

2017 CBDNA ATHLETIC BANDS SYMPOSIUM

Juicy Orchestrations for Drum Corps and Marching Bands: Getting your Ensemble To Ring

Presented by:

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Brass Orchestrations for the Boston Crusaders Drum and Bugle Corps and Crossmen Drum and Bugle Corps

Assistant Brass Caption Head; Troopers Drum and Bugle Corps

Tubist for the Concord Blue Devils Drum and Bugle Corps (2007, 2008, 2009, 2010, 2011)

Getting an Ensemble to Ring

Drum Corps and Marching Bands perform in the most diverse weather and physical conditions in the arts. Students can perform for hours on end on Gamedays and then play their instruments upside down hanging off props in the summer. As the performers receive more and more demand as part of their routines, arrangers and educators must use the best keys for intonation, write idiomatically in the richest parts of each instrument and plan programs to allow performers to succeed at their highest level possible.

This study explores ways to improve musicianship and awareness through orchestration.

Topics to Explore

- Understanding practical tuning variables in orchestrations
- Research and practice based theory on the overtone series
- Understanding the what makes or breaks arrangements
- What keys "ring" best? – picking your key and ignoring the MIDI
- Understanding the variables that change the quality of arrangements for better or worse
- Show already written? How to "fix" your package before the season!
- Teaching techniques to get the marching ensemble in tune

Harmonic Deviations from 12 Equal Divisions of the Octave

Compiled by Timothy Leonelli, MM

| Harmonic Number | Interval Name | Nearest Note Name with "C" Fundamental | Nearest Note Name with "Bb" Fundamental | Deviation in Cents from 12 EDO |
|-----------------|---------------|--|---|--------------------------------|
| 17* | Minor 2nd | Db | Cb | +5 |
| 16 | Octave | C | Bb | +0 |
| 15 | Major 7th | B | A | -12 |
| 14 | minor 7th | Bb | Ab | -31 |
| 13* | minor 6th | Ab | Gb | +41 |
| 12 | Perfect 5th | G | F | +2 |
| 11* | Tritone | F# | E | -49 |
| 10 | Major 3rd | E | D | -14 |
| 9 | Major 2nd | D | C | +4 |
| 8 | Octave | C | Bb | 0 |
| 7* | minor 7th | Bb | Ab | -31 |
| 6 | Perfect 5th | G | F | +2 |
| 5* | Major 3rd | E | D | -14 |
| 4 | Octave | C | Bb | 0 |
| 3* | Perfect 5th | G | F | +2 |
| 2* | Octave | C | Bb | 0 |
| 1 | Fundamental | C | Bb | 0 |

*Denotes Prime Number

Unisons and Octaves have no deviation from 12 EDO as they are tuned "justly".

Considering pitch classes at all octaves, higher pitches will have 2x the frequency of its lower equivalency. For Example, Harmonics #3, #6, #13 will all be 2 cents flat, Harmonics #5 and #10 will be 14 cents flat and Harmonics #7 and #14 will be 31 cents flat.

Terms:

Equal Divisions of the Octave (EDO) or simply **Equal Temperament/Equal splitting of an octave**
Overtone/Harmonic Series (OTS) – multiples from the base frequency

Just/Pure Intonation – cycle of fifths with an equal ratio or tuning based on "in tune" fifths

Pitch Class – Perfect octaves that include pitches in all possible octaves and their enharmonics

Brass Overtone Series: Tuning Variables for Major Chords

Compiled by TIMOTHY LEONELLI, MM

| | Bb Major Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------------------------|------------------------------|-------------------------|---------------------------------|-----------------|
| Trumpets in Bb | Bb OTS (0) | | Bb OTS (0) | |
| | Bb OTS (+2) | | Bb OTS (+2) | |
| | Bb OTS (-14) | | Bb OTS (-14) | |
| | G OTS (+2) | Adjustment Needed (-16) | | |
| Mellophones in F | Eb OTS (+2) | Adjustment Needed (-2) | Eb OTS (+) with (-2) Adjustment | |
| | F OTS (0) | (+2) Adjustment Needed | F OTS (0) with (+2) Adjustment | |
| | D OTS (0) | Adjustment Needed (-14) | | |
| Trombones/ Baritones | Bb OTS (+2) | | Bb OTS (+2) | |
| | Bb OTS (-14) | | Bb OTS (-14) | |
| | Bb OTS (0) | | Bb OTS (0) | |
| | G OTS (0) | Adjustment Needed (-14) | | |
| Basses | Bb OTS (+2) | | Bb OTS (+2) | |
| | Bb OTS (-14) | | Bb OTS (-14) | |
| | G OTS (+2) | Adjustment Needed (-16) | | |
| | Bb OTS (0) | | Bb OTS (0) | |

C Score

2

F Major Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

Tpts.

Mlms.

LB.

Bs.

| Instrument | F Major Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|------------|-----------------------------|-------------------------|------------------------------------|-----------------|
| Tpts. | A OTS (0) | (-14) Adjustment needed | A OTS (0) with -14 Adjustment | |
| | Bb OTS (+2) | (-2) Adjustment needed | Bb OTS (+2) with (-2) Adjustment | |
| | Ab OTS (-14) | (+16) Adjustment needed | | |
| | F OTS (+2) | | F OTS (+2) | |
| Mlms. | F OTS (0) | | F OTS (0) | |
| | F OTS (+2) | | F OTS (+2) | |
| | F OTS (-14) | | F OTS (-14) | |
| | D OTS (+2) | (-16) Adjustment Needed | | |
| LB. | Bb OTS (+2) | (-2) Adjustment Needed | Bb OTS (+2) with (-2) Adjustment | |
| | Ab OTS (-14) | (+16) Adjustment Needed | Ab OTS (-14) with (+16) Adjustment | |
| | A OTS (0) | (-14) Adjustment Needed | A OTS (0) with (-14) Adjustment | |
| | F OTS (+2) | | F OTS (+2) | |
| Bs. | A OTS (0) | (-14) Adjustment Needed | | |
| | F OTS (+2) | | F OTS (+2) | |
| | Bb OTS (+2) | (-2) Adjustment Needed | Bb OTS (+2) with (-2) Adjustment | |
| | F OTS (0) | | F OTS (0) | |

E♭ Major Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | E♭ Major Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-------------------------------------|-------------------------|--------------------------------|-----------------|
| Tpts. | B♭ OTS (0) | (+2) Adjustment Needed | B♭ OTS (0) with +2 Adjustment | |
| | G OTS (0) | (-14) Adjustment Needed | | |
| | A♭ OTS (+2) | (-2) Adjustment Needed | A♭ OTS (+2) with -2 Adjustment | |
| | B♭ OTS (0) | (+2) Adjustment Needed | B♭ OTS (0) with +2 Adjustment | |
| Mlms. | E♭ OTS (0) | | E♭ OTS (0) | |
| | E♭ OTS (+2) | | E♭ OTS (+2) | |
| | D OTS (-14) | | D OTS (-14) | |
| LB. | G OTS (0) | (-14) Adjustment Needed | | |
| | A♭ OTS (+2) | (-2) Adjustment Needed | A♭ OTS (+2) with -2 Adjustment | |
| | B♭ OTS (0) | (+2) Adjustment Needed | B♭ OTS (0) with +2 Adjustment | |
| Bs. | G OTS (0) | (-14) Adjustment Needed | | |
| | B♭ OTS (0) | (+2) Adjustment Needed | B♭ OTS (0) with +2 Adjustment | |
| | A♭ OTS (+2) | (-2) Adjustment Needed | A♭ OTS (+2) with -2 Adjustment | |

C Score

4

Ab Major Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

Tpts.

Mlns.

LB.

Bs.

Ab OTS (0)

Ab OTS (+2)

Ab OTS (-14)

F OTS (+2) (-16) Adjustment Needed

F OTS (+2) (-16) Adjustment Needed

Db OTS (+2) (-2) Adjustment Needed Db OTS (+2) with -2 Adjustment

Eb OTS (0) (+2) Adjustment Needed Eb OTS (0) with +2 Adjustment

C OTS (0) (-14) Adjustment Needed

Ab OTS (+2)

Ab OTS (-14)

Ab OTS (+2)

F OTS (+2) (-16) Adjustment Needed Ab OTS (+2)

Ab OTS (-14)

Ab OTS (+2)

Ab OTS (0)

Ab OTS (0)

C Score

Cb Major Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | Cb Major Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|------------------------------|-------------------------|--|-----------------|
| Tpts. | G OTS (-14) | (+14) Adjustment Needed | G OTS (-14) with (+14) Adjustment | |
| | G \flat OTS (0) | (+2) Adjustment Needed | G \flat OTS (0) with (+2) Adjustment | |
| | A \flat OTS (+2) | (-16) Adjustment Needed | A \flat OTS (+2) with (-16) Adjustment | |
| | E OTS (+2) | (-2) Adjustment Needed | E OTS (+2) with (-2) Adjustment | |
| Mlns. | D OTS (-14) | (+16) Adjustment Needed | | |
| | E \flat OTS (0) | (-2) Adjustment Needed | E \flat OTS (0) with (-2) Adjustment | |
| | E OTS (+2) | (-2) Adjustment Needed | E OTS (+2) with (-2) Adjustment | |
| | | | | |
| LB. | G OTS (-14) | (+14) Adjustment Needed | | |
| | G \flat OTS (0) | (+2) Adjustment Needed | G \flat OTS (0) with (+2) Adjustment | |
| | A \flat OTS (+2) | (-16) Adjustment Needed | A \flat OTS (+2) with (-16) Adjustment | |
| | E OTS (+2) | (-2) Adjustment Needed | E OTS (+2) with (-2) Adjustment | |
| Bs. | G OTS (-14) | (+14) Adjustment Needed | | |
| | G \flat OTS (0) | (+2) Adjustment Needed | G \flat OTS (0) with (+2) Adjustment | |
| | A \flat OTS (+2) | (-16) Adjustment Needed | | |
| | E OTS (+2) | (-2) Adjustment Needed | E OTS (+2) with (-2) Adjustment | |

C Score

D Major Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | D Major Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-----------------------------|-------------------------|---|-----------------|
| Tpts. | G \flat OTS (0) | (-14) Adjustment Needed | G \flat OTS (0) with (-14) Adjustment | |
| | A \flat OTS (-31) | (+17) Adjustment Needed | | |
| | B \flat OTS (-14) | (+14) Adjustment Needed | | |
| | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| | G \flat OTS (0) | (-14) Adjustment Needed | G \flat OTS (0) with (-14) Adjustment | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |
| | F OTS (-14) | (+16) Adjustment Needed | | |
| Mlns. | D OTS (-14) | | D OTS (-14) | |
| | D OTS (0) | | D OTS (0) | |
| | D OTS (+2) | | D OTS (+2) | |
| | B \flat OTS (-14) | (+14) Adjustment Needed | | |
| | | | | |
| LB. | G \flat OTS (0) | (-14) Adjustment Needed | G \flat OTS (0) with (-14) Adjustment | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |
| | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| | B \flat OTS (-14) | (+14) Adjustment Needed | | |
| Bs. | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| | G \flat OTS (0) | (-14) Adjustment Needed | | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |
| | | | | |

Brass Overtone Series: Tuning Variables for Minor Chords

Bb Minor Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | Bb Minor Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-------------------------------------|-------------------------|--|-----------------|
| Tpts. | B \flat OTS (0) | | B \flat OTS (0) | |
| | B \flat OTS (+2) | | B \flat OTS (+2) | |
| | A OTS (-14) | (+30) Adjustment Needed | A OTS (-14) with (+30) Adjustment | |
| | G \flat OTS (+2) | (+14) Adjustment Needed | G \flat OTS (+2) with (+14) Adjustment | |
| Mlns. | E \flat OTS (+2) | Adjustment Needed (-2) | E \flat OTS (+2) with (-2) Adjustment | |
| | F OTS (0) | (+2) Adjustment Needed | F OTS (0) with (+2) Adjustment | |
| | D \flat OTS (0) | Adjustment Needed (+16) | | |
| LB. | B \flat OTS (+2) | | B \flat OTS (+2) | |
| | A OTS (-14) | (+30) Adjustment Needed | A OTS (-14) with (+30) Adjustment | |
| | B \flat OTS (0) | | B \flat OTS (0) | |
| | G \flat OTS (+2) | (+14) Adjustment Needed | G \flat OTS (+2) with (+14) Adjustment | |
| Bs. | B \flat OTS (+2) | | B \flat OTS (+2) | |
| | A OTS (-14) | (+30) Adjustment Needed | | |
| | G \flat OTS (+2) | (+14) Adjustment Needed | | |
| | B \flat OTS (0) | | B \flat OTS (0) | |

C Score

8

F Minor Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | F Minor Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-----------------------------|-------------------------|--|-----------------|
| Tpts. | A ^b OTS (0) | (+16) Adjustment needed | A ^b OTS (0) with (+16) Adjustment | |
| | B ^b OTS (+2) | (-2) Adjustment needed | B ^b OTS (+2) with (-2) Adjustment | |
| | A ^b OTS (-14) | (+16) Adjustment needed | | |
| | F OTS (+2) | | F OTS (+2) | |
| Mlns. | F OTS (0) | | F OTS (0) | |
| | F OTS (+2) | | F OTS (+2) | |
| | E OTS (-14) | (+30) Adjustment Needed | | |
| | D ^b OTS (+2) | (+14) Adjustment Needed | | |
| LB. | B ^b OTS (+2) | (-2) Adjustment Needed | B ^b OTS (+2) with (-2) Adjustment | |
| | A ^b OTS (-14) | (+16) Adjustment Needed | A ^b OTS (-14) with (+16) Adjustment | |
| | A ^b OTS (0) | (+16) Adjustment Needed | A ^b OTS (0) with (+16) Adjustment | |
| | F OTS (+2) | | F OTS (+2) | |
| Bs. | A ^b OTS (0) | Adjustment Needed (+16) | | |
| | F OTS (+2) | | F OTS (+2) | |
| | B ^b OTS (+2) | Adjustment Needed (-2) | B ^b OTS (+2) with (-2) Adjustment | |
| | F OTS (0) | | F OTS (0) | |

C Score

D Minor Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | D Minor Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-----------------------------|-------------------------|--|-----------------|
| Tpts. | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| | B \flat OTS (+2) | (+14) Adjustment Needed | B \flat OTS (+2) with (+14) Adjustment | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |
| Mlns. | F OTS (-14) | (+16) Adjustment Needed | | |
| | F OTS (0) | (+16) Adjustment Needed | F OTS (0) with (+16) Adjustment | |
| | D OTS (0) | | D OTS (0) | |
| LB. | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| | B \flat OTS (+2) | (+14) Adjustment Needed | B \flat OTS (+2) with (+14) Adjustment | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |
| | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| Tuba | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| | A OTS (0) | (+2) Adjustment Needed | A OTS (0) with (+2) Adjustment | |
| | B \flat OTS (+2) | (+14) Adjustment Needed | B \flat OTS (+2) with (+14) Adjustment | |
| | G OTS (+2) | (-2) Adjustment Needed | G OTS (+2) with (-2) Adjustment | |



C Score

10

G Minor Chord Possibilities

Adjustments Needed

Suggested Pitch Classes

Your Variations

| | G Minor Chord Possibilities | Adjustments Needed | Suggested Pitch Classes | Your Variations |
|-------|-----------------------------|-------------------------|--|-----------------|
| Tpts. | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| | B \flat OTS (0) | (+16) Adjustment Needed | B \flat OTS (0) with (+16) Adjustment | |
| | G OTS (0) | | G OTS (0) | |
| | G OTS (+2) | | G OTS (+2) | |
| Mlns. | D OTS (-14) | (+14) Adjustment Needed | | |
| | D OTS (0) | Adjustment Needed (+2) | D OTS (0) with (+2) Adjustment | |
| | E \flat OTS (+2) | (+14) Adjustment Needed | E \flat OTS (+2) with (+14) Adjustment | |
| | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| LB. | B \flat OTS (0) | (+16) Adjustment Needed | B \flat OTS (0) with (+16) Adjustment | |
| | G OTS (+2) | | G OTS (+2) | |
| | G OTS (0) | | G OTS (0) | |
| | B \flat OTS (-14) | (+16) Adjustment Needed | | |
| Tuba | B \flat OTS (0) | (+16) Adjustment Needed | | |
| | G OTS (+2) | | G OTS (+2) | |
| | G OTS (0) | | G OTS (0) | |
| | B \flat OTS (-14) | (+16) Adjustment Needed | | |