

*Extended  
Diatonic  
Modes*

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## *Extended Diatonic Modes*

It is very simple to play and deal with modes using a temperament. One just rotates through the pitches of a scale and chooses one as the root or drone. This will be the note which all the other pitches harmonize and gravitate to. It is another thing when Just Intonation ratios are applied to the pitches.

When fixing the pitches of a mode by ratios in Just Intonation things become tricky very quickly. No longer does just rotating one set of pitches work. The ratios of each mode must be chosen from the bottom note with maximum consonance in mind, especially those of the fourth and fifth. With all Just Intonation diatonic scales we find we need at least 8 notes to realize the three major and three minor triads of an Ionian mode or major scale. Two same letter name pitches must be used that are a Syntonic Comma ( $81/80$ ) apart. Otherwise there is no way we can construct all the triads available in a mode or key.

| **D**( $10/9$ ) <sup>(6/5)</sup> **F**( $4/3$ ) <sup>(5/4)</sup> **A**( $5/3$ ) <sup>(6/5)</sup> **C**( $1/1$ ) <sup>(5/4)</sup> **E**( $5/4$ ) <sup>(6/5)</sup> **G**( $3/2$ ) <sup>(5/4)</sup> **B**( $15/8$ ) <sup>(6/5)</sup> **D**( $9/8$ ) |

If we have 8 notes in a scale that means we also must have 8 distinct modes. The two distinct pitches that share the same letter name but are a Syntonic Comma apart are always on the second degree of the major scale. That means we have two Dorian modes, Dorian I and Dorian II. The 8 modes are divided into Upper and Lower modes which are inversions of one another or to put it differently, in an Otonality / Utonality relation. Each root or bottom note of each Diatonic Mode (Lydian, Ionian etc) belongs then to 8 different scales and so has 8 different possible sets of triads related to it. We see now that there are many possible arrangements of ratios and intervals and not just a single rotating set of a fixed temperament. In total then we have 8 different modes each with 8 different scale possibilities giving 64 extended modes in all.

Two sets of 64 Diatonic Modes are given. The first is the set of 64 Diatonic Modes “on” C while the second is the set of 64 Diatonic Modes “in” C. The “Normal” Diatonic Mode is outlined and each “Normal” Diatonic Mode contains all 6 possible major/minor triads. The seventh triad being the diminished triad is always found internally. The diminished fifth of the “Normal” Diatonic Mode always has the ratio of  $64/45$  and there are two possible diminished triads with internal intervals of  $(6/5, 32/27)$  and  $(32/27, 6/5)$ . The two possible internal notes of the diminished triad are the two pitches with the same letter name that are a Syntonic Comma apart. These two pitches are always the small ( $10/9$ ) and large ( $9/8$ ) major second of whatever the key the “Normal Diatonic Mode on C” belongs to.

All Extended Diatonic Modes that aren't the “Normal” Diatonic Mode have a diminished fifth with the ratio of  $36/25$ , the diminished triad being made up of two  $6/5$  intervals. All Extended Diatonic Modes of 8 distinct pitches will also always have only 5 major/minor triads. The perfect fifth interval of the missing triad will always be the ratio  $40/27$  which is a Syntonic Comma flat from a  $3/2$  perfect fifth. One main criterion for choosing an Extended Diatonic Mode is based upon the unique set of triads we would like to use in relation to the root note.

A complete set of “64 Extended Diatonic Modes on C” requires 27 notes while a complete set of “64 Extended Diatonic Modes in C” requires only 15 distinct notes. Taking the 15 notes of the “64 Extended Diatonic Modes in C” and adding an extended set of musica ficta accidentals for Renaissance Polyphony will give us a slightly different 27 note scale.

All possible interval combinations found in the “64 Extended Diatonic Modes on/in C” are given in two separate lists. The first is by interval

## *Compendium Musica*

size and the second by interval in relation to a note in the 27 note scale.

Most important of all is the comparison of the 5 Limit Extended Diatonic Modes to 53Et Equal Temperament. 5 Limit Just Intonation and 53Et could be considered practically synonymous as they deviate from each other on average by only around 1 cent which is 1/100 of a semitone. The vagueness of the inharmonicity of any pitch is far greater than that. In constructing our 15 and 27 note scales we find pairs of pitches that are a Syntonic Comma ( $81/80$ ) or 21.51 cents apart. The size of a step in 53Et is 22.64 cents. We can extend 5 Limit Just Intonation to very high number ratios and the close approximation to 53Et still holds. The size of a perfect fifth in 53Et is only 0.07 cents flat from just which is less than 1/1428 of a semitone! That the two completely different tuning systems of 5 Limit Just Intonation and 53Et are practically equivalent is quite amazing and very convenient! More information can be found in the Just Intonation chapter.

Finally, more information on the notation system used can be found in the “Polychromatic Notation and Extended Tonality” chapter.















27 Note Scale on C

64 Extended Diatonic Modes on C

	C 1/1	C <sup>+</sup> 81/80	Db <sup>+</sup> 16/15	Db <sup>+</sup> <sup>+</sup> 27/25	D <sub>↓</sub> 10/9	D 9/8	Eb 32/27	Eb <sup>+</sup> 6/5	E <sub>↓</sub> 100/81	E <sub>↓</sub> 5/4	F 4/3	F <sup>+</sup> 27/20	F# <sub>↓</sub> 25/18	F# <sub>↓</sub> 45/32
	81/80	256/243	81/80	250/243	81/80	256/243	81/80	250/243	81/80	16/15	81/80	250/243	81/80	250/243
	21.51	90.22	21.51	49.17	21.51	90.22	21.51	49.17	21.51	111.73	21.51	49.17	21.51	
	0	21.51	111.73	133.24	182.40	203.91	294.13	315.64	364.81	386.31	498.04	519.55	568.72	590.22
+/- 12ET	0	21.51	11.73	33.24	-17.60	3.91	-5.87	15.64	-35.19	-13.69	-1.96	19.55	-31.28	-9.78
53ET	2^(0/53)	2^(1/53)	2^(5/53)	2^(6/53)	2^(8/53)	2^(9/53)	2^(13/53)	2^(14/53)	2^(16/53)	2^(17/53)	2^(22/53)	2^(23/53)	2^(25/53)	2^(26/53)
	0	22.64	113.21	135.85	181.13	203.77	294.34	316.98	362.26	384.91	498.11	520.75	566.04	588.68
+/- 12ET	0	22.64	13.21	35.85	-18.87	3.77	-5.66	16.98	-37.74	-15.09	-1.89	20.75	-33.96	-11.32
(53ET - Just)	0.00	1.14	1.48	2.61	-1.27	-0.14	0.20	1.34	-2.54	-1.41	0.07	1.20	-2.68	-1.54
Avg.+/-	1.31													

15 Note Scale in C

64 Extended Diatonic Modes in C

	C 1/1	C <sup>+</sup> 81/80			D <sub>↓</sub> 10/9	D 9/8			E <sub>↓</sub> 100/81	E <sub>↓</sub> 5/4	F 4/3	F <sup>+</sup> 27/20		
	81/80			800/729	81/80			800/729	81/80	16/15	81/80			
	21.51			160.90	21.51			160.90	21.51	111.73	21.51			
	0	21.51			182.40	203.91			364.81	386.31	498.04	519.55		
+/- 12ET	0	21.51			-17.60	3.91			-35.19	-13.69	-1.96	19.55		
53ET	2^(0/53)	2^(1/53)			2^(8/53)	2^(9/53)			2^(16/53)	2^(17/53)	2^(22/53)	2^(23/53)		
	0	22.64			181.13	203.77			362.26	384.91	498.11	520.75		
+/- 12ET	0	22.64			-18.87	3.77			-37.74	-15.09	-1.89	20.75		
(53ET - Just)	0.00	1.14			-1.27	-0.14			-2.54	-1.41	0.07	1.20		
Avg.+/-	1.05													

27 Note Scale in C

Extended Diatonic Modes in C with Extended Musica Ficta for Renaissance Polyphony

	C 1/1	C <sup>+</sup> 81/80	C# <sub>↓</sub> 25/24	C# <sub>↓</sub> 135/128	D <sub>↓</sub> 10/9	D 9/8	Eb 32/27	Eb <sup>+</sup> 6/5	E <sub>↓</sub> 100/81	E <sub>↓</sub> 5/4	E 81/64	F 4/3	F <sup>+</sup> 27/20	F# <sub>↓</sub> 25/18
	81/80	250/243	81/80	256/243	81/80	256/243	81/80	250/243	81/80	81/80	256/243	81/80	250/243	81/80
	21.51	49.17	21.51	90.22	21.51	90.22	21.51	49.17	21.51	21.51	90.22	21.51	49.17	21.51
	0	21.51	70.67	92.18	182.40	203.91	294.13	315.64	364.81	386.31	407.82	498.04	519.55	568.72
+/- 12ET	0	21.51	-29.33	-7.82	-17.60	3.91	-5.87	15.64	-35.19	-13.69	7.82	-1.96	19.55	-31.28
53ET	2^(0/53)	2^(1/53)	2^(3/53)	2^(4/53)	2^(8/53)	2^(9/53)	2^(13/53)	2^(14/53)	2^(16/53)	2^(17/53)	2^(18/53)	2^(22/53)	2^(23/53)	2^(25/53)
	0	22.64	67.92	90.57	181.13	203.77	294.34	316.98	362.26	384.91	407.55	498.11	520.75	566.04
+/- 12ET	0	22.64	-32.08	-9.43	-18.87	3.77	-5.66	16.98	-37.74	-15.09	7.55	-1.89	20.75	-33.96
(53ET - Just)	0.00	1.14	-2.75	-1.61	-1.27	-0.14	0.20	1.34	-2.54	-1.41	-0.27	0.07	1.20	-2.68
Avg.+/-	1.19													

	Gb↑	Gb↑	G↓	G	Ab↑	Ab↑	A↓	A	Bb	Bb↑	B↓	B↓	C↓	C
2048/	64/45	36/25	40/27	3/2	8/5	81/50	5/3	27/16	16/9	9/5	50/27	15/8	160/81	2/1
2025	81/80	250/243	81/80	16/15	81/80	250/243	81/80	256/243	81/80	250/243	81/80	256/243	81/80	256/243
19.55	21.51	49.17	21.51	111.73	21.51	49.17	21.51	90.22	21.51	49.17	21.51	90.22	21.51	21.51
	609.78	631.28	680.45	701.96	813.69	835.19	884.36	905.87	996.09	1017.60	1066.76	1088.27	1178.49	1200
	9.78	31.28	-19.55	1.96	13.69	35.19	-15.64	5.87	-3.91	17.60	-33.24	-11.73	-21.51	0
	2^(27/53)	2^(28/53)	2^(30/53)	2^(31/53)	2^(36/53)	2^(37/53)	2^(39/53)	2^(40/53)	2^(44/53)	2^(45/53)	2^(47/53)	2^(48/53)	2^(52/53)	2^(53/53)
	611.32	633.96	679.25	701.89	815.09	837.74	883.02	905.66	996.23	1018.87	1064.15	1086.79	1177.36	1200
	11.32	33.96	-20.75	1.89	15.09	37.74	-16.98	5.66	-3.77	18.87	-35.85	-13.21	-22.64	0
	1.54	2.68	-1.20	-0.07	1.41	2.54	-1.34	-0.20	0.14	1.27	-2.61	-1.48	-1.14	0.00

	G↓	G	A↓	A	B↓	B↓	C↓	C
	40/27	3/2	5/3	27/16	50/27	15/8	160/81	2/1
800/729	81/80	10/9	81/80	800/729	81/80	256/243	81/80	256/243
160.90	21.51	182.40	21.51	160.90	21.51	90.22	21.51	21.51
	680.45	701.96	884.36	905.87	1066.76	1088.27	1178.49	1200
	-19.55	1.96	-15.64	5.87	-33.24	-11.73	-21.51	0
	2^(30/53)	2^(31/53)	2^(39/53)	2^(40/53)	2^(47/53)	2^(48/53)	2^(52/53)	2^(53/53)
	679.25	701.89	883.02	905.66	1064.15	1086.79	1177.36	1200
	-20.75	1.89	-16.98	5.66	-35.85	-13.21	-22.64	0
	-1.20	-0.07	-1.34	-0.20	-2.61	-1.48	-1.14	0.00

	F#↓	G↓	G	G#↓	Ab	Ab↑	A↓	A	Bb	Bb↑	B↓	B↓	C↓	C
	45/32	40/27	3/2	25/16	128/81	8/5	5/3	27/16	16/9	9/5	50/27	15/8	160/81	2/1
81/80	256/243	81/80	25/24	2048/	81/80	25/24	81/80	256/243	81/80	250/243	81/80	256/243	81/80	256/243
21.51	90.22	21.51	70.67	19.55	21.51	70.67	21.51	90.22	21.51	49.17	21.51	90.22	21.51	21.51
	590.22	680.45	701.96	772.63	792.18	813.69	884.36	905.87	996.09	1017.60	1066.76	1088.27	1178.49	1200
	-9.78	-19.55	1.96	-27.37	-7.82	13.69	-15.64	5.87	-3.91	17.60	-33.24	-11.73	-21.51	0
	2^(26/53)	2^(30/53)	2^(31/53)	2^(34/53)	2^(35/53)	2^(36/53)	2^(39/53)	2^(40/53)	2^(44/53)	2^(45/53)	2^(47/53)	2^(48/53)	2^(52/53)	2^(53/53)
	588.68	679.25	701.89	769.81	792.45	815.09	883.02	905.66	996.23	1018.87	1064.15	1086.79	1177.36	1200
	-11.32	-20.75	1.89	-30.19	-7.55	15.09	-16.98	5.66	-3.77	18.87	-35.85	-13.21	-22.64	0
	-1.54	-1.20	-0.07	-2.82	0.27	1.41	-1.34	-0.20	0.14	1.27	-2.61	-1.48	-1.14	0.00

Interval Combinations of the 64 Diatonic Modes

(by interval size with inversions)

				1/1		2/1	
				0		1200	
				0		0	
C	C	C	2/1		2/1 - 1/1		2/1
C	C	C	1/1		1/1		2/1

				81/80		160/81	
				21.51		1178.49	
				21.51		-21.51	
C↓	C	C↓	160/81		2/1 - 1/1		160/81
B↓	B↓	B↓	50/27		15/8		50/27
Bb	Bb↑	Bb	16/9		9/5		16/9
A↓	A	A↓	5/3		27/16		5/3
Ab↑	Ab↑	Ab↑	8/5		81/50		8/5
G↓	G	G↓	40/27		3/2		40/27
Gb↑	Gb↑	Gb↑	64/45		36/25		64/45
F#↓	F#↓	F#↓	25/18		45/32		25/18
F	F↑	F	4/3		27/20		4/3
E↓	E↓	E↓	100/81		5/4		100/81
Eb	Eb↑	Eb	32/27		6/5		32/27
D↓	D	D↓	10/9		9/8		10/9
Db↑	Db↑	Db↑	16/15		27/25		16/15
C	C↑	C	1/1		81/80		2/1

				16/15		15/8	
				111.73		1088.27	
				11.73		-11.73	
B↓	C	B↓	15/8		2/1 - 1/1		15/8
B↓	C↓	B↓	50/27		160/81		50/27
A	Bb↑	A	27/16		9/5		27/16
A↓	Bb	A↓	5/3		16/9		5/3
G	Ab↑	G	3/2		8/5		3/2
F#↓	G	F#↓	45/32		3/2		45/32
F#↓	G↓	F#↓	25/18		40/27		25/18
F↑	Gb↑	F↑	27/20		36/25		27/20
F	Gb↑	F	4/3		64/45		4/3
E↓	F	E↓	5/4		4/3		5/4
D	Eb↑	D	9/8		6/5		9/8
D↓	Eb	D↓	10/9		32/27		10/9
C↑	Db↑	C↑	81/80		27/25		81/80
C	Db↑	C	1/1		16/15		2/1

				27/25		50/27	
				133.24		1066.76	
				33.24		-33.24	
C↓	Db↑	C↓	160/81		16/15		160/81
B↓	C↑	B↓	15/8		81/80		15/8
B↓	C	B↓	50/27		2/1 - 1/1		50/27
A↓	Bb↑	A↓	5/3		9/5		5/3
G	Ab↑	G	3/2		81/50		3/2
G↓	Ab↑	G↓	40/27		8/5		40/27
F#↓	G	F#↓	25/18		3/2		25/18
F	Gb↑	F	4/3		36/25		4/3
E↓	F↑	E↓	5/4		27/20		5/4
E↓	F	E↓	100/81		4/3		100/81
D↓	Eb↑	D↓	10/9		6/5		10/9
C	Db↑	C	1/1		27/25		2/1

				10/9		9/5	
				182.40		1017.60	
				-17.60		17.60	
Bb↑	C	Bb↑	9/5		2/1 - 1/1		9/5
Bb	C↓	Bb	16/9		160/81		16/9
A	B↓	A	27/16		15/8		27/16
A↓	B↓	A↓	5/3		50/27		5/3
Ab↑	Bb↑	Ab↑	81/50		9/5		81/50
Ab↑	Bb	Ab↑	8/5		16/9		8/5
G	A↓	G	3/2		5/3		3/2
Gb↑	Ab↑	Gb↑	36/25		8/5		36/25
F↑	G	F↑	27/20		3/2		27/20
F	G↓	F	4/3		40/27		4/3
E↓	F#↓	E↓	5/4		25/18		5/4
Eb↑	F	Eb↑	6/5		4/3		6/5
D	E↓	D	9/8		5/4		9/8
D↓	E↓	D↓	10/9		100/81		10/9
Db↑	Eb↑	Db↑	27/25		6/5		27/25
Db↑	Eb	Db↑	16/15		32/27		16/15
C↑	D	C↑	81/80		9/8		81/80
C	D↓	C	1/1		10/9		2/1

				9/8		16/9	
				203.91		996.09	
				3.91		-3.91	
C↓	D↓	C↓	160/81		10/9		160/81
Bb↑	C↑	Bb↑	9/5		81/80		9/5
Bb	C	Bb	16/9		2/1 - 1/1		16/9
A↓	B↓	A↓	5/3		15/8		5/3
Ab↑	Bb↑	Ab↑	8/5		9/5		8/5
G	A	G	3/2		27/16		3/2
G↓	A↓	G↓	40/27		5/3		40/27
Gb↑	Ab↑	Gb↑	36/25		81/50		36/25
Gb↑	Ab↑	Gb↑	64/45		8/5		64/45
F	G	F	4/3		3/2		4/3
E↓	F#↓	E↓	5/4		45/32		5/4
E↓	F#↓	E↓	100/81		25/18		100/81
Eb↑	F↑	Eb↑	6/5		27/20		6/5
Eb	F	Eb	32/27		4/3		32/27
D↓	E↓	D↓	10/9		5/4		10/9
Db↑	Eb↑	Db↑	16/15		6/5		16/15
C	D	C	1/1		9/8		2/1

				32/27		27/16	
				294.13		905.87	
				-5.87		5.87	
B↓	D↓	B↓	15/8		10/9		15/8
Bb↑	Db↑	Bb↑	9/5		16/15		9/5
A	C	A	27/16		2/1 - 1/1		27/16
A↓	C↓	A↓	5/3		160/81		5/3
G	Bb	G	3/2		16/9		3/2
F#↓	A↓	F#↓	45/32		5/3		45/32
F↑	Ab↑	F↑	27/20		8/5		27/20
E↓	G↓	E↓	5/4		40/27		5/4
Eb↑	Gb↑	Eb↑	6/5		64/45		6/5
D	F	D	9/8		4/3		9/8
C↑	Eb↑	C↑	81/80		6/5		81/80
C	Eb	C	1/1		32/27		2/1

			6/5	5/3			
			315.64	884.36			
			15.64	-15.64			
C↓	Eb	C↓	160/81	32/27	160/81		
B↓	D	B↓	15/8	9/8	15/8		
B↓↓	D↓	B↓↓	50/27	10/9	50/27		
Bb↑	Db↑↑	Bb↑	9/5	27/25	9/5		
Bb	Db↑	Bb	16/9	16/15	16/9		
A	C↑	A	27/16	81/80	27/16		
A↓	C	A↓	5/3	2/1 - 1/1	5/3		
G	Bb↑	G	3/2	9/5	3/2		
G↓	Bb	G↓	40/27	16/9	40/27		
F#↓	A	F#↓	45/32	27/16	45/32		
F#↓↓	A↓	F#↓↓	25/18	5/3	25/18		
F↑	Ab↑↑	F↑	27/20	81/50	27/20		
F	Ab↑	F	4/3	8/5	4/3		
E↓	G	E↓	5/4	3/2	5/4		
E↓↓	G↓	E↓↓	100/81	40/27	100/81		
Eb↑	Gb↑↑	Eb↑	6/5	36/25	6/5		
Eb	Gb↑	Eb	32/27	64/45	32/27		
D	F↑	D	9/8	27/20	9/8		
D↓	F	D↓	10/9	4/3	10/9		
C	Eb↑	C	1/1	6/5	2/1		

			100/81	81/50			
			364.81	835.19			
			-35.19	35.19			
Bb↑	D↓	Bb↑	9/5	10/9	9/5		
Ab↑↑	C	Ab↑↑	81/50	2/1 - 1/1	81/50		
Ab↑	C↓	Ab↑	8/5	160/81	8/5		
G	B↓	G	3/2	50/27	3/2		
Gb↑↑	Bb	Gb↑↑	36/25	16/9	36/25		
F↑	A↓	F↑	27/20	5/3	27/20		
Eb↑	G↓	Eb↑	6/5	40/27	6/5		
D	F#↓	D	9/8	25/18	9/8		
Db↑↑	F	Db↑↑	27/25	4/3	27/25		
C↑	E↓	C↑	81/80	5/4	81/80		
C	E↓↓	C	1/1	100/81	2/1		

			5/4	8/5			
			386.31	813.69			
			-13.69	13.69			
C↓	E↓↓	C↓	160/81	100/81	160/81		
Bb↑	D	Bb↑	9/5	9/8	9/5		
Bb	D↓	Bb	16/9	10/9	16/9		
Ab↑↑	C↑	Ab↑↑	81/50	81/80	81/50		
Ab↑	C	Ab↑	8/5	2/1 - 1/1	8/5		
G	B↓	G	3/2	15/8	3/2		
G↓	B↓↓	G↓	40/27	50/27	40/27		
Gb↑↑	Bb↑	Gb↑↑	36/25	9/5	36/25		
Gb↑	Bb	Gb↑	64/45	16/9	64/45		
F↑	A	F↑	27/20	27/16	27/20		
F	A↓	F	4/3	5/3	4/3		
Eb↑	G	Eb↑	6/5	3/2	6/5		
Eb	G↓	Eb	32/27	40/27	32/27		
D	F#↓	D	9/8	45/32	9/8		
D↓	F#↓↓	D↓	10/9	25/18	10/9		
Db↑↑	F↑	Db↑↑	27/25	27/20	27/25		
Db↑	F	Db↑	16/15	4/3	16/15		
C	E↓	C	1/1	5/4	2/1		

			4/3	3/2			
			498.04	701.96			
			-1.96	1.96			
B↓	E↓	B↓	15/8	5/4	15/8		
B↓↓	E↓↓	B↓↓	50/27	100/81	50/27		
Bb↑	Eb↑	Bb↑	9/5	6/5	9/5		
Bb	Eb	Bb	16/9	32/27	16/9		
A	D	A	27/16	9/8	27/16		
A↓	D↓	A↓	5/3	10/9	5/3		
Ab↑↑	Db↑↑	Ab↑↑	81/50	27/25	81/50		
Ab↑	Db↑	Ab↑	8/5	16/15	8/5		
G	C	G	3/2	2/1 - 1/1	3/2		
G↓	C↓	G↓	40/27	160/81	40/27		
F#↓	B↓	F#↓	45/32	15/8	45/32		
F#↓↓	B↓↓	F#↓↓	25/18	50/27	25/18		
F↑	Bb↑	F↑	27/20	9/5	27/20		
F	Bb	F	4/3	16/9	4/3		
E↓	A↓	E↓	5/4	5/3	5/4		
Eb↑	Ab↑	Eb↑	6/5	8/5	6/5		
D	G	D	9/8	3/2	9/8		
D↓	G↓	D↓	10/9	40/27	10/9		
Db↑↑	Gb↑↑	Db↑↑	27/25	36/25	27/25		
Db↑	Gb↑	Db↑	16/15	64/45	16/15		
C↑	F↑	C↑	81/80	27/20	81/80		
C	F	C	1/1	4/3	2/1		

			27/20	40/27			
			519.55	680.45			
			19.55	-19.55			
C↓	F	C↓	160/81	4/3	160/81		
B↓↓	E↓	B↓↓	50/27	5/4	50/27		
Bb	Eb↑	Bb	16/9	6/5	16/9		
A↓	D	A↓	5/3	9/8	5/3		
Ab↑	Db↑↑	Ab↑	8/5	27/25	8/5		
G	C↑	G	3/2	81/80	3/2		
G↓	C	G↓	40/27	2/1 - 1/1	40/27		
F#↓↓	B↓	F#↓↓	25/18	15/8	25/18		
F	Bb↑	F	4/3	9/5	4/3		
E↓	A	E↓	5/4	27/16	5/4		
E↓↓	A↓	E↓↓	100/81	5/3	100/81		
Eb↑	Ab↑↑	Eb↑	6/5	81/50	6/5		
Eb	Ab↑	Eb	32/27	8/5	32/27		
D↓	G	D↓	10/9	3/2	10/9		
Db↑	Gb↑↑	Db↑	16/15	36/25	16/15		
C	F↑	C	1/1	27/20	2/1		

			25/18	36/25			
			568.72	631.28			
			-31.28	31.28			
Bb↑	E↓	Bb↑	9/5	5/4	9/5		
Bb	E↓↓	Bb	16/9	100/81	16/9		
Ab↑↑	D	Ab↑↑	81/50	9/8	81/50		
Ab↑	D↓	Ab↑	8/5	10/9	8/5		
Gb↑↑	C	Gb↑↑	36/25	2/1 - 1/1	36/25		
Gb↑	C↓	Gb↑	64/45	160/81	64/45		
F↑	B↓	F↑	27/20	15/8	27/20		
F	B↓↓	F	4/3	50/27	4/3		
Eb↑	A↓	Eb↑	6/5	5/3	6/5		
Db↑↑	G	Db↑↑	27/25	3/2	27/25		
Db↑	G↓	Db↑	16/15	40/27	16/15		
C↑	F#↓	C↑	81/80	45/32	81/80		
C	F#↓↓	C	1/1	25/18	2/1		

			45/32	64/45			
			590.22	609.78			
			-9.78	9.78			
C↓	F#↓↓	C↓	160/81	25/18	160/81		
Bb	E↓	Bb	16/9	5/4	16/9		
Ab↑	D	Ab↑	8/5	9/8	8/5		
Gb↑↑	C↑	Gb↑↑	36/25	81/80	36/25		
Gb↑	C	Gb↑	64/45	2/1 - 1/1	64/45		
F	B↓	F	4/3	15/8	4/3		
Eb↑	A	Eb↑	6/5	27/16	6/5		
Eb	A↓	Eb	32/27	5/3	32/27		
Db↑	G	Db↑	16/15	3/2	16/15		
C	F#↓	C	1/1	45/32	2/1		

Interval Combinations of the 64 Diatonic Modes

(ascending only, inversions not given)

			Interval		Interval	+/- 12ET
<b>Db</b> ↑ C	27/25 *	50/27 =	2/1	1066.76	-33.24	
<b>Db</b> ↑ <b>Bb</b> ↑	27/25 *	5/3 = 9/5		884.36	-15.64	
<b>Db</b> ↑ <b>Ab</b> ↑	27/25 *	3/2 = 81/50		701.96	1.96	
<b>Db</b> ↑ <b>G</b>	27/25 *	40/27 = 8/5		680.45	-19.55	
<b>Db</b> ↑ <b>F</b>	27/25 *	25/18 = 3/2		568.72	-31.28	
<b>Db</b> ↑ <b>E</b>	27/25 *	4/3 = 36/25		498.04	-1.96	
<b>Db</b> ↑ <b>D</b>	27/25 *	5/4 = 27/20		386.31	-13.69	
<b>Db</b> ↑ <b>C</b>	27/25 *	100/81 = 4/3		364.81	-35.19	
<b>Db</b> ↑ <b>B</b>	27/25 *	10/9 = 6/5		182.40	-17.60	
<b>C</b>	16/15 *	5/8 = 2/1		1088.27	-11.73	
<b>C</b> <b>C</b>	16/15 *	50/27 = 160/81		1066.76	-33.24	
<b>C</b> <b>B</b>	16/15 *	27/16 = 9/5		905.87	5.87	
<b>C</b> <b>Bb</b>	16/15 *	5/3 = 16/9		884.36	-15.64	
<b>C</b> <b>A</b>	16/15 *	45/32 = 3/2		590.22	-9.78	
<b>C</b> <b>G</b>	16/15 *	25/18 = 40/27		568.72	-31.28	
<b>C</b> <b>F</b>	16/15 *	27/20 = 36/25		519.55	19.55	
<b>C</b> <b>E</b>	16/15 *	4/3 = 64/45		498.04	-1.96	
<b>C</b> <b>D</b>	16/15 *	5/4 = 4/3		386.31	-13.69	
<b>C</b> <b>C</b>	16/15 *	9/8 = 6/5		203.91	3.91	
<b>C</b> <b>B</b>	16/15 *	10/9 = 32/27		182.40	-17.60	
<b>C</b> <b>Bb</b>	16/15 *	81/80 = 27/25		21.51	21.51	
<b>C</b> <b>A</b>	81/80 *	160/81 = 2/1		1178.49	-21.51	
<b>C</b> <b>G</b>	81/80 *	50/27 = 15/8		1066.76	-33.24	
<b>C</b> <b>F</b>	81/80 *	16/9 = 9/5		996.09	-3.91	
<b>C</b> <b>E</b>	81/80 *	5/3 = 27/16		884.36	-15.64	
<b>C</b> <b>D</b>	81/80 *	8/5 = 81/50		813.69	13.69	
<b>C</b> <b>C</b>	81/80 *	40/27 = 3/2		680.45	-19.55	
<b>C</b> <b>B</b>	81/80 *	64/45 = 36/25		609.78	9.78	
<b>C</b> <b>Bb</b>	81/80 *	25/18 = 45/32		568.72	-31.28	
<b>C</b> <b>A</b>	81/80 *	4/3 = 27/20		498.04	-1.96	
<b>C</b> <b>G</b>	81/80 *	100/81 = 5/4		364.81	-35.19	
<b>C</b> <b>F</b>	81/80 *	27/20 = 6/5		294.13	-5.87	
<b>C</b> <b>E</b>	81/80 *	10/9 = 9/8		182.40	-17.60	
<b>C</b> <b>D</b>	81/80 *	16/15 = 27/25		111.73	11.73	
<b>C</b> <b>C</b>	1/1 *	2/1 = 2/1		1200	0	
<b>C</b> <b>C</b>	1/1 *	160/81 = 160/81		1178.49	-21.51	
<b>C</b> <b>B</b>	1/1 *	15/8 = 15/8		1088.27	-11.73	
<b>C</b> <b>Bb</b>	1/1 *	50/27 = 50/27		1066.76	-33.24	
<b>C</b> <b>A</b>	1/1 *	9/5 = 9/5		1017.60	17.60	
<b>C</b> <b>G</b>	1/1 *	16/9 = 16/9		996.09	-3.91	
<b>C</b> <b>F</b>	1/1 *	27/16 = 27/16		905.87	5.87	
<b>C</b> <b>E</b>	1/1 *	5/3 = 5/3		884.36	-15.64	
<b>C</b> <b>D</b>	1/1 *	81/50 = 81/50		835.19	35.19	
<b>C</b> <b>C</b>	1/1 *	8/5 = 8/5		813.69	13.69	
<b>C</b> <b>B</b>	1/1 *	45/32 = 45/32		701.96	1.96	
<b>C</b> <b>Bb</b>	1/1 *	3/2 = 3/2		701.96	1.96	
<b>C</b> <b>A</b>	1/1 *	40/27 = 40/27		680.45	-19.55	
<b>C</b> <b>G</b>	1/1 *	36/25 = 36/25		631.28	31.28	
<b>C</b> <b>F</b>	1/1 *	64/45 = 64/45		609.78	9.78	
<b>C</b> <b>E</b>	1/1 *	25/18 = 25/18		568.72	-31.28	
<b>C</b> <b>D</b>	1/1 *	27/20 = 27/20		519.55	19.55	
<b>C</b> <b>C</b>	1/1 *	4/3 = 4/3		498.04	-1.96	
<b>C</b> <b>B</b>	1/1 *	5/4 = 5/4		386.31	-13.69	
<b>C</b> <b>Bb</b>	1/1 *	100/81 = 100/81		364.81	-35.19	
<b>C</b> <b>A</b>	1/1 *	6/5 = 6/5		315.64	15.64	
<b>C</b> <b>G</b>	1/1 *	32/27 = 32/27		294.13	-5.87	
<b>C</b> <b>F</b>	1/1 *	9/8 = 9/8		203.91	3.91	
<b>C</b> <b>E</b>	1/1 *	10/9 = 10/9		182.40	-17.60	
<b>C</b> <b>D</b>	1/1 *	16/15 = 16/15		111.73	11.73	
<b>C</b> <b>C</b>	1/1 *	81/80 = 81/80		21.51	21.51	
<b>C</b> <b>B</b>	1/1 *	1/1 = 1/1		0	0	

			Interval		Interval	+/- 12ET
<b>E</b> ↑ C	6/5 *	5/3 = 2/1		884.36	-15.64	
<b>E</b> ↑ <b>B</b> ↑	6/5 *	3/2 = 9/5		701.96	1.96	
<b>E</b> ↑ <b>Bb</b>	6/5 *	40/27 = 16/9		680.45	-19.55	
<b>E</b> ↑ <b>A</b>	6/5 *	45/32 = 27/16		590.22	-9.78	
<b>E</b> ↑ <b>A</b>	6/5 *	25/18 = 5/3		568.72	-31.28	
<b>E</b> ↑ <b>Ab</b> ↑	6/5 *	27/20 = 81/50		519.55	19.55	
<b>E</b> ↑ <b>Ab</b> ↑	6/5 *	4/3 = 8/5		498.04	-1.96	
<b>E</b> ↑ <b>G</b>	6/5 *	5/4 = 3/2		386.31	-13.69	
<b>E</b> ↑ <b>G</b>	6/5 *	100/81 = 40/27		364.81	-35.19	
<b>E</b> ↑ <b>G</b> ↑	6/5 *	6/5 = 36/25		315.64	15.64	
<b>E</b> ↑ <b>G</b> ↑	6/5 *	32/27 = 64/45		294.13	-5.87	
<b>E</b> ↑ <b>F</b>	6/5 *	9/8 = 27/20		203.91	3.91	
<b>E</b> ↑ <b>F</b>	6/5 *	10/9 = 4/3		182.40	-17.60	
<b>E</b> ↑ <b>C</b>	32/27 *	27/16 = 2/1		905.87	5.87	
<b>E</b> ↑ <b>C</b>	32/27 *	5/3 = 160/81		884.36	-15.64	
<b>E</b> ↑ <b>B</b>	32/27 *	3/2 = 16/9		701.96	1.96	
<b>E</b> ↑ <b>A</b>	32/27 *	45/32 = 5/3		590.22	-9.78	
<b>E</b> ↑ <b>Ab</b> ↑	32/27 *	27/20 = 8/5		519.55	19.55	
<b>E</b> ↑ <b>G</b>	32/27 *	5/4 = 40/27		386.31	-13.69	
<b>E</b> ↑ <b>G</b> ↑	32/27 *	6/5 = 64/45		315.64	15.64	
<b>E</b> ↑ <b>F</b>	32/27 *	9/8 = 4/3		203.91	3.91	
<b>E</b> ↑ <b>E</b> ↑	32/27 *	81/80 = 6/5		21.51	21.51	
<b>D</b> C	9/8 *	16/9 = 2/1		996.09	-3.91	
<b>D</b> <b>B</b>	9/8 *	5/3 = 15/8		884.36	-15.64	
<b>D</b> <b>Bb</b>	9/8 *	8/5 = 9/5		813.69	13.69	
<b>D</b> <b>A</b>	9/8 *	3/2 = 27/16		701.96	1.96	
<b>D</b> <b>A</b>	9/8 *	40/27 = 5/3		680.45	-19.55	
<b>D</b> <b>Ab</b> ↑	9/8 *	36/25 = 81/50		631.28	31.28	
<b>D</b> <b>Ab</b> ↑	9/8 *	64/45 = 8/5		609.78	9.78	
<b>D</b> <b>G</b>	9/8 *	4/3 = 3/2		498.04	-1.96	
<b>D</b> <b>F</b>	9/8 *	5/4 = 45/32		386.31	-13.69	
<b>D</b> <b>F</b> ↑	9/8 *	100/81 = 25/18		364.81	-35.19	
<b>D</b> <b>F</b>	9/8 *	6/5 = 27/20		315.64	15.64	
<b>D</b> <b>E</b>	9/8 *	32/27 = 4/3		294.13	-5.87	
<b>D</b> <b>E</b>	9/8 *	10/9 = 5/4		182.40	-17.60	
<b>D</b> <b>E</b> ↑	9/8 *	16/15 = 6/5		111.73	11.73	
<b>D</b> <b>C</b>	10/9 *	9/5 = 2/1		1017.60	17.60	
<b>D</b> <b>C</b>	10/9 *	16/9 = 160/81		996.09	-3.91	
<b>D</b> <b>B</b>	10/9 *	27/16 = 15/8		905.87	5.87	
<b>D</b> <b>Bb</b>	10/9 *	5/3 = 50/27		884.36	-15.64	
<b>D</b> <b>A</b>	10/9 *	81/50 = 9/5		835.19	35.19	
<b>D</b> <b>A</b>	10/9 *	8/5 = 16/9		813.69	13.69	
<b>D</b> <b>Ab</b> ↑	10/9 *	3/2 = 5/3		701.96	1.96	
<b>D</b> <b>Ab</b> ↑	10/9 *	36/25 = 8/5		631.28	31.28	
<b>D</b> <b>G</b>	10/9 *	27/20 = 3/2		519.55	19.55	
<b>D</b> <b>G</b>	10/9 *	4/3 = 40/27		498.04	-1.96	
<b>D</b> <b>F</b>	10/9 *	5/4 = 25/18		386.31	-13.69	
<b>D</b> <b>F</b>	10/9 *	6/5 = 4/3		315.64	15.64	
<b>D</b> <b>E</b>	10/9 *	9/8 = 5/4		203.91	3.91	
<b>D</b> <b>E</b> ↑	10/9 *	10/9 = 100/81		182.40	-17.60	
<b>D</b> <b>E</b> ↑	10/9 *	27/25 = 6/5		133.24	33.24	
<b>D</b> <b>E</b>	10/9 *	16/15 = 32/27		111.73	11.73	
<b>D</b> <b>D</b>	10/9 *	81/80 = 9/8		21.51	21.51	

			Interval		Interval	+/- 12ET
<b>F</b> ↑ C	45/32 *	64/45 = 2/1		609.78	9.78	
<b>F</b> ↑ <b>B</b>	45/32 *	4/3 = 15/8		498.04	-1.96	
<b>F</b> ↑ <b>A</b>	45/32 *	6/5 = 27/16		315.64	15.64	
<b>F</b> ↑ <b>A</b>	45/32 *	32/27 = 5/3		294.13	-5.87	
<b>F</b> ↑ <b>G</b>	45/32 *	16/15 = 3/2		111.73	11.73	
<b>F</b> ↑ <b>C</b>	25/18 *	36/25 = 2/1		631.28	31.28	
<b>F</b> ↑ <b>C</b>	25/18 *	64/45 = 160/81		609.78	9.78	
<b>F</b> ↑ <b>B</b>	25/18 *	27/20 = 15/8		519.55	19.55	
<b>F</b> ↑ <b>B</b>	25/18 *	4/3 = 50/27		498.04	-1.96	
<b>F</b> ↑ <b>A</b>	25/18 *	6/5 = 5/3		315.64	15.64	
<b>F</b> ↑ <b>A</b>	25/18 *	27/25 = 3/2		133.24	33.24	
<b>F</b> ↑ <b>G</b>	25/18 *	16/15 = 40/27		111.73	11.73	
<b>F</b> ↑ <b>G</b>	25/18 *	81/80 = 45/32		21.51	21.51	
<b>F</b> ↑ <b>C</b>	27/20 *	40/27 = 2/1		680.45	-19.55	
<b>F</b> ↑ <b>B</b>	27/20 *	25/18 = 15/8		568.72	-31.28	
<b>F</b> ↑ <b>Bb</b>	27/20 *	4/3 = 9/5		498.04	-1.96	
<b>F</b> ↑ <b>A</b>	27/20 *	5/4 = 27/16		386.31	-13.69	
<b>F</b> ↑ <b>A</b>	27/20 *	100/81 = 5/3		364.81	-35.19	
<b>F</b> ↑ <b>Ab</b> ↑	27/20 *	6/5 = 81/50		315.64	15.64	
<b>F</b> ↑ <b>Ab</b> ↑	27/20 *	32/27 = 8/5		294.13	-5.87	
<b>F</b> ↑ <b>G</b>	27/20 *	10/9 = 3/2		182.40	-17.60	
<b>F</b> ↑ <b>G</b> ↑	27/20 *	16/15 = 36/25		111.73	11.73	
<b>F</b> ↑ <b>C</b>	4/3 *	3/2 = 2/1		701.96	1.96	
<b>F</b> ↑ <b>C</b>	4/3 *	40/27 = 160/81		680.45	-19.55	
<b>F</b> ↑ <b>B</b>	4/3 *	45/32 = 15/8		590.22	-9.78	
<b>F</b> ↑ <b>B</b>	4/3 *	25/18 = 50/27		568.72	-31.28	
<b>F</b> ↑ <b>Bb</b>	4/3 *	27/20 = 9/5		519.55	19.55	
<b>F</b> ↑ <b>Bb</b>	4/3 *	4/3 = 16/9		498.04	-1.96	
<b>F</b> ↑ <b>A</b>	4/3 *	5/4 = 5/3		386.31	-13.69	
<b>F</b> ↑ <b>Ab</b> ↑	4/3 *	6/5 = 8/5		315.64	15.64	
<b>F</b> ↑ <b>G</b>	4/3 *	9/8 = 3/2		203.91	3.91	
<b>F</b> ↑ <b>G</b>	4/3 *	10/9 = 40/27		182.40	-17.60	
<b>F</b> ↑ <b>G</b> ↑	4/3 *	27/25 = 36/25		133.24	33.24	
<b>F</b> ↑ <b>G</b> ↑	4/3 *	16/15 = 64/45		111.73	11.73	
<b>F</b> ↑ <b>F</b>	4/3 *	81/80 = 27/20		21.51	21.51	
<b>E</b> ↓ C	5/4 *	8/5 = 2/1		813.69	13.69	
<b>E</b> ↓ <b>B</b>	5/4 *	3/2 = 15/8		701.96	1.96	
<b>E</b> ↓ <b>B</b>	5/4 *	40/27 = 50/27		680.45	-19.55	
<b>E</b> ↓ <b>Bb</b>	5/4 *	36/25 = 9/5		631.28	31.28	
<b>E</b> ↓ <b>Bb</b>	5/4 *	64/45 = 16/9		609.78	9.78	
<b>E</b> ↓ <b>A</b>	5/4 *	27/20 = 27/16		519.55	19.55	
<b>E</b> ↓ <b>A</b>	5/4 *	4/3 = 5/3		498.04	-1.96	
<b>E</b> ↓ <b>G</b>	5/4 *	6/5 = 3/2		315.64	15.64	
<b>E</b> ↓ <b>G</b>	5/4 *	32/27 = 40/27		294.13	-5.87	
<b>E</b> ↓ <b>F</b>	5/4 *	9/8 = 45/32		203.91	3.91	
<b>E</b> ↓ <b>F</b> ↑	5/4 *	10/9 = 25/18		182.40	-17.60	
<b>E</b> ↓ <b>F</b>	5/4 *	27/25 = 27/20		133.24	33.24	
<b>E</b> ↓ <b>F</b>	5/4 *	16/15 = 4/3		111.73	11.73	
<b>E</b> ↓ <b>C</b>	100/81 *	8				

