

The "front" of the Musigraph is the side bearing the trademark and the name MUSIGRAPH 100. The "back" is the side which has the names of the modes across the top. The instrument consists of a "slider" moving between two "stators"—or fixed frame sections—which will be referred to as the "upper" or "lower" stator in relation to a given side, in directing attention to various tables and rows.

**LOCATION OF TABLES AND ROWS (FRONT)**

**Transposing Rows:** On the upper stator, beginning at the extreme left, the row reading Gbb through Ax. This is the *upper transposing row*. The identical row, directly below on the slider, is the *lower transposing row*. Together, the two rows are "the transposing rows."

**Auxiliary Row:** The row on the lower edge of the slider, identical to the transposing rows except in its function.

**Basic Interval Table:** The table on the lower stator, reading from oo4 through ++5.

**Vibration Frequency Ratios:** The small superimposed numerals under the intervals o7 through +2 on the basic interval table.

**Interval Finder:** The † sign over "D" on the auxiliary row, but having no significance to D or that row.

**Harmonic Interval Table:** The table to the right of the Basic Interval Table, reading o7 through #6.

**Harmonic Interval Finder:** The † sign directly over the harmonic interval table when the slider is at or near "rest" position.

**Harmonic Resources Table:** The table of Roman numerals and chord symbols on the lower stator.

**Instrument Indexing Rows:** The two short identical rows—A through Ab—to the extreme right on the slider and upper stator, and labeled "Instruments." The row on the stator is the upper, and that on the slider the lower, instrument indexing row.

**Overtone Series Graph:** On the upper stator, the graph of ascending numbers found between the upper instrument indexing row and the upper transposing row.

**Relationships & Function Table:** The table of Roman numerals and function symbols between the lower transposing row and the lower instrument indexing row.

= Signs: These are explained in the pertinent instructional sections.

Key & Signature Tables: See pertinent instructional section.

**LOCATION OF TABLES AND ROWS (BACK)**

**Scale/Mode Tables:** The nine tables on the upper stator.

**Scale Reference Rows:** The three identical rows, Fb through B#, under the scale/mode tables.

**Modulation Resources Table:** The table reading from "#IV in" to "bII in" along the lower left edge of the slider.

**Harmonization Table:** The table just to the right of the Modulation Resources Table, reading from "#5 on" through "o7 on."

**Modulation/Harmonization Row:** Gbb—Ax on the lower stator.

**Harmony Reference Row:** The row Fb through B# along the lower right edge of the slider.

**Harmony Reference Tables:** The tables "IV" through "VII" (major) and "bVI" through "bVII" (minor) on the lower stator.

**SCALE/MODE ACCIDENTALS GUIDE**

In the tone rows and scale/mode tables, the symbol "b" stands for flat, "bb" for double flat, "#" for sharp, and "x" for double sharp. In spelling scales and modes, the following guide may be consulted (read toward the right to raise, toward the left to lower, a pitch):

bb—b—natural—#—x

Examples: Bb when raised becomes B, when lowered becomes Bbb. F# when raised becomes Fx, when lowered becomes F natural, etc.

**SYMBOLS USED IN INTERVAL TABLES**

oo = doubly diminished      M = Major  
o = diminished              + = augmented (++=doubly aug.)  
m = minor                    b = minor, lowered, flat  
P = perfect                  # = augmented, raised, sharp

**SYMBOLS USED IN RELATIONSHIPS/FUNCTION TABLE**

S      the subdominant, in major and minor  
D      the dominant, in major and minor  
T      the tonic (keynote), in major and minor  
o      diminished-tritone relative of  
+      augmented-tritone relative of  
Rs,Rd,Rt      relative major of minor subdominant, dominant, tonic  
rS, rD, rT      relative minor of major subdominant, dominant, tonic  
↓, †      lower, upper relative of

**CHORD SYMBOLS**

M,m,o,+      major, minor, diminished, augmented triads  
M7      major 7th chord  
7      7th (also called dominant 7th) chord  
m7      minor 7th chord  
ø7      half-diminished (m7b5) chord  
6      on triad, 6 and/or 9 may be added  
9      on 7th chord, 9th may be added  
mM, mM7      minor triad with added M7 interval  
+M7      + triad with added M7  
7b5      dominant 7th with lowered 5th  
+7      dominant 7th with raised 5th  
o7      diminished 7th chord  
M7b5      M7 chord with lowered 5th  
oM7      o triad with added M7 (M7b3b5)

**+6 CHORDS:** These sound (out of context) like, and are symbolized "7" and "7b5"—and on IV in minor, "ø7." But they are spelled with a #6 instead of a b7, and with other chromatic modifications. Where you see +6 listed in the table, you may use 7 and/or 7b5—plus, on IV, the ø7 chord. For spellings, etc., see a harmony text.  
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The "note-on-a-staff" is a trademark, "Musigraph 100" a trade name.

**CHORD CONSTRUCTION/HARMONIZATION GUIDE**

Symbol	1	b3	3	b5	5	#5	6	o7	b7	M7	b9	9	#9	11	#11	b13	13
+	■		■			■						□			□		
M	■		■		■							□			□		
m	■	■			■							□		□			
o	■	■		■				□				□		□			
+M7	■		■			■				■		□			□		
M7	■		■		■					■		□			□		□
7	■		■		■				■		□	□	□		□	□	□
6	■		■		■		■			□		□			□		□
mM7	■	■			■					■		□		□			□
m7	■	■			■				■			□		□			□
m6	■	■			■		■			□		□		□			□
oM7	■	■		■						■		□		□			□
ø7	■	■		■					■			□		□			□
o7	■	■		■				■		□		□		□			□
M7b5	■		■	■						■		□		□			□
7b5	■		■	■					■		□	□	□			□	□
+7	■		■			■			■		□	□	□		□		□

**CHORD CONSTRUCTION:** Intervals of chord construction are indicated by the solid square dots ■ opposite chord symbols, while the open dots □ indicate 9ths, 11ths, 13ths which may be added. For symbols such as C9, Cm9 etc. use the equivalent 7th chord (C7, Cm7, etc.) and add the 9th. If #9 or b9 is intended, symbol will so state ("7#9"). Follow same procedure with 11th and 13th chords. Presence of 7th is assumed when symbol is 9, 11 or 13; but 9th is optional on an 11th chord, 9th and 11th optional on a 13th chord. **HARMONIZATION:** Use table "in reverse" to explore possible harmonies for any melody note—*Harmonization Table* provides melody/root relationships, then Guide shows chord qualities which will harmonize each interval. For example, "D"—as "11 on A"—may be harmonized with Am,o,mM7,m7,m6 etc. Or, as "13 on F," with FM7,7,mM7, m7 and 7b5. There are more than 100 harmonizations indexed for any melody note—so observe key and context rather than random searching. Follow harmonic consonance (1, b3,3,5,6 of a chord) with dissonance (all other intervals), and vice-versa.

# Musigraph 100 Highlights (front)

The examples below are intended to provide an introduction to the major features of the Musigraph 100. The enclosed literature explains all the functions in detail. One should work through those applications which are of interest.

## Key Signatures

Major key signatures are indicated above the *Upper Transposing Row*.

Minor key signatures are indicated below the *Lower Transposing Row*.

## Transposition

Using the two *Transposing Rows*, place the name of the original key below the name of the key to which you are transposing. The example shows C to E (or D to F#, Eb to G, etc). Any note on the lower row will be replaced by the corresponding note in the upper row in the new key.

## Intervals

The *Basic Interval Table* lists all intervals from the doubly diminished fourth to the doubly augmented fifth.

In order to find the interval between any two notes, align those notes on the *Transposing Rows* and read the interval below the double arrow. (Note: The "D" below this arrow is not relevant to this function.) The example above shows that the interval C-E (or, again, any of the other intervals created by this position of the slider) is a major third.

The *Harmonic Interval Table* gives the interval name as used in building chords.

By placing the "C" under the "B" on the transposing rows, the double arrow for harmonic intervals points to M7.

### Harmonic Analysis

To find the Roman numeral indication for chords, use the *Relationships and Functions Table*.

← FLATS →												SHARPS →					
7	6	5	4	3	2	1	0	1	2	3	4	5	6	7			
Gbb Dbb Abb Ebb Bbb Fb Cb Gb Db Ab Eb Bb F C G D A E B F# C#	# E# B# Fx Cx Gx Dx Ax	bII bVI bIII bVII	IV I V II VI III VII IV A	°D Rs Rt Rd S T D rs rT rD s s t D													
# E# B# Fx Cx Gx Dx Ax	†																
oo4 oo8 oo5 o2 o6 o3 o7	o4 o8 o5 m2 m6 m3 m7	P4 P18 P5	M2 M6 M3 M7														
	5 5 11 7 12 8 6 7 4 2 3 8 5 5 11	3 4 6 5 11 5 5 4 3 1 2 7 3 4 6															

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Place the tonic "I" under the key name. In the example, the key of C has C as "I", G as "V", E as "III", etc.

### Chord Building

MUSIGRAPH 100

												17	19	28	21	16	24	18	26	20	30	22					
												14	8	12	9	13	10	15	11	Instruments							
A# E# B# Fx Cx Gx Dx Ax	Gbb Dbb Abb Ebb Bbb Fb Cb Gb Db Ab Eb Bb F C G D A E B F# C# G# D# A# E# B#																										
+5 8 5	+2 5	+6	+3	+7	+4	+1	+5	o7	.	.	b5	b9	b13	b3	b7	11	<b>1</b>	S	9	6 <sup>13</sup>	3	M7	#11	.	#5	#9	#6
I:M7,7; mM7, m7    bII: +M7, M7, +6    II: m7, $\phi$ 7 (7, 7b5)    bIII: +M7, M7, +7, 7    III: m7, $\phi$ 7, o7    IV: M7, mM7, +6; 7, m7 (#IV: $\phi$ 7, o7) V: 7, 7b5, m7, $\phi$ 7 (M7, mM7, M7b5, oM7)    bVI: +M7, +6; M7, +6    VI: m7, $\phi$ 7    bVII: M7, mM7, m7, m7 (+M7, +7)    VII: $\phi$ 7, o7 (m7)																											

To construct chords, use the *Auxiliary Row* of pitch names, placed above the *Harmonic Interval Table*.

In this example, "G" is placed over the "1," making it the root of the chord. All other notes are shown in their relationship to G. D is the fifth, Bb is the flat third, etc. Using the chord construction chart, any chord can be created on any root.

### Other Functions

*Overtone Series Graph:*  
place tonic under the "1"  
for overtones on that pitch

*Instrument Indexing Rows:*  
used when working with  
transposing instruments

← FLATS →												SHARPS →						MUSIGRAPH 100											
7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	17	19	28	21	16	24	18	26	20	30	22				
Bbb Fb Cb Gb Db Ab Eb Bb F C G D A E B F# C# G# D# A# E# B# Fx Cx Gx Dx Ax	Bbb Fb Cb Gb Db Ab Eb Bb F C G D A E B F# C# G# D# A# E# B# Fx Cx Gx Dx Ax																												

*Vibration Frequency Ratios:*  
shows the ratio of the pitches  
of interval above the numbers

*Harmonic Resources Table:*  
lists available chords  
on each note of the scale

