

Lecture Notes on Transposition and Reading an Orchestral Score

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Orchestral Scores

The amount of information presented in an orchestral score can seem daunting, but a few simple things about the way the score is arranged can make it much more manageable.

The instruments are grouped by families, in the following order:

- Woodwinds
- Horns
- Brass
- Percussion
- [Soloists, Singers]
- Strings

Within each family, instruments are grouped by type, ordered with the higher instrument types higher within the family:

- Woodwinds:
 - Flutes
 - Oboes
 - Clarinets
 - Bassoons
- Brass:
 - Trumpets
 - Trombones
 - Tubas
- Strings:
 - Violin 1
 - Violin 2
 - Viola
 - Cello
 - Bass

Similarly, individual instruments within an instrument type are ordered from high to low:

- Flutes
 - Piccolo
 - Flute
 - Alto Flute
- Oboes
 - Oboe
 - Cor anglais
- Clarinets
 - E♭ Clarinet
 - Clarinet
 - Bass Clarinet

Note that grouping by instrument type first means that the score will not reflect a consistent progression from high to low within instrument families. For example, among the woodwinds, the cor anglais will appear above the E♭ clarinet, even though the E♭ clarinet has a higher register.

For the purposes of harmonic analysis, it is very convenient that scores are laid out with the strings on the bottom. This reflects an 18th-century concept of orchestration, in which the strings served as a foundation, with winds and brass added for extra color. Even into the 19th century, it remains true that all of the information needed for harmonic analysis is found in the strings, at the bottom of the score. This makes analysis easier, because string instruments are not transposing instruments.

Transposition

You are probably aware that some instruments have their parts written in different keys than the actual sounding key, and that the written notes for these instruments are not the same as the sounding notes; for example, for a clarinet in B-flat, if the composer wants a sounding C the part will have a written D.

The reasons for this have to do with the history of instrument design, which is intermingled with a phase of music history in which music tended to be fairly diatonic, that is, using relatively few notes that don't belong to the key. For some instruments, mostly winds and brass, different instruments were used to play in different keys. This was because instruments sounded most in tune in one key, and it could be quite challenging to play in tune in a different key. The player would read music in C major, choosing from a number of different instruments (or a number of different possible adjustments to the instrument) to make the music sound in the actual key. Since then instruments have evolved and become more standardized, and players will use a single instrument to play in any number of keys. But the older practice continues to influence music notation for those instruments.

The key to dealing with transposing instruments is bearing clearly in mind what exactly phrases such as “in B-flat” or “in F” actually mean. A phrase of the form “in [key X]” actually means “if written in C, sounds in [key X]”. Thus “clarinet in B-flat” means “if written in C, sounds in B-flat”. One of the easiest mistakes to make when dealing with transpositions is to reverse this statement, as if “in B-flat” meant “written in B-flat, sounds in C”. Be very careful to work with transpositions slowly and carefully enough that you don’t get them backwards in this way.

This is fine if you are actually dealing with music written in C and sounding in B-flat, but what if the sounding key is different? Then you use two versions of basically the same statement, one for the general name of the transposition and one for the actual situation. Suppose that you want to write music that sounds in D major, and that you’re trying to figure out how to write a B-flat clarinet part. You would set up two statements as follows:

Name of transposition: “written in C, sounds in B-flat”

Actual situation: “written in __, sounds in D”

The first statement is based on the general name of the transposition, and it is complete, because you know the transposition of the instrument you are writing for. The second statement is incomplete: you know what sounding key you want, and you are trying to figure out what key to write in. Now you just fill in the blank in the second statement in a way that makes a parallel relationship between the two keys in each statement. In the first statement, the written key is, very loosely speaking, a major second above the sounding key.¹ To fill in the blank in the second statement, we just find the key that is a major second above D major, which is E major. This gives us:

Name of transposition: “written in C, sounds in B-flat”

Actual situation: “written in E, sounds in D”

So we’ll write the B-flat clarinet part in E major.

Suppose that we are in opposite situation: we are looking at a score, and we can see that the music is sounding in E major, with a clarinet part written in G major. The score tells us that this is a clarinet part, but it doesn’t tell us what the transposition is, and we want to find out. We use the same paired statements, but with the blank in a different place:

¹ “Loosely speaking” because keys are named by pitch classes, and intervals exist between specific pitches. Thus we can say for convenience that the key of B-flat is a major second below the key of C, but if we are dealing with a bass clarinet in B-flat, the notes will sound a major ninth below the written pitches.

Name of transposition: “written in C, sounds in __”

Actual situation: “written in G, sounds in E”

We see that in the actual part, the sounding key is a minor third below the written key, so in the name of the transposition the sounding key must be a minor third below C. We can now complete the first statement:

Name of transposition: “written in C, sounds in A”

Actual situation: “written in G, sounds in E”

We know that the part is written for a clarinet in A.

Reading Note Names in Other Languages

Many scores will tell you what transposition is being used, but they may do so using note names in other languages.

In French, notes are named using fixed-do solfege, which is basically like movable-do solfege in C major except that B is ‘si’ instead of ‘ti’. Sharp and flat are ‘dièse’ and ‘bémol’, respectively. Thus a clarinet in B-flat is “en si bémol” and one in A is “en la”.

German note names are just like English ones, with the one very confusing exception that the note we call ‘B’ is ‘H’ in German, and the note we call ‘B-flat’ is ‘B’ in German. Thus if you see “Kl. (B)” in a score, that’s a standard B-flat clarinet, not a strange one in B. For a note with sharp, you add the suffix ‘is’, and for a note with a flat you add the suffix ‘es’. Thus D-sharp is ‘Dis’ and D-flat is ‘Des’. The one exception is that E-flat is ‘Es’, not ‘Ees’.

Transposed Key Signatures

Most transposing instruments used transposed key signatures. This makes figuring out transpositions very easy. In most common-practice music (i.e. Western art music written ca. 1600-1900), a movement is written with a single key signature throughout; if the music modulates, accidentals will be used instead of a new key signatures.

If you are reading a score, and the part you are looking at uses a transposed key signature, you don’t need to worry about the actual sounding key of the music at the moment in order to identify the transposition of the instrument. You can figure this out just using the key signatures. For the statement about the actual situation, just use the keys implied by the signatures for the written and the sounding keys in order to figure out the name of the transposition.

You will be asked to memorize the standard transpositions for a variety of instruments. Always bear in mind that the score you are looking at may use non-standard instruments or transpositions. If the instrument you are looking at uses a transposed key signature, always trust the transposed key signature, even if this leads you to identify in unusual instrument such as a clarinet in A-flat.

Standard Transpositions

You should memorize the following list of transpositions. You must memorize both the name of the transposition and the actual relationship between sounding and written pitch. Common names in foreign languages are listed after the English name of the instrument.

<u>Instrument</u>	<u>Name of transp</u>	<u>Sound in relation to notation</u>
Piccolo (Ger: kleine Flöte)	–	↑P8
Flute	–	–
Alto Flute	in G	↓P4
Oboe (Fr: Hautbois)	–	–
English Horn (Fr: Cor anglais)	in F	↓P5
E-flat Clarinet (piccolo clar.)	in E-flat	↑m3
Clarinet (Ger: Klarinette)	in B-flat	↓M2
	in A	↓m3
Bass Clarinet	in B-flat	↓M9
Bassoon (Ger: Fagott)	–	–
Contrabassoon	–	↓P8
Horn (Fr, It: Cor, Corno)	in F	↓P5
Trumpet (It: Tromba [≠ trombone!])	in B-flat	↓M2
	in C	–
Trombone (Ger: Posaune)	–	–
Tuba	–	–
Violin	–	–
Viola (Ger: Bratsche)	–	–
Cello (It: Violoncello)	–	–
Bass (Ger: Kontrabass)	–	↓P8

Note: The lowest members of the string and woodwind families (contrabassoon and bass) sound an octave lower than written. The tuba, the lowest brass instrument, sounds as written.

You should also memorize the transpositions for saxophones; though seldom used in an orchestra, they are of course very commonly used in jazz.

<u>Instrument</u>	<u>Name of transp</u>	<u>Sound in relation to notation</u>
Soprano Saxophone	in B-flat	↓M2
Alto Saxophone	in E-flat	↓M6
Tenor Saxophone	in B-flat	↓M9
Baritone Saxophone	in E-flat	↓M6+P8

Horns and Trumpets

Until the early 19th century, horns and trumpets used crooks to play in different keys; they did not have valves, as modern instruments do. Until this time, they always read in C major, and the choice of crook would determine the sounding key. Even after the introduction of valved instruments, which made it much easier to play in different keys, these instruments maintained a tradition of using a C major signature at all times. Effectively, these instruments do not use transposing key signatures, instead using no signature at all.

Suppose that music was sounding in D major, and a part was being written for a horn in F. To sound in D, the horn player would be playing what would look like A major, but instead of using the key signature of A major, the part would be written with no key signature, instead writing in F-sharps, C-sharps, and G-sharps as accidentals whenever they were needed.

Until this point, we have only seen clarinets having multiple standard transpositions, and they had only two. Almost any transposition is possible for horns and trumpets, so you must memorize the following guidelines for how sounding pitch relates to written pitch.

Trumpets: always go the closer distance. Trumpet in F is ↑P4, trumpet in G is ↓P4, etc. (Thankfully, there is no trumpet in F-sharp...)

Horns always go down. This includes horn in C, which is ↓P8. The only (fairly rare) exception is when the horn part is written in bass clef, in which case the sounding pitch is higher than the written pitch.

Modern band scores tend to be written using transposed key signatures for horns and trumpets, and most of the online worksheets will reflect this practice. But when you are reading scores from the 18th or 19th centuries, you will need to be able to figure out what the transposition is, without the help of a transposed key signature. This will require you to do harmonic analysis, and to figure out how the horn or trumpet part fits in to the ensemble.

Consider the end of Beethoven's seventh symphony, shown in the example at the end of these notes.

From the non-transposing instruments, we can see that music is in A major, and a V chord in the first four measures shown moves to a I chord for the final three measures.

Starting with the horn part, we have a relatively easy task, because there are two different pitches sounding at once. The notated G and D form a perfect fifth, and V (or possibly V7) contains only one perfect fifth, between the root and the fifth. This tells us that the notated G must be the root of the V chord, or E. We can now set up our paired statements (note that my actual situation statement now talks about actual pitch classes, as opposed to keys, though the same procedure would also work with keys):

Name of transposition: "written in C, sounds in __"

Actual situation: "written as G, sounds as E"

The sound is a minor third below the notation, so the name of the transposition must be A:

Name of transposition: "written in C, sounds in A"

Actual situation: "written as G, sounds as E"

If we double check this with the final measures, knowing that the written C and E produce a major third, which must be between root and third of the tonic triad, we will get the same result. Because horns always sound lower than written, horn in A sounds down a minor third.

The trumpets are a bit more challenging, as only one pitch sounds at a time. Here our only clue is the motion through a fifth as V goes to I. This could be either fifth to fifth or root to root. But looking at the score, we see that the bass moves from root to root. The trumpet line could be an octave reinforcement of the bass. So root to root is a possible option. What about fifth to fifth? This would create fifths with the bass, so we may safely conclude that the trumpet moves from root to root, and this lets us set up our paired statements. Using the final note, we get the following:

Name of transposition: "written in C, sounds in __"

Actual situation: "written as G, sounds as A"

Sound is a major second above notation, so the trumpets are in D. (That names the transposition, of course, not the actual situation.) Because the shorter path from a C to a D is up a major second, not down a minor seventh, trumpet in D sounds up a whole step.

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Fl.
ff sf sf sf ff

Ob.
ff sf sf sf ff

Cl.
ff sf sf sf ff

Fg.
ff sf sf sf ff

Cor.
ff sf sf sf ff

Tr.
ff sf sf sf ff

Timp.
ff sf sf sf ff

VI.
ff sf sf sf ff

Vla.
ff sf sf sf ff

Vc.
Cb.
ff sf sf sf ff

The score is arranged in two systems. The first system includes Flute, Oboe, Clarinet, Bassoon, Trumpet, Trombone, and Tympani. The second system includes Violin I & II, Viola, Violoncello & Contrabass. Each staff is labeled on the left with its instrument name and has dynamic markings (ff and sf) placed below the notes. The music consists of rhythmic patterns and melodic lines, with some passages marked with accents (sf). The key signature is two sharps (F# and C#), and the time signature is not explicitly shown but appears to be 4/4.