Transpositions

Understanding and Study

A guide for addressing common transposition issues for conductors and educators

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Understanding Transpositions

INTRODUCTION

One of the questions often asked in conducting classes is: "Why do instruments transpose? Why can't everyone just read it in concert key?" As you can probably guess, this question seems to pop up around the "Score Study" section of the class, when musicians who have only ever dealt with concert key are suddenly inundated with instruments pitched in B-flat, E-flat, and F. Musicians who have only ever read C parts find score study and transposition to be difficult at first, but with practice and a bit of application, any musician can learn how to transpose with ease. There are several unrelated reasons why we (still) have transposing instruments, and they have nothing to do with making a student conductor's life harder.

HISTORY

THE ORGAN

Before pitch was standardized at A440 (1936 in America, 1955 by the International Organization for Standardization), pitch in any given locale was often dictated by the local church organs. This often created the need for traveling musicians to transpose parts on-the-fly. Bach himself notated certain transpositions for out of town musicians who visited the Thomaskirche (St. Thomas Church) in Leipzig. Likewise, instrument makers in those towns would most certainly make instruments that conformed to the pitch set by the town's organs (causing problems when those musicians traveled elsewhere).

THE VOICE

Vocal practice has always been to notate music within the staff as much as possible, in order to keep things simple. When instruments began to have notated music, parts were written within the staff as much as possible, using few ledger lines in order to simplify reading of the music. Of course, instruments are not all created equal. To account for the various ranges and tessituras of different instruments, transposition became the norm.

BRASS INSTRUMENTS

Before the advent of valves, brass instruments were built in many different lengths (keys) so that they could play the harmonic series of the particular fundamental note they were built in. Once valves were introduced, instruments became fully chromatic, and musicians (and publishers) had a choice to make: Rewrite all the music written prior to this, or transpose the old parts that had been written in concert pitch. Needless to say, publishers were in favour of whatever was going to cost less, and since engraving by hand was time-consuming and expensive, musicians were left with the burden of transposition.

WOODWIND INSTRUMENTS

Some woodwind instrument families (e.g., clarinets, double reeds, saxophones) have variants which change the instrument range by something other than an octave. To make it easy to switch between instruments in the same family, the parts for these instruments are transposed so the same written note has the same fingering, but *produces* a *different* sounding pitch.

LOGISTICS

Music, much like history, is cumulative. It represents the collective contributions and practices of those who came before us. A vast repertoire exists that is written specifically for transposing instruments, and performers of these instruments are systematically trained to read in transposed keys. Proposing a shift to concert pitch notation for all beginning students would have significant implications. It would necessitate the re-engraving or re-transcription of virtually all existing literature for transposing instruments. Moreover, current performers - trained extensively within the traditional transposition framework -would be required to relearn how to read and interpret notation for their instruments.

For an extended period (likely spanning several decades) educators, composers, and publishers would be forced to maintain parallel systems: one using traditional transpositions and another using concert pitch notation. This dual approach would be necessary until the majority of musicians trained in the traditional system had exited the field. Ultimately, while such a change might offer long-term clarity, the logistical and pedagogical challenges of such a transition would be considerable. As with other long-standing systems, such as the imperial measurement system or the QWERTY keyboard, efforts to reform deeply ingrained practices often encounter substantial resistance.

TRANSPOSITION FOR CONDUCTORS

Transposition is an essential skill for conductors, yet it is often overlooked in score study. Because many instruments do not sound at concert pitch, conductors must understand how to transpose between concert and written pitch, transfer parts between instruments, and determine accurate key signatures for each transposition. Without these skills, effective score study and part correction are simply not possible.

As an initial step in learning transposition, it is essential to memorize the sounding interval of each transposing instrument relative to concert pitch. One helpful heuristic is to consider the general size of the instrument: smaller instruments tend to sound above concert pitch, while larger instruments typically sound below it. While this guideline is not universally applicable, it can serve as a useful reference for students who have a mental image of the instrument families. For example, following this logic, the piccolo, being a small instrument, sounds above concert pitch, whereas the larger alto saxophone sounds below concert pitch.

> Tip: Most instruments written in a clef *other* than treble (e.g., bass clef, tenor clef, alto clef) will be sounding at concert pitch, *regardless* of their name. There are exceptions such as the string bass and contrabassoon, who sound an octave below written pitch, or the Horn when it reads in bass clef).

A PROCESS FOR TRANSPOSITION

To learn transposition, a musician must understand that it is a mathematical process, not a "musical" one. A proper understanding of transposition comes about when one sees that the intervals represent an equation, just as in mathematics. If the correct names and numbers are entered in the first half of the following "equation," the second half of the equation is automatic and always correct. Here is the equation:

> The [***instrument***] sounds a [***major/minor/perfect***] [***above/below/in***] concert key, and is written a [***major/minor/perfect***] [***above/below***] concert in the [***treble/bass/etc.***] staff.

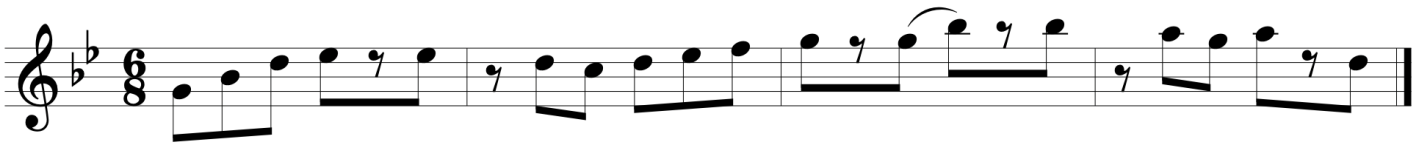
So, as an example: The [Bb Soprano Clarinet] sounds a [Major 2nd] [below] concert key, and is written a [Major 2nd] [above] concert in the [treble clef] staff.

The second half of the equation simply *reverses* the direction of the interval, and tells us what has to be done in order to make a properly readable part. In the previous case, every note of the part in concert pitch must be raised a Major 2nd to be played correctly by the clarinetist. The new key signature for the part is derived in the same manner. For example, in the above case, if the concert key signature were D Major, our part would have to have an E Major Key.

If an error in the clarinet part requires correction, the conductor must translate the music back into concert pitch to check it with the underlying chord structure: You would lower the written note a Major 2nd to concert pitch to check it against the underlying chord structure. Remember, the sentence in its entirety tells the writer how to transpose for the instrument and derive the new key signature. Reversing the direction brings the transposed note back to concert pitch.

Sometimes while on the podium, the conductor must react quickly to questions and problems that necessitate transposition. "*My note sounds wrong. Do I have a misprint*?" is a typical rehearsal question. To answer it, it is necessary to transpose the student's note back to concert pitch, immediately find the underlying chord by transposing many other parts, and make an instant judgment as to the correctness of the questioned note. It is not enough just to compare the student's note to the score, since that note may simply duplicate an error already in the score.

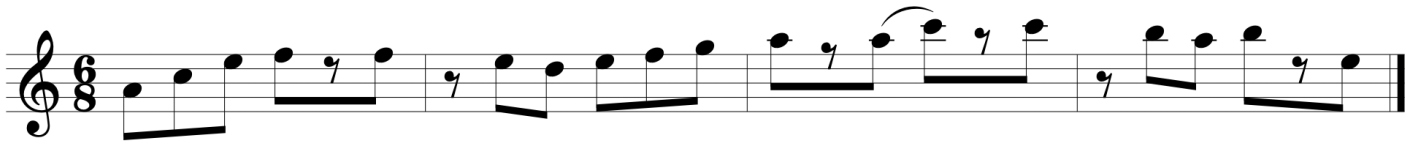
Here is another common problem: A piece of music has a prominent English Horn solo, but that instrument is not available in the ensemble, and the solo is not cued. The conductor must first make the choice of an alternate instrument (possibly the alto saxophone), and then write out a transposed part for the performer on that instrument. For example…here is an English Horn solo, but you have no English Horn:



You decide to give the solo to an alto saxophone. Our equation reads as follows:

> "The E-flat Alto Saxophone sounds a Major 2nd below the English Horn (which is in F) and is written a major 2nd above the English Horn in the treble staff."

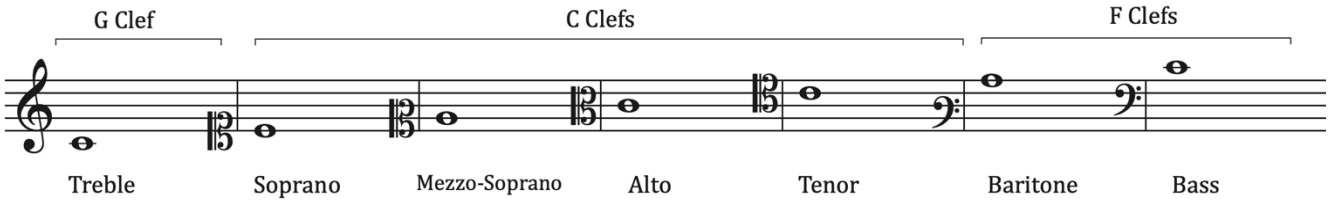
First, we would take whatever key signature is in the English Horn part and raise that key signature a Major 2nd. Since the original part shows the key of B-flat, raising it a Major 2nd gives us the key of C – no sharps or flats. We then raise all notes in the English Horn part a major 2nd so they can be read correctly by the alto saxophonist. Now we have a part that can be given to the saxophone player:



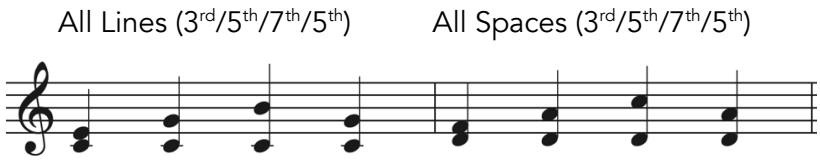
Musicians who invest time in learning transpositions will develop significantly greater confidence in score study. With continued practice, transposition becomes increasingly intuitive. Rather than relying on uncertain guesses or postponing decisions until a later rehearsal risking forgetfulness, conductors will be able to provide accurate, immediate answers that are clear both to themselves and to those seeking clarification.

READING TRANSPOSITIONS by CHANGING CLEFS

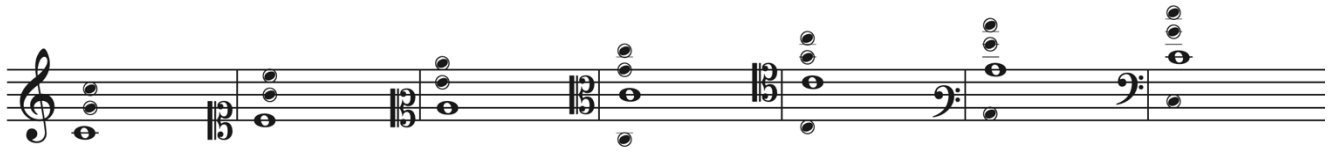
In the following section we will discuss specific transposition by instruments, but before we get there, we might do well to review the different clefs that can be used to aid in transposition. Clef names are identified by the vocal parts that originally used them, or by the umbrella terms G Clef, C Clef, or F Clef (because the clef centers itself around those pitches).



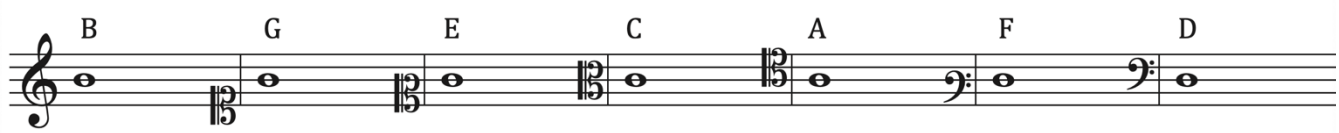
Instead of trying to memorize every line and space on each staff, it is useful to think in terms of reference points to measure intervals quickly. For example, all intervals of 3rds, 5ths, and 7ths are going to be on either every other line, or every other space, depending on the starting pitch, as shown below.



Middle C is also a good reference point in each clef, and we can become fairly adept at picturing the 5th and the octaves (above and below) as well.



Another good option is to memorize what the center line is for each clef (plus octaves).



As we prepare to read transposing instruments and transposed music using some of the information above, it is important to keep in mind that all transposition requires three steps:

1. Changing the clef;
2. Adding or subtracting accidentals from the original key signature;
3. Correcting some, not all, of the accidentals in the original music after the clef has changed.

In the next section, we tackle the job of transposing each instrumental pitch family. A word of warning for the faint of heart: This is not easy. It will get easier with practice, but if you do not put in the time to practice transposition, it will remain daunting for the rest of your musical career, putting you (and your students) at a disadvantage). As with most other things musical, the key is to practice until you can consistently transpose at a comfortable rate.

READING TRANSPOSING INSTRUMENTS IN A SCORE

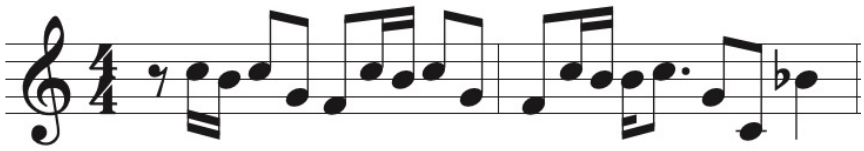
C Instruments

Clearly, the easiest staves to read will be the instruments that are pitched in C. With this grouping of instruments, the only thing that needs to be remembered is which instruments sound an octave or two below (or above) written pitch (e.g., piccolo, celesta, glockenspiel, string bass, guitar, etc.)

B-flat Instruments

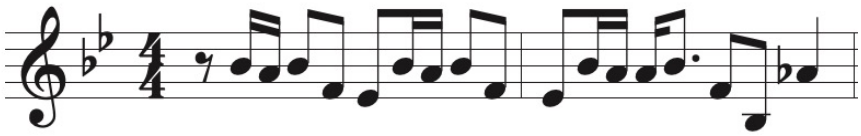
The second easiest grouping of staves to read will be the instruments that are pitched in B-flat. One can easily "do the math" and transpose a major second down from any written pitch (e.g., a written E-flat would sound a D-flat, a written G would sound an F, written C-sharp would sound a B natural, etc.)

However, if you are comfortable with tenor clef, you can also pretend that you are reading notes in tenor clef rather than in treble clef. The only catch is that you would need to modify the key signature by subtracting two sharps (or adding two flats). Also keep in mind that these notes would sound one octave higher than written. Here's an example:



Written Melody for B-flat instruments

If this were our melody, played by a B-flat instrument, it would sound a Major second lower than written (and would have a corresponding key that was a Major 2nd lower). It would ***sound*** like this:



Sounding Melody if played by a B-flat instrument

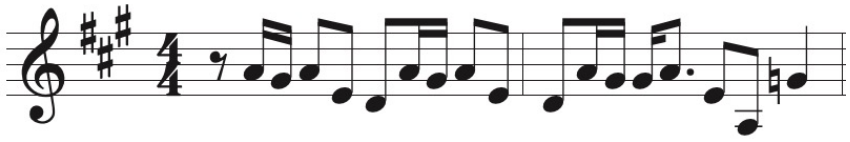
So…if we go back to the written melody, and *pretend* it was in tenor clef instead, we get:

Reading the part as if it were in tenor clef

If you are familiar with tenor clef, then this method might be easier for you (as long as you remembered that the resulting sound is an octave lower than it needs to be). But if you are simply interested in the pitch names, then using tenor clef might work well for you. Don't forget to use the key that is a major second lower than the written melody.

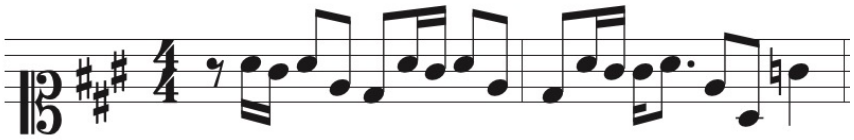
A Instruments

As with B-flat instruments, you can choose to simply "do the math" and transpose a minor third down from any written pitch. If you do so on an A-pitched instrument, then the original melody (first example above) would sound:



Sounding Melody if played by an A instrument

Note that you also have to transpose the key – since the original key was C Major, transposing it down a minor would give you the key of A Major, which is three sharps. However, if you are comfortable with movable clef, you can also choose to pretend you are reading in soprano clef:

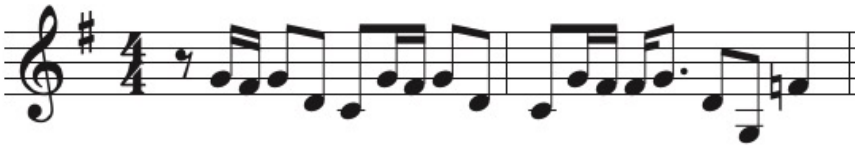


Reading the part as if it were in soprano clef.

Again, it all depends on which method you are most comfortable in using. Some people are more comfortable reading movable clefs than mathematically transposing pitches up or down in their head. Try using both methods and stick to the one that you are more comfortable with.

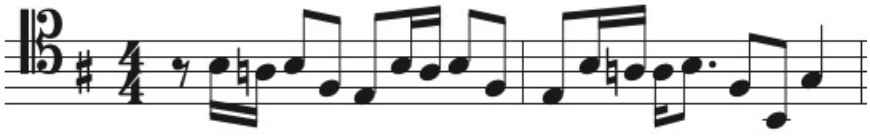
G Instruments

Starting with the G instruments, it gets a little more difficult for some to simply "do the math" (sounds one Perfect 4th below written). Luckily, the only G instrument likely to be encountered by most conductors will be the Alto Flute, which is a somewhat rare instrument.



Sounding Melody if played by a G instrument

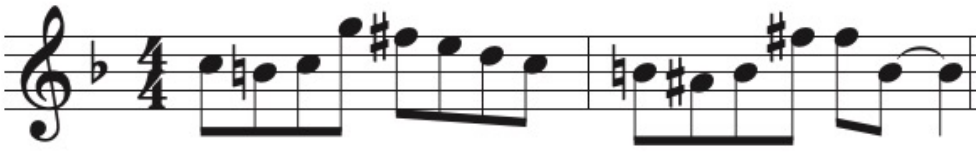
You can also choose to read the melody in *baritone clef*, where the top line of the staff is middle C. Don't forget that you would need to "borrow" and apply the work's concert/sounding key signature.



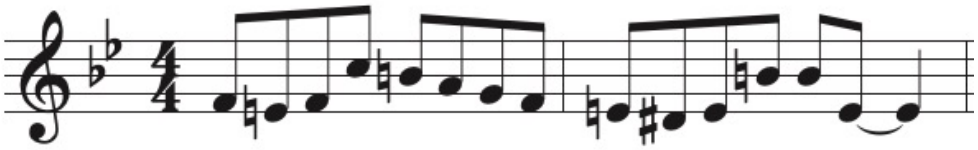
Reading the part as if it were in baritone clef.

F Instruments

Despite the "math" being somewhat easy (everything sounds down a Perfect 5th, should be easy, right?), I find that F instruments are often difficult for beginning teachers. Here is a written F part:

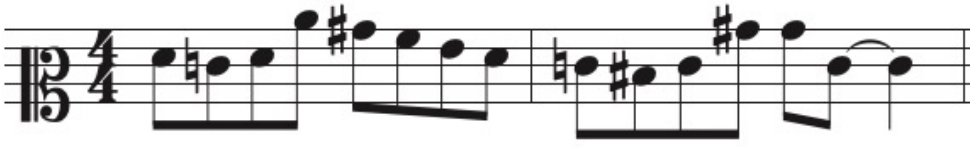


Written Melody read by F instruments



Sounding melody when read by F instruments

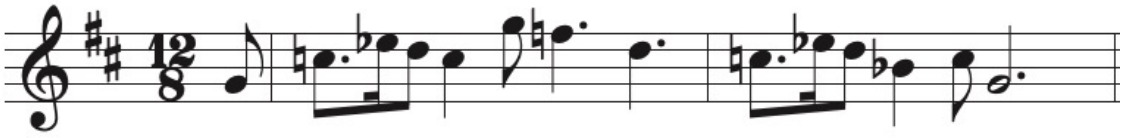
You can continue thinking of the transposition in the above manner…or you can read the music as if it were in mezzo-soprano clef. Looking at the original melody once again, we can pretend to read it as if the second line were middle C (i.e., mezzo-soprano clef), and we get this:



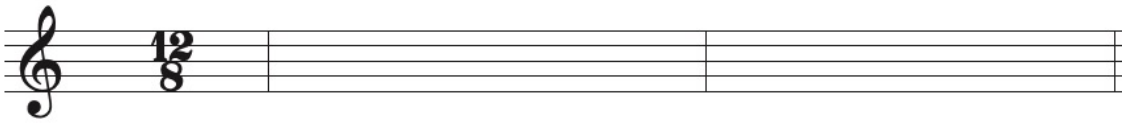
Reading the F part as if it were in mezzo-soprano clef

Is this easier to read for you? There is only one more thing we must do…we must take the key signature of the "concert key" and apply it (instead of the transposed key that the original written part is in). For example, in this excerpt, the written key is F. That means the concert key is B-flat, so we must apply that key to what we are reading. That will also mean that the "natural" you see on the second note is actually applying to the E-flat (that we cannot see and are pretending is there), and the sharp you see on the fifth note is actually raising the (pretend) B-flat up a half-step, so it is essentially a natural.

Some people (like me!) find this method much faster at a glance. However, it is something that must be practiced, like anything else. You may begin by thinking that doing the math is faster, and over time come to find the movable clef idea to be easier and quicker. Try writing these notes out for practice:



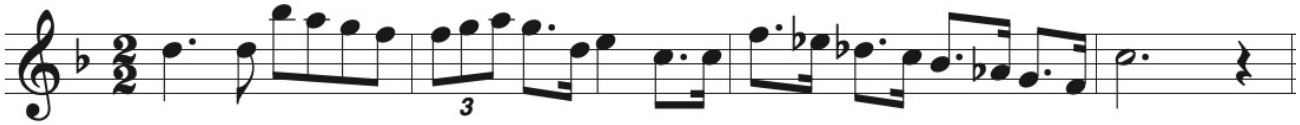
Written melody read by F instruments



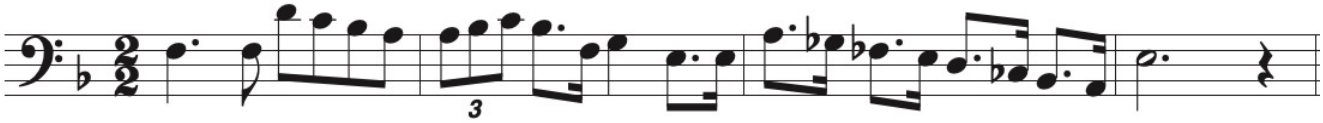
Write in the correct sounding note and key for practice.

E-flat Instruments

The E-flat instruments tend to be the hardest ones for beginning conductors (except, of course, for Alto or Bari Sax performers). However, there is hardly ever any need for you to "do the math" on this transposition…all you have to do is read the part as if it were in bass clef, which should be a familiar enough clef for almost everyone:

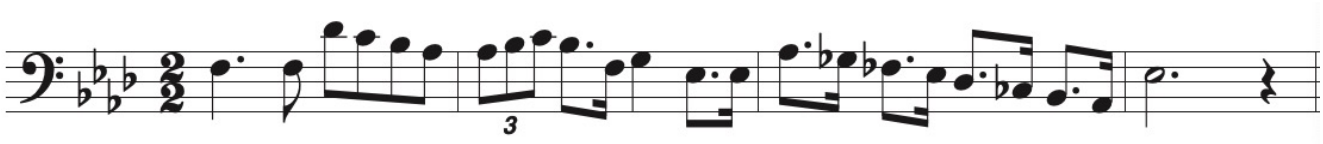


Written melody as read by E-flat instruments



Reading the E-flat part as if it were in bass clef

There is only one step left to do – do you remember what is needed? We must take the concert key and apply it to our "cheat." The original *written* melody is in the key of F, and on an E-flat instrument, that will mean the *concert* key is A-flat. You would also have to adjust the octave upwards, but that won't affect the actual note names for the sake of score studying.



Reading the E-flat part as if it were in bass clef, with the concert key added

The methods outlined above are intended as suggestions only. If you discover an alternative approach that improves speed and accuracy for you, it is entirely appropriate to adopt it. The primary goal is to develop the ability to quickly and accurately identify transpositional issues, whether during score study or in real-time on the podium. While relying on intervallic calculation ("the math") can be helpful in the early stages, it is generally too slow for practical use in rehearsal settings, particularly when immediate answers are required.

As with any musical skill, the benefits gained from studying transposition are directly proportional to the time and effort invested. With consistent practice, reading transposed scores will become second nature. The appendices that follow are designed to support this process by providing tools for memorizing, reinforcing, and practicing the transpositions associated with commonly encountered instruments. Difficulty at the outset is normal…even experienced conductors have struggled with this skill. Don't get frustrated! And always remember: all musical fluency comes with repetition and perseverance.

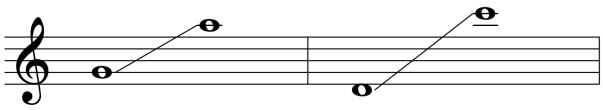
APPENDIX I: RANGES & TRANSPOSITIONS

Note: The "practical" range of the instrument encompasses the ranges most likely to be encountered in a typical orchestral or band work. The advanced range encompasses ranges likely to be found in solo literature, and are usually achievable by advanced performers. All ranges are written ranges.

WOODWIND INSTRUMENTS

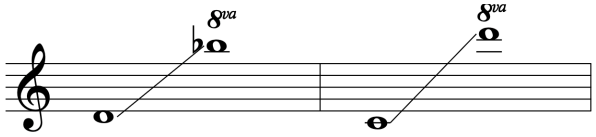
The **Piccolo** is a C instrument, sounds one octave higher than written.

Practical Advanced



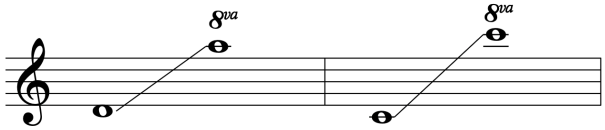
The **Flute** is a C instrument and sounds as written.

Practical Advanced



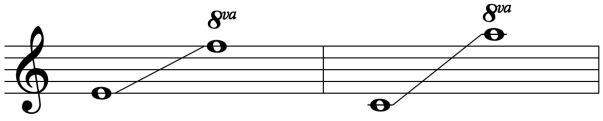
The **Alto Flute** is a G instrument and sounds a Perfect 4th lower than written.

Practical Advanced



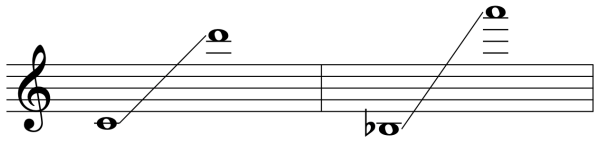
The **Bass Flute** is a C instrument and sounds an octave lower than written.

Practical Advanced



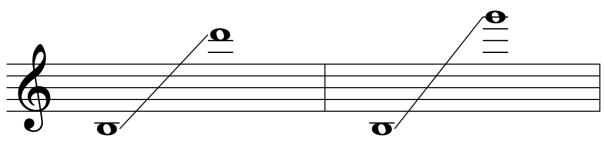
The **Oboe** is a C instrument and sounds as written.

Practical Advanced



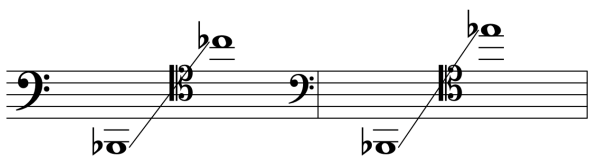
The **English Horn** is an F instrument and sounds a Perfect 5th lower than written.

Practical Advanced



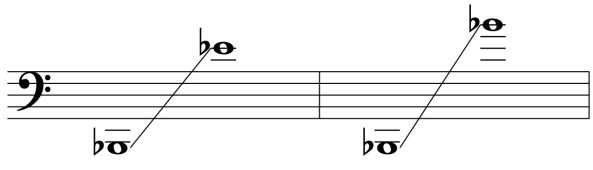
The **Bassoon** is a C instrument, set in bass clef (tenor and treble clef can also used) and sounds as written.

Practical Advanced

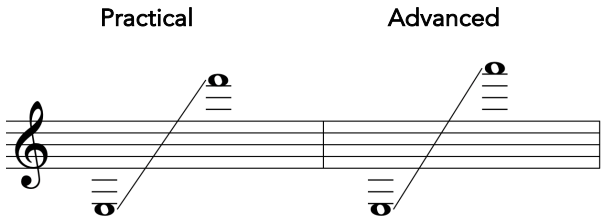


The **Contrabassoon** is a C instrument, set in bass clef, and sounds an octave lower than written.

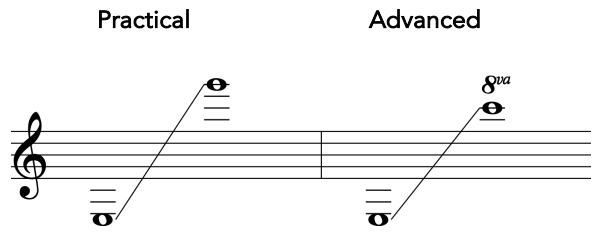
Practical Advanced



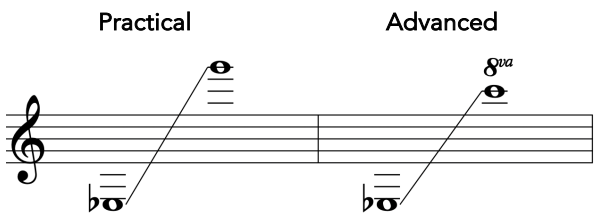
The **E-flat Clarinet** (sometimes called Sopranino Clarinet) sounds a minor 3rd higher than written.



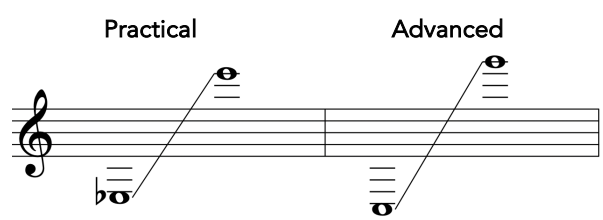
The **A Clarinet** sounds a minor 3rd below written.
The **B-flat Clarinet** sounds a Major 2nd below written.



The **Alto Clarinet** is an E-flat instrument, and sounds a Major 6th lower than written.



The **Bass Clarinet** is a B-flat instrument and sounds a Major 9th lower than written.

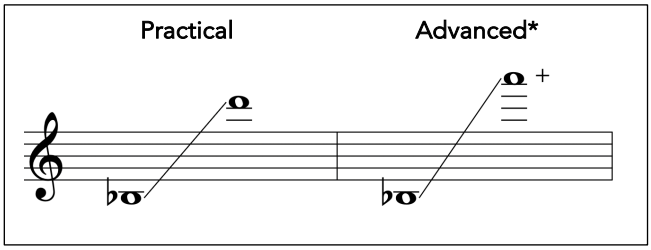


The **Contra-Alto Clarinet** (sometimes *erroneously* referred to as the E-flat Contra*bass* Clarinet) is an E-Flat instrument, set in treble clef, and sounds a Major 13th (a Major 6th plus an octave) lower than written. The practical (written) range is the same as that of the B-flat Bass Clarinet.

The **Contrabass Clarinet** is a B-flat instrument, set in treble clef, and *sounds a Major 16th lower than written* (a Major 2nd plus two octaves below the written pitch - thus putting it two octaves below the B-flat soprano clarinet and one octave below the B-flat Bass Clarinet). The practical (written) range is the same as that of the B-flat Bass Clarinet.

All of the **Saxophones** use the same fingerings and share the same basic written range.

** Notes in the altissimo register, up to written G8, are possible by advanced performers on all of the saxophones.*



The **Soprano Saxophone** is a B-flat instrument and sounds a Major 2nd lower than written. It is most often found in jazz and commercial music, though it can also be found in orchestral and wind band literature.

The **Alto Saxophone** is an E-flat instrument and sounds a Major 6th lower than written. It is mostly found in jazz, commercial music, and wind band literature, though it can also be found in some orchestral scores.

The **Tenor Saxophone** is a B-flat instrument. It is set in treble clef and sounds a Major 9th (a Major 2nd plus an octave) lower than written. It is mostly found in jazz and wind band music, but can also be found in some orchestral scores.

The **Baritone Saxophone** is an E-flat instrument. It is set in treble clef and sounds a Major 13th (a Major 6th plus an octave) lower than written. It is mostly found in jazz and wind band music.

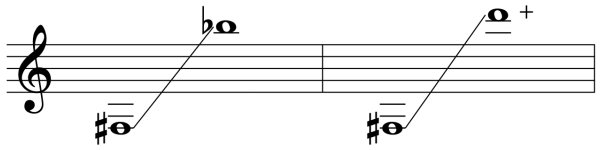
The **Bass Saxophone** is a B-flat instrument. It is set in treble clef and sounds a Major 16th (a Major 2nd plus two octaves) lower than written - thus putting it one octave below the Tenor Saxophone).

BRASS INSTRUMENTS

Note: Trumpets and Horns can be built in many keys. In this handout, we are discussing the most common usage likely to be encountered by conductors, i.e., B-flat Trumpets and Horns in F.

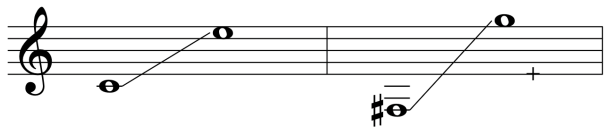
The **Trumpet** is pitched in B-flat, and sounds a Major 2nd lower than written. Cornets and Flügelhorns transpose similarly.

Practical Advanced

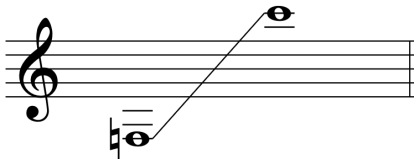


The **Piccolo Trumpet** is typically pitched in B-flat, but can also be converted to A, making it easier to read in sharp keys. It sounds a minor 7th higher than written (Major 6th higher if using the A leadpipe).

Practical Advanced

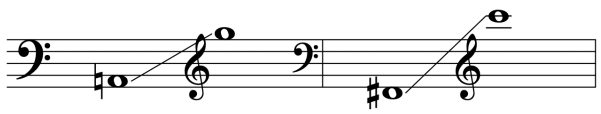


The **Bass Trumpet** is pitched in B-flat, and sounds a Major 9th (Major 2nd plus an octave) lower than written. It also comes in C and E-flat versions.



The **Horn in F** is most often set in treble clef* and sounds a Perfect Fifth lower than written.

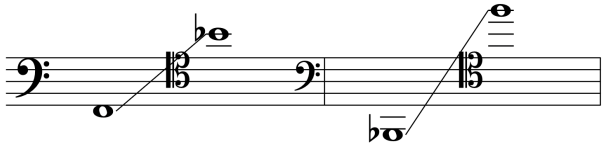
Practical Advanced



** While the Horn is most often set in treble clef, it can sometimes be found in bass clef. When set in bass clef, the current practice is to notate the desired pitch a Perfect 5th higher (just like when writing it in treble). However, older practice was to notate the pitch a Perfect 4th lower than the pitch desired. This practice is now defunct, but careful study of a score is sometimes necessary to ascertain the correct methodology.*

The **Tenor Trombone** is a C instrument and sounds as written. It is most often set in bass clef, but can also be found in alto and tenor clefs.

Practical Advanced



The **Bass Trombone** is a C instrument and sounds as written. Most often set in bass clef, it can also be found in tenor clef.

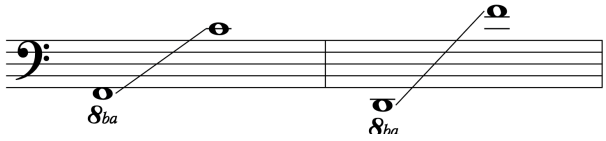
The practical and advanced ranges are similar to that of the tenor trombone, but there are some upper range limitations, mostly caused by the mouthpiece, not the instrument itself.

The **Euphonium** is a C instrument and sounds as written. It can be found in both bass clef and in treble clef, and the clef affects the transposition.

When in bass clef, the Euphonium *sounds as written*. When written in treble clef, the euphonium *sounds a Major 9th lower than written*. The practical and advanced ranges are similar to the trombone.

The **Tuba** is a C instrument and sounds as written. They can also be pitched in other keys, but regardless of their fundamental pitch, transposition is the responsibility of the performer.

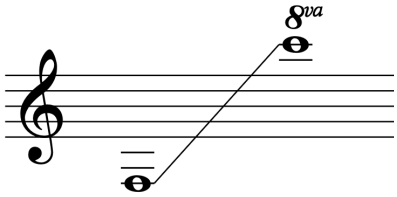
Practical Advanced



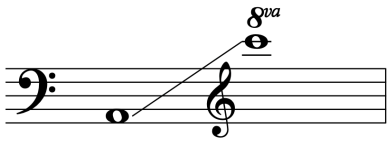
PERCUSSION/MALLET/KEYBOARD INSTRUMENTS

Note: The mallet instruments come in a variety of sizes, and may not include (or may surpass) all of the ranges presented here. All Mallet instruments are pitched in C, though some have octave transpositions.

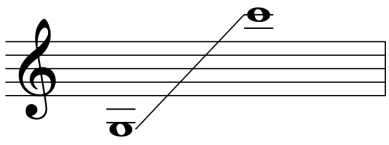
The **Xylophone** sounds one octave higher than written.



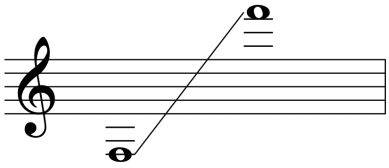
The **Marimba** sounds as written. A grand staff is sometimes used.



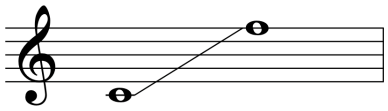
The **Glockenspiel** sounds two octaves higher than written.



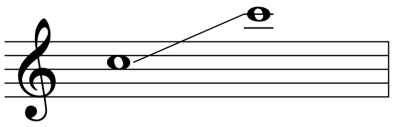
The **Vibraphone** sounds as written.



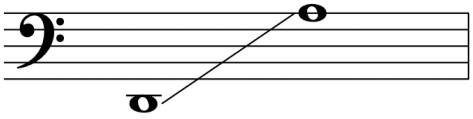
The **Tubular Bells (Chimes)** sound as written.



The **Crotales** sound two octaves higher than written.

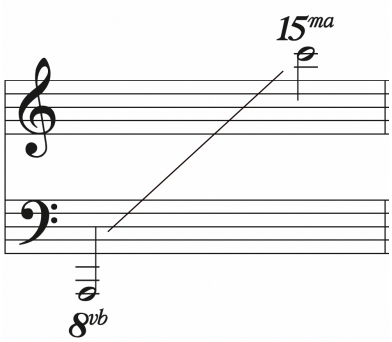


The **Timpani** is a C instrument, and sounds as written. Each of 4-5 drums has a limited range that effectively combine to put the timpani's range at the following:

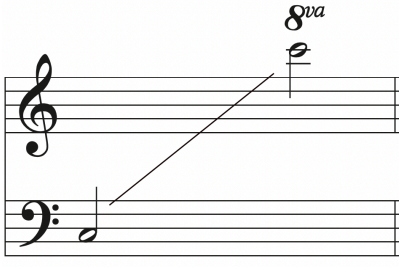


Note: The most appropriate sound on each drum occurs roughly in the middle of its potential range. For more information on the ranges of the individual drums, it is advisable to check with percussion reference books.

The **Piano** is a C instrument. It can be written in bass or treble clef, and a grand staff is typically used.



The **Celesta** is a C instrument, and sounds one octave higher than written. It can be written in treble or bass clef, and a grand staff may be used.



APPENDIX II: TRANSPOSING INSTRUMENTS IN SCORE ORDER

- The **Piccolo** is pitched in C and *sounds one octave higher than written.*
- The **Flute** is pitched in C and *sounds as written.*
- The **Alto Flute** is pitched in G and *sounds a Perfect 4th lower than written.*
- The **Bass Flute** is pitched in C and *sounds an octave lower than written.*
- The **Oboe** is pitched in C and *sounds as written.*
- The **English Horn** is pitched in F and *sounds a Perfect 5th lower than written.*
- The **Bassoon** is pitched in C and *sounds as written.*
- The **Contrabassoon** is pitched in C and *sounds an octave lower than written.*
- The **E-flat Clarinet** is pitched in E-flat and *sounds a minor 3rd higher than written.*
- The **B-flat Clarinet** is pitched in B-flat and *sounds a Major 2nd lower than written.*
- The **Basset Horn** is pitched in F and *sounds a Perfect 5th lower than written.*
- The **Alto Clarinet** is pitched in E-flat and *sounds a Major 6th lower than written.*
- The **Bass Clarinet** is pitched in B-flat and *sounds a Major 9th lower than written.*
- The **Contra-Alto Clarinet** is pitched in E-flat and *sounds a Major 13th lower than written.*
- The **Contrabass Clarinet** is pitched in B-flat and *sounds a Major 16th lower than written.*
- The **Soprano Saxophone** is pitched in B-flat and *sounds a Major 2nd lower than written.*
- The **Alto Saxophone** is pitched in E-flat and *sounds a Major 6th lower than written.*
- The **Tenor Saxophone** is pitched in B-flat and *sounds a Major 9th lower than written.*
- The **Baritone Saxophone** is pitched in E-flat and *sounds a Major 13th* lower than written.
- The **Bass Saxophone** is pitched in B-flat and *sounds a Major 16th lower than written.*
- The **Trumpet** is pitched in B-flat and *sounds a Major 2nd lower than written.*
- The **Cornet** is pitched in B-flat and *sounds a Major 2nd lower than written.*
- The **Flügelhorn** is pitched in B-flat and *sounds a Major 2nd lower than written.*
- The **Bass Trumpet** is pitched in B-flat and *sounds a Major 9th lower than written.*
- The **Horn** is pitched in F and *sounds a Perfect 5th lower than written.*
- The **Trombone** is pitched in C, and *sounds as written.*
- The **Treble Clef Baritone/Euphonium** is pitched in B-flat and *sounds a Major 9th lower than written.*
- The **Bass Clef Baritone/Euphonium** is pitched in C, and *sounds as written.*
- The **Tuba** is pitched in C and *sounds as written.*
- The **Timpani** is pitched in C and *sounds as written.*
- The **Glockenspiel** is pitched in C and *sounds two octaves higher than written.*
- The **Xylophone** is pitched in C and *sounds one octave higher than written.*
- The **Vibraphone** is pitched in C and *sounds as written.*
- The **Marimba** is pitched in C and *sounds as written.*
- The **Crotales** are pitched in C and *sound two octaves higher than written.*
- The **Tubular Bells/Chimes** are pitched in C and *sound as written.*
- The **Harp** is pitched in C and *sounds as written.*
- The **Piano** is pitched in C and *sounds as written.*
- The **Celesta** is pitched in C and *sounds one octave higher than written.*
- The **Guitar** is pitched in C and *sounds one octave lower than written.*
- The **Violin** is pitched in C and *sounds as written.*
- The **Viola** is pitched in C and *sounds as written.*
- The **Violoncello/Cello** is pitched in C and *sounds as written.*
- The **String Bass/Contrabass** is pitched in C and *sounds one octave lower than written.*

APPENDIX III: TRANSPOSING INSTRUMENTS GROUPED BY KEY

C Instruments

Piccolo	-	Sounds one octave higher than written.
Flute	-	Sounds as written.
Bass Flute	-	Sounds one octave lower than written.
Oboe	-	Sounds as written.
Heckelphone	-	Sounds one octave lower than written.
Bassoon	-	Sounds as written.
Contrabassoon	-	Sounds one octave lower than written.
Trombone	-	Sounds as written.
Baritone	-	Sounds as written (or a M9th lower if set in treble clef).
Euphonium	-	Sounds as written (or a M9th lower if set in treble clef).
Tuba	-	Sounds as written.
Timpani	-	Sounds as written.
Glockenspiel	-	Sounds two octaves higher than written.
Xylophone	-	Sounds one octave higher than written.
Vibraphone	-	Sounds as written.
Marimba	-	Sounds as written.
Tubular Bells	-	Sounds as written (see entry for more information).
Harp	-	Sounds as written
Celesta	-	Sounds one octave higher than written.
Piano	-	Sounds as written.
Violin	-	Sounds as written.
Viola	-	Sounds as written.
Violoncello	-	Sounds as written.
Contrabass	-	Sounds one octave lower than written.
Guitar	-	Sounds one octave lower than written.

B-flat Instruments

Bb Soprano Clarinet	-	Sounds a M2 lower than written.
Bass Clarinet	-	Sounds a M9 lower than written.
Contrabass Clarinet	-	Sounds a M16 lower than written.
Soprano Saxophone	-	Sounds a M2 lower than written.
Tenor Saxophone	-	Sounds a M9 lower than written.
Bass Saxophone	-	Sounds a M16 lower than written.
Piccolo Trumpet	-	Sounds a m7 higher than written.
Trumpet/Cornet	-	Sounds a M2 lower than written.
Flugelhorn	-	Sounds a M2 lower than written.

A Instruments

Oboe d'Amore	-	Sounds a m3 lower than written.
A Soprano Clarinet	-	Sounds a m3 lower than written.
Piccolo Trumpet	-	Sounds a M6 higher than written.
Horn in A	-	Sounds a m3 lower than written.

G Instruments

Treble Flute	-	Sounds a P5 higher than written.
Alto Flute	-	Sounds a P4 lower than written.
G "Turkish" Clarinet	-	Sounds a P4 lower than written.
Horn in G	-	Sounds a P4 lower than written.

F Instruments

English Horn	-	Sounds a P5 lower than written.
Basset Horn	-	Sounds a P5 lower than written.
French Horn	-	Sounds a P5 lower than written.

E-flat Instruments

E-Flat Flute	-	Sounds a m3 higher than written.
E-flat Soprano Clarinet	-	Sounds a m3 higher than written.
Alto Clarinet	-	Sounds a M6 lower than written.
Contra-Alto Clarinet	-	Sounds a M13 lower than written.
Sopranino Saxophone	-	Sounds a m3 higher than written.
Alto Saxophone	-	Sounds a M6 lower than written.
Baritone Saxophone	-	Sounds a M13 lower than written.
Contrabass Saxophone	-	Sounds a M19 lower than written.
Bass Trumpet	-	Sounds a M6 lower than written.
Tenor Horn	-	Sounds a M6 lower than written.