involves a dotted 8th note followed by a 16th. This staggered syncopation is one you should come to recognize and play without having to count it out.

Chapter 9: Capturing the Feel of a Song

Writing music is open to interpretation. There are many different ways a song may be written correctly. Rhythm, meter and pitch are mathematical facts. Once these facts are decided, a composer's attention shifts to presenting the facts in the most obvious manner. There are a number of things they can do to tweak the arrangement. They can change the size-scale of notes, compound the meter or change the time signature.

Accurately capturing the feel of a song is a subtle skill which not only considers *what* is being said, but also *how* it is being said. It's like the dilemma of the one-line actor that must decide how to say the line "You're not too old." There are four different ways to stress those words. Each way means something different.

"You're not too old."(You still qualify for the child fare)
"You're not too old."(You're still capable of doing it)
"You're not too old."(. . . but you're getting there)
"You're not too old."(Maybe just too stupid)

How the line is performed depends on the situation. To relay the intent clearly, the actor will consider and weigh all of the innuendos and inflections that will make the most of the line.

Writing music is much the same. It's not just a matter of where the accents are located, it's more a matter of how strongly they are stressed in the context of the phrase. "Innuendo" when writing music is a fusing of rhythmical durations of the music with the poetic accent of the verse. Both music and poetry are singularly independent of each other. Fusing music and poetry is a matter of judgment to what works and feels the best. Sometimes you have to work at it a bit but when you find that right mix, you know it.

11 Different Ways To Write The Ants Go Marching

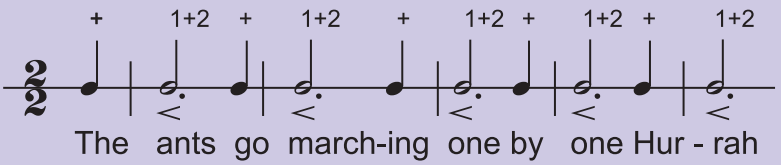
The following is designed to show you exactly what goes through a composer's mind when they write a song. Let's set the stage:

Verse meter is duple: The | ants go march-ing | one by one hur | rah
< < < < <

Melody Rhythm Meter: Seems to be some sort of duple meter

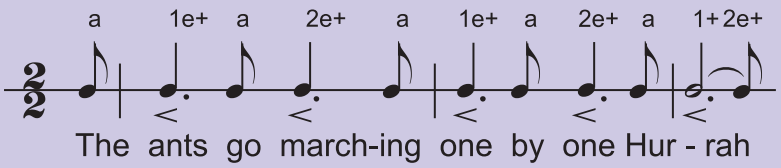
Let's set off on our journey and look at our options one at a time, discuss what the options mean, what's good about them and what doesn't work.

Example #1



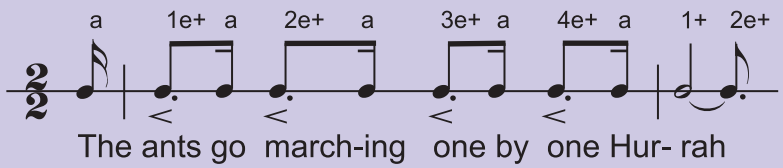
Note Scale Size:	Too big.
Counting:	Easy to count
Speed Inference:	Reads slow
Musical Accent:	Poor - should be accented on 1 and 2. Downbeat is okay.
Time Signature:	Properly represents the duple verse and could be okay but not the way it is currently written.
Rating:	Poor. Size scale too big, reads slow and the musical accent does not represent the 2/2 time signature.

Example #2



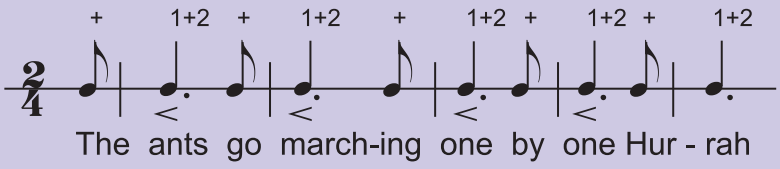
Note Scale Size:	Good
Counting:	Good. 1e+a is a basic count and fairly easy to read. Experienced musicians will recognize the common dotted quarter / eighth note pattern which can be read quickly without actually have to count it out.
Speed Inference:	Good. Appears to move along at the right pace.
Musical Accent:	Good. 2/2 accents fall on 1 and 2 as they should.
Time Signature:	Good. Represents the duple meter of the verse.
Rating:	Good Plus. This one is a contender.

Example #3



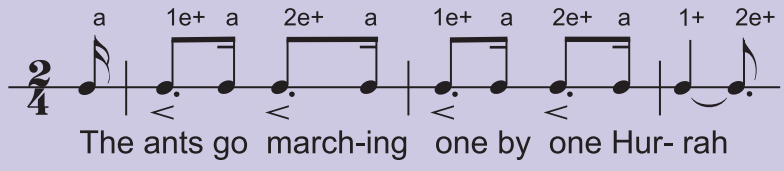
Note Scale Size:	Too small for the song. You would question the intent of the composer.
Counting:	Poor as far as 1e+a counting goes. Experienced musicians will recognize the common dotted eighth / sixteenth note rhythm so it's not particularly hard to count. That said, this size scale is half time counting which cannot be counted in 2/2 time using 1e+a. You have to count it in 4/4 and then double the speed.
Speed Inference:	Fair. Reads fast using 8ths and 16th notes and is written in half time which cannot be read in 2/2 time. This has to be counted in 4/4 and then doubled in speed.
Musical Accent:	Poor. 2/2 accents should fall on 1 and 2. The way it is written, there are 4 accents per measure. Does not represent the duple verse meter whatsoever.
Time Signature:	Good. Represents the duple meter of the verse but only as it relates to the poetic verse and not the musical rhythm shown.
Rating:	Poor. Size scale is too small, cannot count in 2/2, reads too fast and the verse accent is not represented.

Example #4



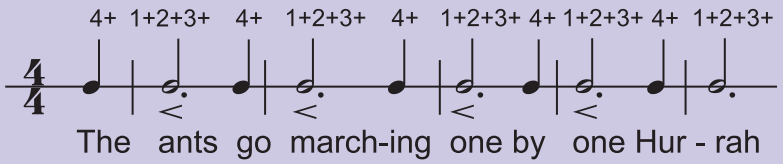
Note Scale Size:	Too big. This is the quarter note version of Example 1.
Counting:	Easy to count
Speed Inference:	Reads slow
Musical Accent:	Poor - should be accented on 1 and 2. Downbeat is okay.
Time Signature:	Properly represents the duple verse and could be okay but not the way it is currently written.
Rating:	Poor. Size scale too big, reads slow and the musical accent does not represent the 2/4 time signature.

Example #5



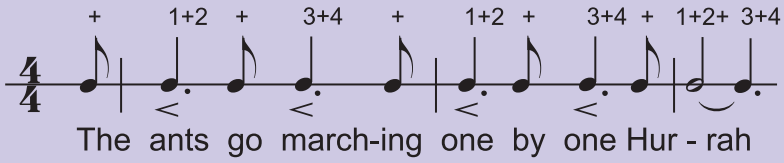
Note Scale Size:	Good -. Reads slightly fast. Some people might be turned off by the smaller scale of the notes as being too busy but it is certainly acceptable. This is the quarter note version of Example 2.
Counting:	Good. 1e+a is a basic count and fairly easy to read. Experienced musicians will recognize the common dotted 8th / 16th note rhythm which can be read quickly without counting it out.
Speed Inference:	Good. Appears to move along at the right pace.
Musical Accent:	Good. 2/4 accents fall on 1 and 2 as they should.
Time Signature:	Good. Represents the duple meter of the verse.
Rating:	Good Plus. This is a contender but not as good as Example 2.

Example #6



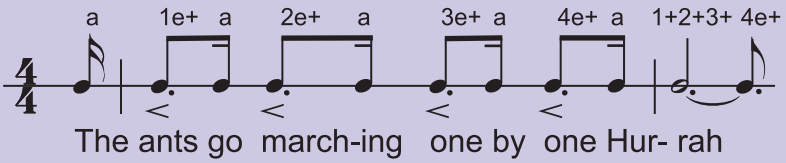
Note Scale Size:	Extremely poor. Way too big.
Counting:	Easy to count but is all wrong.
Speed Inference:	Extremely poor. Reads super slow. One measure is about 4 seconds.
Musical Accent:	Extremely Poor - should be accented on 1 and 2. This one can only place a single accent in 4 distinct beats. Downbeat is the only thing that is okay.
Time Signature:	Fair. Might properly represent the duple verse as a compounded meter. It could be okay but not the way it is written.
Rating:	Extremely poor. Size scale is way too big, reads very slow and the musical accent doesn't match the verse.

Example #7



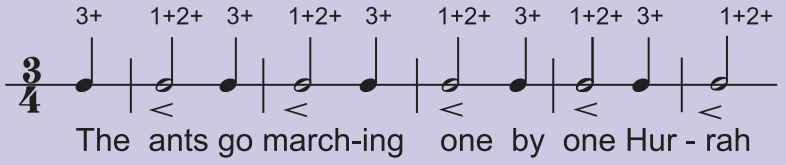
Note Scale Size:	Too big but at first appears acceptable.
Counting:	Easy to count but gosh, are we there yet?
Speed Inference:	Reads slow. Twice as fast as #6 but still a snail's pace.
Musical Accent:	Fair but acceptable - Ideally the duple poetic meter should be accented on 1 and 2. As a compounded duple meter, the accents fall on 1 and 3. That's a long time between accented beats. The downbeat is okay.
Time Signature:	Properly represents the duple verse (compounded 4/4 meter is a judgement call)
Rating:	Poor. Size scale too big, reads slow with a fair musical accent that represents the 2-beat poetic meter.

Example #8



Note Scale Size:	Good.
Counting:	Good. 1e+a is a basic count and fairly easy to read. Experienced musicians will recognize the common dotted 8th / 16th note rhythm which can be read quickly without counting.
Speed Inference:	Good. Infers a little fast but this is certainly acceptable. Moves along at the proper tempo.
Musical Accent:	Fair Plus. Accents fall on 1, 2, 3 and 4 which is sort of unique for 4/4 which is generally unaccented on 2 and 4. That said, the accents fall in line with the verse and it works fine.
Time Signature:	Good. Represents a compounded duple meter of the verse. Not as good as using a duple time signature but overall this is good.
Rating:	Good. The size scale is good, the tempo is in the ballpark and the musical accent matches the poetic meter. A better version of this is Example 5.

Example #9



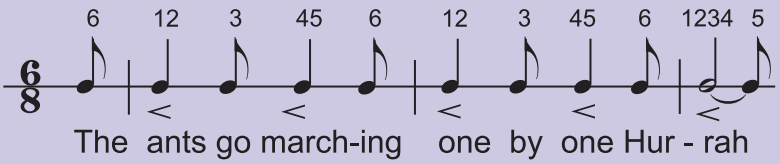
Note Scale Size:	Extremely poor. Way too big.
Counting:	Easy to count but is all wrong.
Speed Inference:	Extremely poor. Reads super slow. One measure is about 3 seconds. The ants are sleepwalking . . .
Musical Accent:	Poor - The poetic verse has a duple meter but only 3 beats can be shown in the measure although the proper accent is shown beginning each measure. The downbeat is the only thing that is okay.

Time Signature:	Fair. 3/4 is generally used for waltzes and I don't think The Ants Go Marching is a waltz. This time signature works but not the way it is written.
Rating:	Extremely poor. Size scale is way too big, reads slower than slow and the musical accent only marginally represents the duple meter of the verse by spreading it over 2 measures.

Example #10

Note Scale Size:	Good. Comfortable size to work with this time signature.
Counting:	Easy to count as far as counting 1 or + but is all wrong. Again 3/4 represents a waltz (which this song is not). Besides that, the note values - although proper - are difficult to count within the context of a 3/4 time signature. 1 2 3, 1 2 3 . . . shall we dance? Not likely using this counting scenerio.
Speed Inference:	Good. The size scale of the notes looks right and actually moves the song along although slightly less than the proper tempo.
Musical Accent:	Good Minus. The duple poetic verse is spread out over the course of one measure but as waltzes go, very few have an accent on the 3rd beat. 1 2 3, 1 2 3 - Please honey, don't step on my feet. . . Works but is just not great.
Time Signature:	Fair. Again 3/4 is generally used for waltzes. This example, however, is a great improvement over Example 9.
Rating:	Fair Plus. Size scale is good, it has an easy counting scheme (but executing it well might be a challenge), the tempo is represented, the verse accent will work and the time signature is acceptable. It's weird because there is something about this that feels so right yet, it's all wrong.

Example #11



Note Scale Size:	Good size scale of notes commonly used with this time signature.
Counting:	Excellent. Very easy to count using 1 2 3 4 5 6 which is a common count for 6/8.
Speed Inference:	Excellent. The size scale of the notes looks right and move the song along at the proper tempo.
Musical Accent:	Excellent. The duple poetic verse is spread out over 6 beats with accents on 1 and 4 which works just fine. 1 2 3 4 5 6, 1 2 3 4 5 6. There is something that is right about this counting scheme.
Time Signature:	Excellent. While this is a trimeter rhythm, it is not a waltz. In fact, many marches are written in 6/8 and we can see why with our example here.
Rating:	Excellent. Size scale is good, it's easy to count, the inferred tempo is right on and the poetic accent is well represented by the counting scheme.

The Winner?

In my opinion, Example #11 is the best option for showing obviousness and capturing the feel of "The Ants Go Marching" (however Examples 2 and 5 made a good showing). Everything seems to come together with this arrangement. Given that many marches are written in 6/8 time it is not such a surprise.

As one last comment you should always remember that meter and clarity are two separate things. The bottom number of the time signature is variable to the size scale of notes one might feel best shows obviousness (in size scale and tempo). The top number of the time signature shows the meter and indicates a particular type of accent that needs to be paired up with the poetic verse.

The initial workable time signature a composer uses to write a song often changes as conflicting elements of obviousness battle it out for dominance in an arrangement.

The Last Word

MIDI Insanity

Much of the music written today is done with the help of MIDI technology. There are many programs that make the process of writing easier by giving a composer tools that let them make changes quickly. Such tools include changing the key signature; time signature; size scale of notes; and everything mentioned throughout this book.

However, it is increasingly evident in modern-day sheet music that for many MIDI is just a mindless crutch. A lot of composers have no idea how to express themselves properly to convey their ideas. Instead of understanding the craft, they forfeit control to a machine that can mathematically make some kind of sense to the work. You can't just accept what it churns out as Gospel truth. You almost always have to manipulate MIDI results.

The most common tip-off of mindlessness when analyzing a score is the use of 32nd notes. 32nds and 64ths are occasionally used but for popular music should really be NONEXISTENT!

I throw my hands up in the air when trying to interpret a piece that may make mathematical sense, but entirely misses the mark of capturing the feel and at being easy to count. It's very clear that transcribing music properly to capture the feel of a song is quickly becoming a lost art form.

You're The Expert

Whether you are relatively new to music theory or a seasoned pro, you may not be able to instantly gauge the value of this book. Some things you have to study for a while before they sink in. This is advanced thinking.

Please be gentle in your critique of what you've read and whether or not this book delivers its promise. These are the most uncommon insights of music theory you will ever find. Reread it several times and ponder the knowledge.

Are there other quandaries of music not discussed? Maybe . . . probably . . . but I believe whatever those questions may be, this book will make it easier for you to figure them out.