Tuning Data

Earth Moon Planets Sun

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The following pages contain the astronomical original frequencies and their octave tone frequencies with the corresponding concert pitches, the cent value deviations from the 440 Hertz concert pitch and the reverb, delay and loop times in Milliseconds. In addition, octave-analog tempos and corresponding pendulum lengths, as well as the frequencies and wavelengths of the octave-analog colors are listed.

In each case an additional table shows the intervals to the cosmic tones with interval ratio, frequency, tone designation, corresponding concert pitch A and the respective cent value difference to A 440 Hz.

Content

EARTH - Rotation: Synodic Day

Seconds	Octave	Hertz
1 day = 86 400.00	0	0.000 0116 Hz

Reverb, Delay & Loop Times — **Tempo** — Pendulum

Length Milliseconds		Sound Frequency	bpm	cm	inch
10.546.88	13	0.095	5.69		
5.273.44	14	0.19	11.38		
2.636.72	15	0.38	22.76	172.8	68.03
1.318.36	16	0.76	45.51	43.2	17.01
659.18	17	1.52	91.02	10.8	4.25
329.59	18	3.03	182.04	2.7	1.06
164.79	19	6.07	364.09		
82.39	20	12.14	728.18		
41.20	21	24.27			
20.60	22	48.55			
10.30	23	97.09			
5.15	24	**194.18**			
2.57	25	388.36			
1.29	26	776.72			
0.64	27	1 553.45			
	28	3 106.89			
	29	6 213.78			
	30	12 427.57			
	31	24 855.14			

Note name = **G**
Concert pitch = 435.9 Hz
Difference to 440 Hz = **-16.1** cent

Microtune (+/-64):	-10
Pitch (64=0); Range 1	54
Pitch (64=0); Range 2	59
Pitchbend (+/-8192); Range 1	-1319
Pitch (8191) +/-0); Range 1	6872
Pitch (8191) +/-0); Range 2	7532
Pitch (8191) +/-0); Range 8	8026

Color		Color frequency	Wavelength
red orange	65	4.2701 x 10^{14} Hz	702 nm

The synodic day of the earth is the duration of the earth's rotation, measured from one culmination of the sun (noon) to the next.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the earth's synodic day:
www.planetware.de/octave/earthday.html

EARTH - Rotation: Synodic Day

Intervals to the Fundamental Frequency 194.18 Hz (G)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	194.18	G	G	435.92	-16.12
81 / 80	Syntonic Comma	196.61	G	G	441.37	5.38
3^{12} / 2^{12}	Pythagorean Comma	196.83	G	G	441.87	7.34
128 / 125	Diesis	198.34	G	G	446.38	24.93
648 / 625	Greater Diessis	201.33	G#	G	451.96	46.44
25 / 24	Chroma	202.27	G#	G#	428.60	-45.45
$2^{1/12}$	Chromatic Semitone	205.72	G#			
16 / 15	Diatonic Semitone	207.13	G#	G#	438.88	-4.39
10 / 9	Minor Whole Tone	215.76	A	A	431.51	-33.72
$2^{2/12}$	Chromatic Whole Tone	217.96	A			
9 / 8	Major Whole Tone	218.45	A	A	436.91	-12.21
8 / 7	Chinese Whole Tone	221.92	A	A	443.84	15.05
$2^{3/12}$	Chromatic Minor Third	230.92	Bb			
6 / 5	Minor Third	233.02	Bb	Bb	439.88	-0.48
5 / 4	Major Third	242.73	B	B	432.49	-29.81
$2^{4/12}$	Chromatic Major Third	244.65	B			
4 / 3	Perfect Fourth	258.91	C	C	435.43	-18.08
$2^{5/12}$	Chromatic Fourth	259.20	C			
$2^{6/12}$	Chromatic Tritone	274.61	C#			
$2^{7/12}$	Chromatic Fifth	290.94	D			
3 / 2	Perfect Fifth	291.27	D	D	436.41	-14.17
$2^{8/12}$	Chromatic Minor Sixth	308.24	D#			
8 / 5	Minor Sixth	310.69	D#	D#	439.38	-2.44
5 / 3	Major Sixth	323.63	E	E	432.00	-31.77
$2^{9/12}$	Chromatic Major Sixth	326.57	E			
7 / 4	Natural Seventh	339.82	F	F	428.14	-47.30
16 / 9	Diminished Seventh	345.21	F	F	434.94	-20.03
$2^{10/12}$	Chromatic Minor Seventh	345.99	F			
9 / 5	Minor Seventh	349.53	F	F	440.37	1.47
15 / 8	Major Seventh	364.09	F#	F#	432.98	-27.86
$2^{11/12}$	Chromatic Major Seventh	366.56	F#			
2 / 1	Octave	388.36	G	G	435.92	-16.12

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A.
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

EARTH - Rotation: Sideric Day

	Seconds	Octave	Hertz
1 Tag =	86 164.09054	0	0.000 0116 Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
10 518.08	13	0.095	5.70		
5 259.04	14	0.19	11.41		
2 629.52	15	0.38	22.82	172.0	67.72
1 314.76	16	0.76	45.64	43.0	16.94
657.37	17	1.52	91.27	10.7	4.21
328.69	18	3.04	182.54	2.7	1.06
164.34	19	6.08	365.09		
82.17	20	12.17	730.17		

		Sound Frequency
41.09	21	24.68
20.54	22	48.68
10.27	23	97.36
5.14	24	**194.71**
2.57	25	389.42
1.29	26	778.85
0.64	27	1 557.70
	28	3 115.40
	29	6 230.80
	30	12 461.59
	31	24 923.19

Note name = **G**
Concert pitch = 437.12 Hz
Difference to 440 Hz = **-11.4** cent

Microtune (+/-64):	-7
Pitch (64=0); Range I +/-64:	57
Pitch (64=0); Range II +/-32:	60
Pitchbend (+/-8192); Range 1	-934
Pitch (8191 € +/-0); Range 1	7257
Pitch (8191 € +/-0); Range 2	7724
Pitch (8191 € +/-0); Range 8	8074

Color		Color Frequency	Wavelength
red-orange	65	4.2818×10^{14} Hz	700 nm

Originally, the “sideric day” was the time from one culmination (highest point) of a star to the next, or in other words, a rotation of the earth around its own axis, measured in the fixed star sky. In modern astronomy, sideric day is defined as the time that elapses between two consecutive upper culminations of the vernal equinox. The difference, however, is very small and is only about 0.009 seconds.

From “Die Kosmische Octave” by Hans Cousto, Synthesis Verlag Essen

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the sideric day and audio sample:
www.planetware.de/octave/other_tones.html#sideric-day

EARTH - Rotation: Sideric Day

Intervals to the Fundamental Frequency 194.71 Hz (G)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	194.71	G	G	437.11	-11.39
81 / 80	Syntonic Comma	197.15	G	G	442.58	10.12
3^{12} / 2^{12}	Pythagorean Comma	197.37	G	G	443.08	12.07
128 / 125	Diesis	199.39	G	G	447.61	29.67
648 / 625	Greater Diessis	201.88	G#	G#	427.76	-48.83
25 / 24	Chroma	202.83	G#	G#	429.77	-40.72
$2^{1/12}$	Chromatic Semitone	206.29	G#			
16 / 15	Diatonic Semitone	207.69	G#	G#	440.09	0.34
10 / 9	Minor Whole Tone	216.35	A	A	432.69	-28.99
$2^{2/12}$	Chromatic Whole Tone	218.56	A			
9 / 8	Major Whole Tone	219.05	A	A	438.10	-7.48
8 / 7	Chinese Whole Tone	222.53	A	A	445.06	19.78
$2^{3/12}$	Chromatic Minor Third	231.55	Bb			
6 / 5	Minor Third	233.65	Bb	Bb	441.08	4.25
5 / 4	Major Third	243.39	Bb	Bb	433.67	-25.08
$2^{4/12}$	Chromatic Major Third	245.32	Bb			
4 / 3	Perfect Fourth	259.62	C	C	436.62	-13.35
$2^{5/12}$	Chromatic Fourth	259.91	C			
$2^{6/12}$	Chromatic Tritone	275.36	C#			
$2^{7/12}$	Chromatic Fifth	291.74	D			
3 / 2	Perfect Fifth	292.07	D	D	437.61	-9.44
$2^{8/12}$	Chromatic Minor Sixth	309.09	D#			
8 / 5	Minor Sixth	311.54	D#	D#	440.58	2.30
5 / 3	Major Sixth	324.52	E	E	433.18	-27.03
$2^{9/12}$	Chromatic Major Sixth	327.47	E			
7 / 4	Perfect Seventh	340.75	F	F	429.31	-42.56
16 / 9	Diminished Seventh	346.16	F	F	436.13	-15.30
$2^{10/12}$	Chromatic Minor Seventh	346.94	F			
9 / 5	Minor Seventh	350.48	F	F	441.58	6.21
15 / 8	Major Seventh	365.09	F#	F#	434.16	-23.12
$2^{11/12}$	Chromatic Major Seventh	367.57	F#			
2 / 1	Octave	389.42	G	G	437.11	-11.39

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (Perfect unison).

EARTH - Sun orbit: Earth Year

Seconds	Octave	Hertz
1 year = 31 556 925.9747	0	3.1689 x 10^{-8} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
15 047.52	21	0.066	3.99		
7 523.76	22	0.13	7.97		
3 761.88	23	0.27	15.95	351.6	138.43
1 880.94	24	0.53	31.90	87.9	34.61
940.47	25	1.06	63.80	22.0	8.66
470.23	26	2.13	127.60	5.5	2.17
235.12	27	4.25	255.19		
117.56	28	8.51	510.38		
		Sound Frequency			
58.78	29	17.01			
29.39	30	34.03			
14.69	31	68.05			
7.35	32	**136.10**			
3.67	33	272.20			
1.84	34	544.41			
0.92	35	1 088.82			
	36	2 177.63			
	37	4 355.27			
	38	8 710.54			
	39	17 421.08			

Note name = **C#**
Concert pitch = 432.10 Hz
Difference to 440 Hz = **-31.38** cent

Microtune (+/-64):	-20
Pitch (64=0); Range I +/-64:	44
Pitch (64=0); Range II +/-32:	54
Pitchbend (+/-8192); Range 1	-2571
Pitch (8191 € +/-0); Range 1	5620
Pitch (8191 € +/-0); Range 2	6906
Pitch (8191 € +/-0); Range 8	7870

Color		Color Frequency	Wavelength
blue-green	74	5.9858 x 10^{14} Hz	501 nm

The earth year - to be precise: the tropical earth year - is the length of time the earth orbits around the sun, measured from one (apparent) passage of the sun through the spring equinox to the next.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the earth-sun orbit and audio sample:
www.planetware.de/octave/earthyear.html

EARTH - Sun orbit: Earth Year

Intervals to the Fundamental Frequency 136.10 Hz (C#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	136.10	C#	C#	432.10	-31.38
81 / 80	Syntonic Comma	137.80	C#	C#	437.50	-9.87
3^{12} / 2^{12}	Pythagorean Comma	137.96	C#	C#	437.99	-7.92
128 / 125	Diesis	139.37	C#	C#	442.47	9.68
648 / 625	Greater Diessis	141.11	D	C#	448.00	31.19
25 / 24	Chroma	141.77	D	C#	450.10	39.30
$2^{1/12}$	Chromatic Semitone	144.20	D			
16 / 15	Diatonic Semitone	145.18	D	D	435.04	-19.64
10 / 9	Minor Whole Tone	151.22	D#	D#	427.73	-48.97
$2^{2/12}$	Chromatic Whole Tone	152.77	D#			
9 / 8	Major Whole Tone	153.11	D#	D#	433.07	-27.47
8 / 7	Chinese Whole Tone	155.55	D#	D#	439.95	-0.20
$2^{3/12}$	Chromatic Minor Third	161.85	E			
6 / 5	Minor Third	163.32	E	E	436.02	-15.73
5 / 4	Major Third	170.13	F	F	428.70	-45.06
$2^{4/12}$	Chromatic Major Third	171.48	F			
4 / 3	Perfect Fourth	181.47	F#	F#	431.61	-33.33
$2^{5/12}$	Chromatic Fourth	181.67	F#			
$2^{6/12}$	Chromatic Tritone	192.48	G			
$2^{7/12}$	Chromatic Fifth	203.92	G#			
3 / 2	Perfect Fifth	204.15	G#	G#	432.59	-29.42
$2^{8/12}$	Chromatic Minor Sixth	216.05	A			
8 / 5	Minor Sixth	217.76	A	A	435.53	-17.69
5 / 3	Major Sixth	226.84	Bb	Bb	428.21	-47.02
$2^{9/12}$	Chromatic Major Sixth	228.90	Bb			
7 / 4	Perfect Seventh	238.18	B	Bb	449.62	37.45
16 / 9	Diminished Seventh	241.96	B	B	431.12	-35.29
$2^{10/12}$	Chromatic Minor Seventh	242.51	B			
9 / 5	Minor Seventh	244.98	B	B	436.51	-13.78
15 / 8	Major Seventh	255.19	C	C	429.18	-43.11
$2^{11/12}$	Chromatic Major Seventh	256.93	C			
2 / 1	Octave	272.20	C#	C#	432.10	-31.38

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (Perfect unison).

EARTH - Precession: Platonic Year

1 Platonic year = 25 920 Jahre	Octave	Hertz
	0	1.2226 x 10^{-12} Hz

Reverb, Delay & Loop Times		Tempo		Pendulum Length	
Milliseconds			bpm	cm	inch
11 902.82	36	0.084	5.04		
5 951.41	37	0.17	10.08		
2 975.70	38	0.34	20.16	220.0	86.61
1 487.85	39	0.67	40.33	55.0	21.65
743.93	40	1.34	80.65	13.8	5.43
371.96	41	2.69	161.31	3.4	1.34
185.98	42	5.38	322.61		
92.99	43	10.75	645.23		

		Sound Frequency
46.50	44	21.51
23.25	45	43.02
11.62	46	86.03
5.81	47	**172.06**
2.91	48	344.12
1.45	49	688.24
0.73	50	1 376.48
	51	2 752.96
	52	5 505.92
	53	11 011.85
	54	22 023.69

Note name = **F**
Concert pitch = 433,56 Hz
Difference to 440 Hz = **-25.51 cent**

Microtune (+/-64):	-16
Pitch (64=0); Range I +/-64:	48
Pitch (64=0); Range II +/-32:	56
Pitchbend (+/-8192); Range 1	-2090
Pitch (8191 € +/-0); Range 1	6101
Pitch (8191 € +/-0); Range 2	7146
Pitch (8191 € +/-0); Range 8	7930

Color		Color Frequency	Wavelength
red-violet	88	3.7836 x 10^{14} Hz	792 nm
	89	7.5673 x 10^{14} Hz	396 nm

The axis around which the Earth rotates every day also performs a gyroscopic motion called precession. The Earth's axis is inclined to the ecliptic (solar orbit). The gyroscopic motion of the Earth's axis causes the intersection of the Earth's equatorial plane with the ecliptic to shift. The point of intersection, also called the vernal equinox, moves once through the ecliptic (zodiac) in 25 920 years.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I. a rotation from the middle class to the top or bottom corresponds to a semitone (64 units). for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the Platonic Year of the Earth and audio sample:
www.planetware.de/octave/earthplato.html

EARTH - Precession: Platonic Year

Intervals to the Fundamental Frequency 172.06 Hz (F)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	172.06	F	F	433.56	-25.51
81 / 80	Syntonic Comma	174.21	F	F	438.98	-4.00
3^{12} / 2^{12}	Pythagorean Comma	174.41	F	F	439.48	15.55
128 / 125	Diesis	176.19	F	F	443.97	37.06
648 / 625	Greater Diessis	178.39	F#	F	449.52	45.16
25 / 24	Chroma	179.23	F#	F	451.63	39.30
$2^{1/12}$	Chromatic Semitone	182.29	F#			
16 / 15	Diatonic Semitone	183.53	F#	F#	436.51	-13.78
10 / 9	Minor Whole Tone	191.18	G	F	429.18	-43.10
$2^{2/12}$	Chromatic Whole Tone	193.13	F			
9 / 8	Major Whole Tone	193.57	F	F	434.54	-21.60
8 / 7	Chinese Whole Tone	196.64	F	F	441.44	5.67
$2^{3/12}$	Chromatic Minor Third	204.62	G#			
6 / 5	Minor Third	206.47	G#	G#	437.50	-9.87
5 / 4	Major Third	215.08	A	A	430.15	-39.19
$2^{4/12}$	Chromatic Major Third	216.78	A			
4 / 3	Perfect Fourth	229.41	Bb	Bb	433.08	-27.46
$2^{5/12}$	Chromatic Fourth	229.67	Bb			
$2^{6/12}$	Chromatic Tritone	243.33	B			
$2^{7/12}$	Chromatic Fifth	257.80	C			
3 / 2	Perfect Fifth	258.09	C	C	434.05	-23.55
$2^{8/12}$	Chromatic Minor Sixth	273.13	C#			
8 / 5	Minor Sixth	275.30	C#	C#	437.01	-11.82
5 / 3	Major Sixth	286.77	D	D	429.66	-41.15
$2^{9/12}$	Chromatic Major Sixth	289.37	D			
7 / 4	Perfect Seventh	301.11	D#	D	451.15	43.32
16 / 9	Diminished Seventh	305.88	D#	D#	432.59	-29.42
$2^{10/12}$	Chromatic Minor Seventh	306.58	D#			
9 / 5	Minor Seventh	309.71	D#	D#	437.99	-7.91
15 / 8	Major Seventh	322.61	E	E	430.64	-37.24
$2^{11/12}$	Chromatic Major Seventh	324.81	E			
2 / 1	Octave	344.12	F	F	433.56	-25.51

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (Perfect unison).

MOON - Synodic Moon Orbit: Synodic Month

1 synodic month = 29.530 588 days	Octave	Hertz
	0	0.00000039 Hz

Reverb, Delay & Loop Times		Tempo		Pendulum Length	
Milliseconds			bpm	cm	inch
9 732.98	18	0.103	6.16		
4 866.49	19	0.21	12.33		
2 433.25	20	0.41	24.66	147.2	57.95
1 216.62	21	0.82	49.32	36.8	14.49
608.31	22	1.64	98.63	9.2	3.62
304.16	23	3.29	197.27	2.3	0.91
152.08	24	6.57	394.53		
76.04	25	13.15	789.07		

		Sound Frequency
38.02	26	26.30
19.01	27	52.60
9.50	28	105.21
4.75	29	**210.42**
2.38	30	420.84
1.19	31	841.67
0.59	32	1 683.35
	33	3 366.70
	34	6 733.40
	35	13 466.79
	36	26 933.58

Note name = **G#**
Concert pitch = 445.86 Hz
Difference to 440 Hz = **22.91 cent**

Microtune (+/-64):	15
Pitch (64=0); Range I +/-64:	79
Pitch (64=0); Range II +/-32:	71
Pitchbend (+/-8192); Range 1	1877
Pitch (8191 € +/-0); Range 1	6314
Pitch (8191 € +/-0); Range 2	7253
Pitch (8191 € +/-0); Range 8	7956

Color		Color Frequency	Wavelength
orange	70	4.6272 x 10^{14} Hz	648 nm

The synodic month is the duration of the moon‘s orbit around the earth from one new moon to the next (synod means meeting; here the meeting of sun and moon at new moon). The synodic month lasts an average of 29 days, 12 hours, 44 minutes and 2.8 seconds.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I. a rotation from the middle class to the top or bottom corresponds to a semitone (64 units). for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the synodic moon orbit and audio sample:
www.planetware.de/octave/moon.html

MOON - Synodic Moon Orbit: Synodic Month

Intervals to the Fundamental Frequency 210.42 Hz (G#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	210.42	G#	G#	445.86	22.91
81 / 80	Syntonic Comma	213.05	G#	G#	451.43	44.42
3^{12} / 2^{12}	Pythagorean Comma	213.29	G#	G#	451.94	46.37
128 / 125	Diesis	215.47	G#	A	430.94	-36.03
648 / 625	Greater Diessis	218.16	A	A	436.32	-14.52
25 / 24	Chroma	219.19	A	A	438.37	-6.42
$2^{1/12}$	Chromatic Semitone	222.93	A			
16 / 15	Diatonic Semitone	224.45	A	A	448.89	34.64
10 / 9	Minor Whole Tone	233.80	Bb	Bb	441.35	5.31
$2^{2/12}$	Chromatic Whole Tone	236.10	Bb			
9 / 8	Major Whole Tone	236.72	Bb	Bb	446.87	26.82
8 / 7	Chinese Whole Tone	240.48	Bb	B	428.48	-45.92
$2^{3/12}$	Chromatic Minor Third	250.23	B			
6 / 5	Minor Third	252.50	B	B	449.91	38.55
5 / 4	Major Third	263.02	C	C	442.35	9.22
$2^{4/12}$	Chromatic Major Third	265.11	C			
4 / 3	Perfect Fourth	280.56	C#	C#	445.36	20.96
$2^{5/12}$	Chromatic Fourth	280.88	C#			
$2^{6/12}$	Chromatic Tritone	297.58	D			
$2^{7/12}$	Chromatic Fifth	315.27	D#			
3 / 2	Perfect Fifth	315.63	D#	D#	446.37	24.87
$2^{8/12}$	Chromatic Minor Sixth	334.02	E			
8 / 5	Minor Sixth	336.67	E	E	449.40	36.60
5 / 3	Major Sixth	350.70	F	F	441.85	7.27
$2^{9/12}$	Chromatic Major Sixth	353.88	F			
7 / 4	Perfect Seventh	368.23	F#	F#	437.90	-8.26
16 / 9	Diminished Seventh	374.08	F#	F#	444.86	19.00
$2^{10/12}$	Chromatic Minor Seventh	374.92	F#			
9 / 5	Minor Seventh	378.75	F#	F#	450.42	40.51
15 / 8	Major Seventh	394.53	G	G	442.85	11.18
$2^{11/12}$	Chromatic Major Seventh	397.22	G			
2 / 1	Octave	420.84	G#[1]	G#[1]	445.86	22.91

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (Perfect unison).

MOON - Sideric Lunar Orbit: Sideric Month

1 sideric month	Octave	Hertz
= 27.321 661 Days	0	0.00000042 Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
9 004.94	18	0.111	6.66		
4 502.47	19	0.22	13.33		
2 251.24	20	0.44	26.65	126.0	49.61
1 125.62	21	0.89	53.30	31.5	12.40
562.81	22	1.78	106.61	7.9	3.11
281.40	23	3.55	213.22	2.0	0.79
140.70	24	7.11	426.43		
70.35	25	14.21	852.87		

		Sound Frequency
35.18	26	28.43
17.59	27	56.86
8.79	28	113.72
4.40	29	**227.43**
2.20	30	454.86
1.10	31	909.72
0.55	32	1 819.45
	33	3 638.89
	34	7 277.78
	35	14 555.56
	36	29 111.13

Note name = **Bb** (**A#**)
Concert pitch = 429.33 Hz
Difference to 440 Hz = **-42.49 cent**

Microtune (+/-64):	-27
Pitch (64=0); Range I +/-64:	37
Pitch (64=0); Range II +/-32:	50
Pitchbend (+/-8192); Range 1	-3481
Pitch (8191 € +/-0); Range 1	4710
Pitch (8191 € +/-0); Range 2	6451
Pitch (8191 € +/-0); Range 8	7756

Color		Color Frequency	Wavelength
yellow	70	5.0013 x 10^{14} Hz	599 nm

The sidereal month is the duration of the moon orbit around the earth measured at the fixed star sky. If the moon is in front of a fixed star of the ecliptic it takes 27 days, 7 hours, 43 minutes and 11.5 seconds until it is in front of this fixed star again. Assumed the first time was new moon. Since the sun has moved in a month in the ecliptic about one zodiac sign further, it takes after a sidereal lunar revolution still additionally about 2 days and 5 hours, until the moon has caught up the sun again and it is again new moon and then a synodic lunar revolution is completed.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the sidereal moon orbit and audio sample:
www.planetware.de/octave/other_tones.html#sideric-moon

MOON - Sideric Lunar Orbit: Sideric Month

Intervals to the Fundamental Frequency 227.43 Hz (Bb)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	227.43	Bb	Bb	429.33	-42.49
81 / 80	Syntonic Comma	230.27	Bb	Bb	434.70	-20.99
3^{12} / 2^{12}	Pythagorean Comma	230.53	Bb	Bb	435.19	-19.03
128 / 125	Diesis	232.89	Bb	Bb	439.64	-1.43
648 / 625	Greater Diessis	235.80	B	Bb	445.13	20.07
25 / 24	Chroma	236.91	B	Bb	447.22	28.18
$2^{1/12}$	Chromatic Semitone	240.95	B			
16 / 15	Diatonic Semitone	242.59	B	B	432.25	-30.76
10 / 9	Minor Whole Tone	252.70	C	B	450.26	39.91
$2^{2/12}$	Chromatic Whole Tone	255.28	C			
9 / 8	Major Whole Tone	255.86	C	C	430.30	-38.58
8 / 7	Chinese Whole Tone	259.92	C	C	437.13	-11.32
$2^{3/12}$	Chromatic Minor Third	270.46	C#			
6 / 5	Minor Third	272.92	C#	C#	433.23	-26.85
5 / 4	Major Third	284.29	D	C#	451.28	43.82
$2^{4/12}$	Chromatic Major Third	286.54	D			
4 / 3	Perfect Fourth	303.24	D#	D#	428.85	-44.45
$2^{5/12}$	Chromatic Fourth	303.58	D#			
$2^{6/12}$	Chromatic Tritone	321.64	E			
$2^{7/12}$	Chromatic Fifth	340.76	F			
3 / 2	Perfect Fifth	341.15	F	F	429.82	-40.54
$2^{8/12}$	Chromatic Minor Sixth	361.02	F#			
8 / 5	Minor Sixth	363.89	F#	F#	432.74	-28.81
5 / 3	Major Sixth	379.05	G	F#	450.77	41.87
$2^{9/12}$	Chromatic Major Sixth	382.49	G			
7 / 4	Perfect Seventh	398.00	G#	G	446.74	26.33
16 / 9	Diminished Seventh	404.32	G#	G#	428.36	-46.40
$2^{10/12}$	Chromatic Minor Seventh	405.24	G#			
9 / 5	Minor Seventh	409.38	G#	G#	433.72	-24.90
15 / 8	Major Seventh	426.43	A	G#	451.79	45.78
$2^{11/12}$	Chromatic Major Seventh	429.33	A			
2 / 1	Octave	454.86	Bb	Bb	429.33	-42.49

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MOON - Culmination Period

Seconds	Octave	Hertz
89 428.33	0	0.0000112 Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
10 916.54	13	0.092	5.50		
5 458.27	14	0.18	10.99		
2 729.14	15	0.37	21.98	185.2	72.91
1 364.57	16	0.73	43.97	46.3	18.23
682.28	17	1.47	87.94	11.6	4.57
341.14	18	2.93	175.88	2.9	1.14
170.57	19	5.86	351.76		
85.29	20	11.73	703.52		

		Sound Frequency
42.64	21	23.45
21.32	22	46.90
10.66	23	93.80
5.33	24	**187.61**
2.67	25	375.21
1.33	26	750.42
0.67	27	1 500.84
	28	3 001.68
	29	6 003.37
	30	12 006.72
	31	24 013.46

Note name = **F#**
Concert pitch = 446.20 Hz
Difference to 440 Hz = **24.24 cent**

Microtune (+/-64):	16
Pitch (64=0); Range I +/-64:	80
Pitch (64=0); Range II +/-32:	72
Pitchbend (+/-8192); Range 1	1986
Pitch (8191 € +/-0); Range 1	10177
Pitch (8191 € +/-0); Range 2	9184
Pitch (8191 € +/-0); Range 8	8439

Color		Color Frequency	Wavelength
red	65	4.1255 x 10^{14} Hz	727 nm

The moon rises about 50 minutes later each day than the previous day. The moon‘s culmination period is the time span from its highest point in the noon sky (culmination) until it is highest again the next day. On average, a culmination period lasts 24 hours, 50 minutes and 28.33 seconds.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the lunar culmination period and audio sample:
www.planetware.de/octave/other_tones.html#moon-kulmination

MOON - Culmination Period

Intervals to the Fundamental Frequency 187.61 Hz (F#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	187.61	F#	F#	446.20	24.24
81 / 80	Syntonic Comma	189.95	F#	F#	451.78	45.74
3^{12} / 2^{12}	Pythagorean Comma	190.16	F#	F#	452.29	47.70
128 / 125	Diesis	192.11	F#	G	431.27	-34.71
648 / 625	Greater Diessis	194.51	G	G	436.66	-13.20
25 / 24	Chroma	195.42	G	G	438.71	-5.09
$2^{1/12}$	Chromatic Semitone	198.76	G			
16 / 15	Diatonic Semitone	200.11	G	G	449.24	35.97
10 / 9	Minor Whole Tone	208.45	G#	G#	441.69	6.64
$2^{2/12}$	Chromatic Whole Tone	210.58	G#			
9 / 8	Major Whole Tone	211.06	G#	G#	447.21	28.15
8 / 7	Chinese Whole Tone	214.41	G#	A	428.81	-44.59
$2^{3/12}$	Chromatic Minor Third	223.10	A			
6 / 5	Minor Third	225.13	A	A	450.25	39.88
5 / 4	Major Third	234.51	Bb	Bb	442.69	10.55
$2^{4/12}$	Chromatic Major Third	236.37	Bb			
4 / 3	Perfect Fourth	250.14	B	B	445.70	22.28
$2^{5/12}$	Chromatic Fourth	250.42	B			
$2^{6/12}$	Chromatic Tritone	265.31	C			
$2^{7/12}$	Chromatic Fifth	281.09	C#			
3 / 2	Perfect Fifth	281.41	C#	C#	446.71	26.19
$2^{8/12}$	Chromatic Minor Sixth	297.80	D			
8 / 5	Minor Sixth	300.17	D	D	449.74	37.92
5 / 3	Major Sixth	312.68	D#	D#	442.19	8.59
$2^{9/12}$	Chromatic Major Sixth	315.51	D#			
7 / 4	Perfect Seventh	328.31	E	E	438.24	-6.94
16 / 9	Diminished Seventh	333.52	E	E	445.20	20.33
$2^{10/12}$	Chromatic Minor Seventh	334.27	E			
9 / 5	Minor Seventh	337.69	E	E	450.76	41.83
15 / 8	Major Seventh	351.76	F	F	443.19	12.50
$2^{11/12}$	Chromatic Major Seventh	354.15	F			
2 / 1	Octave	375.21	F#	F#	446.20	24.24

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

Moon - Knot Circulation

Seconds	Octave	Hertz
5.8695×10^{8}	0	1.7037×10^{-9} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
8 746.23	26	0.114	6.86		
4 373.11	27	0.23	13.72		
2 186.56	28	0.46	27.44	118.8	46.77
1 093.28	29	0.91	54.88	29.7	11.69
546.64	30	1.83	109.76	7.4	2.91
273.32	31	3.66	219.52	1.9	0.75
136.66	32	7.32	439.05		
68.33	33	14.63			

		Sound Frequency
34.16	34	29.27
17.08	35	58.54
8.54	36	117.08
4.27	37	**234.16**
2.13	38	468.32
1.07	39	936.63
0.53	40	1 873.26
	41	3 746.53
	42	7 493.06
	43	14 986.12

Note name = **Bb** (**A#**)
Concert pitch = 442.03 Hz
Difference to 440 Hz = **7.98 cent**

Microtune (+/-64):	5
Pitch (64=0); Range I +/-64:	69
Pitch (64=0); Range II +/-32:	67
Pitchbend (+/-8192); Range 1	654
Pitch (8191 € +/-0); Range 1	8845
Pitch (8191 € +/-0); Range 2	8518
Pitch (8191 € +/-0); Range 8	8273

Color		Color Frequency	Wavelength
yellow	78	5.1492×10^{14} Hz	582 nm

The moon‘s orbit is inclined by about 5 degrees with respect to the ecliptic. The intersections of the two orbits are called lunar nodes. One orbit of the lunar nodes through the ecliptic takes 6 793 days, 9 hours and 29 minutes.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the lunar knot circulation and audio sample:
/www.planetware.de/octave/other_tones.html#moon-knot

Moon - Knot Circulation

Intervals to the Fundamental Frequency 234.16 Hz (Bb)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	234.16	Bb	Bb	442.03	7.98
81 / 80	Syntonic Comma	237.09	Bb	Bb	447.56	29.48
3^{12} / 2^{12}	Pythagorean Comma	237.35	Bb	Bb	448.06	31.44
128 / 125	Diesis	239.78	Bb	Bb	452.64	49.03
648 / 625	Greater Diessis	242.78	B	B	432.58	-29.46
25 / 24	Chroma	243.91	B	B	434.61	-21.35
$2^{1/12}$	Chromatic Semitone	248.08	B			
16 / 15	Diatonic Semitone	249.77	B	B	445.04	19.71
10 / 9	Minor Whole Tone	260.18	C	C	437.56	-9.62
$2^{2/12}$	Chromatic Whole Tone	262.83	C			
9 / 8	Major Whole Tone	263.43	C	C	443.03	11.89
8 / 7	Chinese Whole Tone	267.61	C	C	450.06	39.15
$2^{3/12}$	Chromatic Minor Third	278.46	C#			
6 / 5	Minor Third	280.99	C#	C#	446.04	23.62
5 / 4	Major Third	292.70	D	D	438.55	-5.71
$2^{4/12}$	Chromatic Major Third	295.02	D			
4 / 3	Perfect Fourth	312.21	D#	D#	441.53	6.02
$2^{5/12}$	Chromatic Fourth	312.56	D#			
$2^{6/12}$	Chromatic Tritone	331.15	E			
$2^{7/12}$	Chromatic Fifth	350.84	F			
3 / 2	Perfect Fifth	351.24	F	F	442.53	9.93
$2^{8/12}$	Chromatic Minor Sixth	371.70	F#			
8 / 5	Minor Sixth	374.65	F#	F#	445.54	21.66
5 / 3	Major Sixth	390.26	G	G	438.06	-7.67
$2^{9/12}$	Chromatic Major Sixth	393.81	G			
7 / 4	Perfect Seventh	409.78	G#	G#[1]	434.14	-23.20
16 / 9	Diminished Seventh	416.28	G#	G#[1]	441.03	4.07
$2^{10/12}$	Chromatic Minor Seventh	417.22	G#			
9 / 5	Minor Seventh	421.48	G#	G#[1]	446.55	25.57
15 / 8	Major Seventh	439.05	A	A	439.05	-3.76
$2^{11/12}$	Chromatic Major Seventh	442.03	A			
2 / 1	Octave	468.32	Bb	Bb	442.03	7.98

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MOON - Saros Period

Seconds	Octave	Hertz
5.6897×10^{8}	0	1.7576×10^{-9} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
8 478.34	26	0.118	7.08		
4 239.16	27	0.24	14.15		
2 119.58	28	0.47	28.31	111.6	43.94
1 059.79	29	0.94	56.61	27.9	10.98
529.90	30	1.89	113.23	7.0	2.76
264.95	31	3.77	226.46	1.7	0.67
132.47	32	7.55	452.92		

		Sound Frequency
66.24	33	15.10
33.12	34	30.19
16.56	35	60.39
8.28	36	120.78
4.14	37	**241.56**
2.07	38	483.11
1.03	39	966.23
0.51	40	1 932.45
	41	3 864.91
	42	7 729.82
	43	15 459.63

Note name = **B**
Concert pitch = 430.41 Hz
Difference to 440 Hz = **-38.17 cent**

Microtune (+/-64):	-24
Pitch (64=0); Range I +/-64:	40
Pitch (64=0); Range II +/-32:	52
Pitchbend (+/-8192); Range 1	-3127
Pitch (8191 € +/-0); Range 1	5064
Pitch (8191 € +/-0); Range 2	6628
Pitch (8191 € +/-0); Range 8	7800

Color		Color Frequency	Wavelength
yellow-green	78	5.3119×10^{14} Hz	564 nm

The saros period is an eclipse period corresponding to the duration of 223 synodic moon orbits which is 6 585 days, 7 hours, 42 minutes and 24.4 seconds.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the saros period of the moon and audio sample:
www.planetware.de/octave/other_tones.html#saros

MOON - Saros Period

Intervals to the Fundamental Frequency 241.56 Hz (B)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	241.56	B	B	430.41	-38.17
81 / 80	Syntonic Comma	244.58	B	B	435.79	-16.66
3^{12} / 2^{12}	Pythagorean Comma	244.85	B	B	436.28	-14.71
128 / 125	Diesis	247.35	B	B	440.73	2.89
648 / 625	Greater Diessis	250.45	C	B	446.24	24.40
25 / 24	Chroma	251.62	C	B	448.34	32.50
$2^{1/12}$	Chromatic Semitone	255.92	C			
16 / 15	Diatonic Semitone	257.66	C	C	433.33	-26.44
10 / 9	Minor Whole Tone	268.40	C#	C	451.39	44.23
$2^{2/12}$	Chromatic Whole Tone	271.14	C#			
9 / 8	Major Whole Tone	271.75	C#	C#	431.38	-34.26
8 / 7	Chinese Whole Tone	276.06	C#	C#	438.23	-7.00
$2^{3/12}$	Chromatic Minor Third	287.26	D			
6 / 5	Minor Third	289.87	D	D	434.31	-22.53
5 / 4	Major Third	301.95	D#	D	452.41	48.14
$2^{4/12}$	Chromatic Major Third	304.34	D#			
4 / 3	Perfect Fourth	322.08	E	E	429.92	-40.12
$2^{5/12}$	Chromatic Fourth	322.44	E			
$2^{6/12}$	Chromatic Tritone	341.61	F			
$2^{7/12}$	Chromatic Fifth	361.93	F#			
3 / 2	Perfect Fifth	362.34	F#	F#	430.89	-36.21
$2^{8/12}$	Chromatic Minor Sixth	383.45	G			
8 / 5	Minor Sixth	386.49	G	G	433.82	-24.48
5 / 3	Major Sixth	402.59	G#	G	451.90	46.19
$2^{9/12}$	Chromatic Major Sixth	406.25	G#			
7 / 4	Perfect Seventh	422.72	A	G#	447.86	30.66
16 / 9	Diminished Seventh	429.43	A	A	429.43	-42.08
$2^{10/12}$	Chromatic Minor Seventh	430.41	A			
9 / 5	Minor Seventh	434.80	A	A	434.80	-20.57
15 / 8	Major Seventh	452.92	Bb	Bb	427.50	-49.90
$2^{11/12}$	Chromatic Major Seventh	456.00	Bb			
2 / 1	Octave	483.11	B	B	430.41	-38.17

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MOON - Apsides Rotation

Seconds	Octave	Hertz
2.793×10^{8}	0	3.5803×10^{-9} Hz

Reverb, Delay & Loop Times		Sound Frequency	Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
8 323.91	25	0.120	7.21		
4 161.95	26	0.24	14.42		
2 080.98	27	0.48	28.83	107.6	42.36
1 040.49	28	0.96	57.66	26.9	10.95
520.24	29	1.92	115.33	6.7	2.64
260.12	30	3.84	230.66	1.7	0.67
130.06	31	7.69	461.32		
65.03	32	15.38			
32.52	33	30.75			
16.26	34	61.51			
8.13	35	123.02			
4.06	36	**246.04**			
2.03	37	492.08			
1.02	38	984.15			
0.51	39	1 968.31			
	40	3 936.61			
	41	7 873.22			
	42	15 746.45			

Note name = **B**
Concert pitch = 438.39 Hz
Difference to 440 Hz = **-6.34 cent**

Microtune (+/-64):	-4
Pitch (64=0); Range I +/-64:	60
Pitch (64=0); Range II +/-32:	62
Pitchbend (+/-8192); Range 1	-519
Pitch (8191 € +/-0); Range 1	7672
Pitch (8191 € +/-0); Range 2	7931
Pitch (8191 € +/-0); Range 8	8126

Color		Color Frequency	Wavelength
yellow-green	77	5.41048×10^{14} Hz	554 nm

The apogee cycle is the orbit of perigee (closest point of the moon‘s orbit to the earth) and apogee (furthest point of the moon‘s orbit to the earth) through the ecliptic.
One cycle lasts 3,232 days 16 hours and 27 minutes.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

Page about the frequency of the moon‘s apsidal orbit and audio sample:
www.planetware.de/octave/other_tones.html#apsidis

MOON - Apsides Rotation

Intervals to the Fundamental Frequency 246.04 Hz (B)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	246.04	B	B	438.39	-6.34
81 / 80	Syntonic Comma	249.11	B	B	443.87	15.16
3^{12} / 2^{12}	Pythagorean Comma	249.40	B	B	444.37	17.12
128 / 125	Diesis	251.94	B	B	448.91	34.71
648 / 625	Greater Diessis	255.09	C	C	429.01	-43.78
25 / 24	Chroma	258.29	C	C	431.03	-35.67
$2^{1/12}$	Chromatic Semitone	260.67	C			
16 / 15	Diatonic Semitone	262.44	C	C	441.37	5.39
10 / 9	Minor Whole Tone	273.38	C#	C#	433.96	-23.94
$2^{2/12}$	Chromatic Whole Tone	276.17	C#			
9 / 8	Major Whole Tone	276.79	C#	C#	439.38	-2.43
8 / 7	Chinese Whole Tone	281.19	C#	C#	446.36	24.83
$2^{3/12}$	Chromatic Minor Third	292.59	D			
6 / 5	Minor Third	295.25	D	D	442.37	9.30
5 / 4	Major Third	307.55	D#	D#	434.94	-20.03
$2^{4/12}$	Chromatic Major Third	309.99	D#			
4 / 3	Perfect Fourth	328.05	E	E	437.90	-8.30
$2^{5/12}$	Chromatic Fourth	328.42	E			
$2^{6/12}$	Chromatic Tritone	347.95	F			
$2^{7/12}$	Chromatic Fifth	368.64	F#			
3 / 2	Perfect Fifth	369.06	F#	F#	438.89	-4.39
$2^{8/12}$	Chromatic Minor Sixth	390.56	G			
8 / 5	Minor Sixth	393.66	G	G	441.87	7.34
5 / 3	Major Sixth	410.06	G#	G#	434.45	-21.99
$2^{9/12}$	Chromatic Major Sixth	413.79	G#			
7 / 4	Perfect Seventh	430.57	A	a^1	430.57	-37.52
16 / 9	Diminished Seventh	437.40	A	a^1	437.40	-10.25
$2^{10/12}$	Chromatic Minor Seventh	438.39	A			
9 / 5	Minor Seventh	442.87	A	A	442.87	11.25
15 / 8	Major Seventh	461.32	Bb	Bb	435.43	-18.08
$2^{11/12}$	Chromatic Major Seventh	464.46	Bb			
2 / 1	Octave	492.08	B	B	438.39	-6.34

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MOON - Metonic Cycle

Seconds	Octave	Hertz
5.9959×10^{8}	0	1.6678×10^{-9} Hz

Reverb, Delay & Loop Times		Tempo		Pendulum Length	
Milliseconds			bpm	cm	inch
8 934.57	26	0.112	6.71		
4 467.29	27	0.23	13.43		
2 233.64	28	0.45	26.86	118.8	46.77
1 116.82	29	0.90	53.72	29.7	11.69
558.41	30	1.79	107.45	7.4	2.91
279.21	31	3.58	214.90	1.9	0.75
139.60	32	7.16	429.79		
69.80	33	14.33			

		Sound Frequency
34.90	34	28.65
17.45	35	57.31
8.72	36	114.61
4.36	37	**229.22**
2.18	38	458.44
1.09	39	916.89
0.54	40	1 833.78
	41	3 667.55
	42	7 335.10
	43	14 670.20

Note name = **Bb** (**A#**)
Concert pitch = 432.71 Hz
Difference to 440 Hz = **-28.91 cent**

Microtune (+/-64):	-12
Pitch (64=0); Range I +/-64:	52
Pitch (64=0); Range II +/-32:	58
Pitchbend (+/-8192); Range 1	-2368
Pitch (8191 € +/-0); Range 1	5823
Pitch (8191 € +/-0); Range 2	7007
Pitch (8191 € +/-0); Range 8	7895

Color		Color Frequency	Wavelength
yellow	78	5.0406×10^{14} Hz	595 nm

A metonic cycle lasts 235 synodic months. That is exactly 19 years, after which the sun and moon form the same aspect again on the same date. For example, someone who is born on the full moon can celebrate his or her birthday, on which she or he turns 19, 38, 57, 76, 95 or 114 years old, also on the full moon.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of the Metonic Lunar Cycle and audio sample:

https://www.planetware.de/octave/other_tones.html#metonic

MOON - Metonic Cycle

Intervals to the Fundamental Frequency 229.22 Hz (Bb)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	229.22	Bb	Bb	432.71	-28.91
81 / 80	Syntonic Comma	232.09	Bb	Bb	438.12	-7.40
3^{12} / 2^{12}	Pythagorean Comma	232.35	Bb	Bb	438.62	-5.45
128 / 125	Diesis	234.72	Bb	Bb	443.10	12.15
648 / 625	Greater Diessis	237.66	B	Bb	448.64	33.65
25 / 24	Chroma	238.77	B	Bb	450.74	41.76
$2^{1/12}$	Chromatic Semitone	242.85	B			
16 / 15	Diatonic Semitone	244.50	B	B	435.66	-17.18
10 / 9	Minor Whole Tone	254.69	C	C	428.34	-46.51
$2^{2/12}$	Chromatic Whole Tone	257.29	C			
9 / 8	Major Whole Tone	257.87	C	C	433.69	-25.00
8 / 7	Chinese Whole Tone	261.97	C	C	440.58	2.26
$2^{3/12}$	Chromatic Minor Third	272.59	C#			
6 / 5	Minor Third	275.07	C#	C#	436.64	-13.27
5 / 4	Major Third	286.53	D	D	429.31	-42.60
$2^{4/12}$	Chromatic Major Third	288.80	D			
4 / 3	Perfect Fourth	305.63	D#	D#	432.22	-30.87
$2^{5/12}$	Chromatic Fourth	305.97	D#			
$2^{6/12}$	Chromatic Tritone	324.17	E			
$2^{7/12}$	Chromatic Fifth	343.44	F			
3 / 2	Perfect Fifth	343.83	F	F	433.20	-26.96
$2^{8/12}$	Chromatic Minor Sixth	363.87	F#			
8 / 5	Minor Sixth	366.76	F#	F#	436.15	-15.22
5 / 3	Major Sixth	382.04	G	G	428.82	-44.55
$2^{9/12}$	Chromatic Major Sixth	385.50	G			
7 / 4	Perfect Seventh	401.14	G#	G	450.26	39.92
16 / 9	Diminished Seventh	407.51	G#	G#	431.74	-32.82
$2^{10/12}$	Chromatic Minor Seventh	408.43	G#			
9 / 5	Minor Seventh	412.60	G#	G#	437.13	-11.31
15 / 8	Major Seventh	429.79	A	A	429.79	-40.64
$2^{11/12}$	Chromatic Major Seventh	432.71	A			
2 / 1	Octave	458.44	Bb	Bb	432.71	-28.91

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MERCURY - Sideric Solar Orbit

Days	Octave	Hertz
87.969	0	0.0000001316 Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
14 496.85	19	0.069	4.14		
7 248.42	20	0.14	8.28		
3 624.21	21	0.28	16.56	326.4	142.67
1 812.11	22	0.55	33.11	81.6	32.13
906.05	23	1.10	66.22	20.4	8.15
453.03	24	2.21	132.44	5.1	2.01
226.51	25	4.41	264.89		
113.26	26	8.83	529.77		

		Sound Frequency
56.63	27	17.66
28.31	28	35.32
14.16	29	70.64
7.08	30	**141.27**
3.54	31	282.54
1.77	32	565.09
0.88	33	1 130.18
	34	2 260.35
	35	4 520.71
	36	9 041.42
	37	18 082.83

Note name = **C#**
Concert pitch = 448.51 Hz
Difference to 440 Hz = **33.17 cent**

Microtune (+/-64):	21
Pitch (64=0); Range I +/-64:	85
Pitch (64=0); Range II +/-32:	75
Pitchbend (+/-8192); Range 1	2717
Pitch (8191 € +/-0); Range 1	10908
Pitch (8191 € +/-0); Range 2	9550
Pitch (8191 € +/-0); Range 8	8531

Color		Color Frequency	Wavelength
blue-green	74	6.2132 x 10^{14} Hz	483 nm

The sidereal orbits of the planets around the sun are measured in relation to the fixed stars, the base of the observation being the sun. If Mercury is in front of a certain fixed star as seen from the Sun, then it is again in front of this fixed star after a solar orbit lasting 87 969 days.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Mercury's sidereal orbit around the Sun and audio sample:
www.planetware.de/octave/mercury.html

MERCURY - Sideric Solar Orbit

Intervals to the Fundamental Frequency 141.27 Hz (C#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	141.27	C#	C#	448.51	33.17
81 / 80	Syntonic Comma	143.04	C#	D	428.63	-45.33
3^{12} / 2^{12}	Pythagorean Comma	143.20	C#	D	429.11	-43.37
128 / 125	Diesis	144.66	C#	D	433.50	-25.77
648 / 625	Greater Diessis	146.47	D	D	438.92	-4.27
25 / 24	Chroma	147.16	D	D	440.98	3.84
$2^{1/12}$	Chromatic Semitone	149.67	D			
16 / 15	Diatonic Semitone	150.69	D	d	451.56	44.90
10 / 9	Minor Whole Tone	156.97	D#	D#	443.98	15.57
$2^{2/12}$	Chromatic Whole Tone	158.57	D#			
9 / 8	Major Whole Tone	158.93	D#	D#	449.53	37.08
8 / 7	Chinese Whole Tone	161.45	D#	E	431.03	-35.66
$2^{3/12}$	Chromatic Minor Third	168.00	E			
6 / 5	Minor Third	169.53	E	e	452.58	48.81
5 / 4	Major Third	176.59	F	F	444.98	19.48
$2^{4/12}$	Chromatic Major Third	177.99	F			
4 / 3	Perfect Fourth	188.36	F#	F#	448.00	31.21
$2^{5/12}$	Chromatic Fourth	188.58	F#			
$2^{6/12}$	Chromatic Tritone	199.79	G			
$2^{7/12}$	Chromatic Fifth	211.67	G#			
3 / 2	Perfect Fifth	211.91	G#	G#	449.02	35.12
$2^{8/12}$	Chromatic Minor Sixth	224.26	A			
8 / 5	Minor Sixth	226.04	A	a	452.07	46.85
5 / 3	Major Sixth	235.45	Bb	Bb	444.48	17.53
$2^{9/12}$	Chromatic Major Sixth	237.59	Bb			
7 / 4	Perfect Seventh	247.23	B	B	440.51	1.99
16 / 9	Diminished Seventh	251.15	B	B	447.50	29.26
$2^{10/12}$	Chromatic Minor Seventh	251.72	B			
9 / 5	Minor Seventh	254.29	B	C	427.66	-49.24
15 / 8	Major Seventh	264.89	C	C	445.48	21.44
$2^{11/12}$	Chromatic Major Seventh	266.69	C			
2 / 1	Octave	282.54	C#	C#	448.51	33.17

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

VENUS - Sideric Solar Orbit

Days	Octave	Hertz
224.7008	0	5.1509×10^{-8} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
9 257.39	21	0.108	6.48		
4 628.69	22	0.22	12.96		
2 314.35	23	0.43	25.93	133.2	52.44
1 157.17	24	0.86	51.85	33.3	13.11
578.59	25	1.72	103.70	8.3	3.27
289.29	26	3.46	207.40	2.1	0.83
144.64	27	6.91	414.80		
72.32	28	13.83			

		Sound Frequency
36.16	29	27.65
18.08	30	55.30
9.04	31	110.61
4.52	32	**221.23**
2.26	33	442.46
1.13	34	884.91
0.56	35	1 769.83
	36	3 539.66
	37	7 079.32
	38	14 158.64

Note name = **A**
Concert pitch = 442.46 Hz
Difference to 440 Hz = **9.64 cent**

Microtune (+/-64):	6
Pitch (64=0); Range I +/-64:	70
Pitch (64=0); Range II +/-32:	67
Pitchbend (+/-8192); Range 1	790
Pitch (8191 € +/-0); Range 1	8981
Pitch (8191 € +/-0); Range 2	8586
Pitch (8191 € +/-0); Range 8	8290

Color		Color Frequency	Wavelength
yellow-orange	73	4.8649×10^{14} Hz	616 nm

If Venus is in front of a certain fixed star seen from the sun,
then it is again in front of this star after a 224.7 days solar orbit.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Venus' sidereal orbit around the sun and audio sample:
www.planetware.de/octave/venus.html

VENUS - Sideric Solar Orbit

Intervals to the Fundamental Frequency 221.23 Hz (A)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	221.23	A	A	442.46	9.64
81 / 80	Syntonic Comma	223.99	A	A	447.99	31.15
3^{12} / 2^{12}	Pythagorean Comma	224.25	A	A	448.49	33.10
128 / 125	Diesis	226.54	A	Bb	427.65	-49.30
648 / 625	Greater Diessis	229.37	Bb	Bb	432.99	-27.79
25 / 24	Chroma	230.45	Bb	Bb	435.03	-19.69
$2^{1/12}$	Chromatic Semitone	234.38	Bb			
16 / 15	Diatonic Semitone	235.98	Bb	Bb	445.47	21.37
10 / 9	Minor Whole Tone	245.81	B	B	437.98	-7.95
$2^{2/12}$	Chromatic Whole Tone	248.32	B			
9 / 8	Major Whole Tone	248.88	B	B	443.46	13.55
8 / 7	Chinese Whole Tone	252.83	B	B	450.50	40.82
$2^{3/12}$	Chromatic Minor Third	263.09	C			
6 / 5	Minor Third	265.47	C	C	446.47	25.28
5 / 4	Major Third	276.54	C#	C#	438.97	-4.04
$2^{4/12}$	Chromatic Major Third	278.73	C#			
4 / 3	Perfect Fourth	294.97	D	D	441.96	7.69
$2^{5/12}$	Chromatic Fourth	295.30	D			
$2^{6/12}$	Chromatic Tritone	312.86	D#			
$2^{7/12}$	Chromatic Fifth	331.47	E			
3 / 2	Perfect Fifth	331.84	E	E	442.96	11.60
$2^{8/12}$	Chromatic Minor Sixth	351.18	F			
8 / 5	Minor Sixth	353.97	F	F	445.97	23.33
5 / 3	Major Sixth	368.71	F#	F#	438.48	-6.00
$2^{9/12}$	Chromatic Major Sixth	372.06	F#			
7 / 4	Perfect Seventh	387.15	G	G	434.56	-21.53
16 / 9	Diminished Seventh	393.30	G	G	441.46	5.73
$2^{10/12}$	Chromatic Minor Seventh	394.18	G			
9 / 5	Minor Seventh	398.21	G	G	446.98	27.24
15 / 8	Major Seventh	414.80	G#	G#	439.47	-2.09
$2^{11/12}$	Chromatic Major Seventh	417.62	G#			
2 / 1	Octave	442.46	A	A	442.46	9.64

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

MARS - Sideric Solar Orbit

Days	Octave	Hertz
686.9798	0	1.6848×10^{-8} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
14 151.35	22	0.071	4.24		
7 075.67	23	0.14	8.48		
3 537.84	24	0.28	16.96	311.2	122.52
1 768.92	25	0.57	33.92	77.8	30.62
884.46	26	1.13	67.84	19.4	7.64
442.23	27	2.26	135.68	4.9	1.93
221.11	28	4.52	271.35		
110.56	29	9.04			

		Sound Frequency
55.28	30	18.09
27.64	31	36.18
13.82	32	72.36
6.91	33	**144.72**
3.45	34	289.44
1.72	35	578.88
0.86	36	1 157.77
	37	2 315.54
	38	4 631.08
	39	9 262.16
	40	18 524.31

Note name = **D**
Concert pitch = 433.67 Hz
Difference to 440 Hz = **-25.07 cent**

Microtune (+/-64):	-16
Pitch (64=0); Range I +/-64:	48
Pitch (64=0); Range II +/-32:	56
Pitchbend (+/-8192); Range 1	-2054
Pitch (8191 € +/-0); Range 1	6137
Pitch (8191 € +/-0); Range 2	7164
Pitch (8191 € +/-0); Range 8	7934

Color		Color Frequency	Wavelength
blue	75	6.3649×10^{14} Hz	471 nm

If Mars is standing in front of a certain fixed star as seen from the Sun, it will pass this star again after a solar orbit lasting 686.9798 days (just under 2 Earth years).

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Mars' sidereal orbit around the sun and audio sample:
www.planetware.de/octave/mars.html

MARS - Sideric Solar Orbit

Intervals to the Fundamental Frequency 144.72 Hz (D)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	144.72	D	D	433.67	-25.07
81 / 80	Syntonic Comma	146.53	D	D	439.09	-3.57
3^{12} / 2^{12}	Pythagorean Comma	146.70	D	D	439.59	-1.61
128 / 125	Diesis	148.19	D	D	444.08	15.98
648 / 625	Greater Diessis	150.05	D#	D	449.63	37.49
25 / 24	Chroma	150.75	D#	D	451.74	45.60
$2^{1/12}$	Chromatic Semitone	153.33	D#			
16 / 15	Diatonic Semitone	154.37	D#	D#	436.62	-13.34
10 / 9	Minor Whole Tone	160.80	E	E	429.29	-42.67
$2^{2/12}$	Chromatic Whole Tone	162.44	E			
9 / 8	Major Whole Tone	162.81	E	E	434.65	-21.16
8 / 7	Chinese Whole Tone	165.40	E	E	441.55	6.10
$2^{3/12}$	Chromatic Minor Third	172.10	F			
6 / 5	Minor Third	173.67	F	F	437.61	-9.43
5 / 4	Major Third	180.90	F#	F#	430.26	-38.76
$2^{4/12}$	Chromatic Major Third	182.34	F#			
4 / 3	Perfect Fourth	192.96	G	G	433.18	-27.03
$2^{5/12}$	Chromatic Fourth	193.18	G			
$2^{6/12}$	Chromatic Tritone	204.67	G#			
$2^{7/12}$	Chromatic Fifth	216.84	A			
3 / 2	Perfect Fifth	217.08	A	A	434.16	-23.12
$2^{8/12}$	Chromatic Minor Sixth	229.73	Bb			
8 / 5	Minor Sixth	231.55	Bb	Bb	437.12	-11.39
5 / 3	Major Sixth	241.20	B	B	429.77	-40.72
$2^{9/12}$	Chromatic Major Sixth	243.39	B			
7 / 4	Perfect Seventh	253.26	C	B	451.26	43.75
16 / 9	Diminished Seventh	257.28	C	C	432.69	-28.98
$2^{10/12}$	Chromatic Minor Seventh	257.86	C			
9 / 5	Minor Seventh	260.50	C	C	438.10	-7.48
15 / 8	Major Seventh	271.35	C#	C#	430.74	-36.81
$2^{11/12}$	Chromatic Major Seventh	273.20	C#			
2 / 1	Octave	289.44	D	D	433.67	-25.07

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

JUPITER - Sideric Solar Orbit

Days	Octave	Hertz
4332.588	0	2.6714×10^{-9} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
11 156.07	25	0.090	5.38		
5 578.04	26	0.18	10.76		
2 789.02	27	0.36	21.51	193.20	76.06
1 394.51	28	0.72	43.03	48.3	19.02
697.25	29	1.43	86.05	12.1	4.76
348.63	30	2.87	172.10	3.0	1.18
174.31	31	5.74	344.21		
87.16	32	11.47			

		Sound Frequency
43.58	33	22.95
21.79	34	45.89
10.89	35	91.79
5.45	36	**183.58**
2.72	37	367.15
1.36	38	734.31
0.68	39	1 468.62
	40	2 937.23
	41	5 874.47
	42	11 748.94
	43	23 497.88

Note name = **F#**
Concert pitch = 436.62 Hz
Difference to 440 Hz = **-13.34 cent**

Microtune (+/-64):	-9
Pitch (64=0); Range I +/-64:	55
Pitch (64=0); Range II +/-32:	60
Pitchbend (+/-8192); Range 1	-1093
Pitch (8191 € +/-0); Range 1	7098
Pitch (8191 € +/-0); Range 2	7645
Pitch (8191 € +/-0); Range 8	8054

Color		Color Frequency	Wavelength
red	77	4.0369×10^{14} Hz	743 nm

If Jupiter passes a certain fixed star as seen from the Sun, it takes 4332.588 days (about 12 Earth years) until it passes this star again.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Jupiter's sidereal orbit around the sun and audio sample:
www.planetware.de/octave/jupiter.html

JUPITER - Sideric Solar Orbit

Intervals to the Fundamental Frequency 183.58 Hz (F#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	183.58	F#	F#	436.62	-13.34
81 / 80	Syntonic Comma	185.87	F#	F#	442.08	8.17
3^{12} / 2^{12}	Pythagorean Comma	186.08	F#	F#	442.58	10.12
128 / 125	Diesis	187.98	F#	F#	447.10	27.72
648 / 625	Greater Diessis	190.33	G	F#	452.69	49.23
25 / 24	Chroma	191.23	G	G	429.29	-42.67
$2^{1/12}$	Chromatic Semitone	194.49	G			
16 / 15	Diatonic Semitone	195.82	G	G	439.59	-1.61
10 / 9	Minor Whole Tone	203.97	G#	G#	432.21	-30.94
$2^{2/12}$	Chromatic Whole Tone	206.06	G#			
9 / 8	Major Whole Tone	206.52	G#	G#	437.61	-9.43
8 / 7	Chinese Whole Tone	209.80	G#	G#	444.56	17.83
$2^{3/12}$	Chromatic Minor Third	218.31	A			
6 / 5	Minor Third	220.29	A	A	440.59	2.30
5 / 4	Major Third	229.47	Bb	Bb	433.18	-27.03
$2^{4/12}$	Chromatic Major Third	231.29	Bb			
4 / 3	Perfect Fourth	244.77	B	B	436.13	-15.30
$2^{5/12}$	Chromatic Fourth	245.05	B			
$2^{6/12}$	Chromatic Tritone	259.62	C			
$2^{7/12}$	Chromatic Fifth	275.05	C#			
3 / 2	Perfect Fifth	275.37	C#	C#	437.12	-11.39
$2^{8/12}$	Chromatic Minor Sixth	291.41	D			
8 / 5	Minor Sixth	293.72	D	D	440.09	0.35
5 / 3	Major Sixth	305.96	D#	D#	432.70	-28.98
$2^{9/12}$	Chromatic Major Sixth	308.74	D#			
7 / 4	Perfect Seventh	321.26	E	E	428.83	-44.51
16 / 9	Diminished Seventh	326.36	E	E	435.64	-17.25
$2^{10/12}$	Chromatic Minor Seventh	327.10	E			
9 / 5	Minor Seventh	330.44	E	E	441.08	4.26
15 / 8	Major Seventh	344.21	F	F	433.67	-25.07
$2^{11/12}$	Chromatic Major Seventh	346.55	F			
2 / 1	Octave	367.15	F#	F#	436.62	-13.34

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

SATURN - Sideric Solar Orbit

Days	Octave	Hertz
10.759.21	0	1.0757×10^{-9} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
13 852.06	26	0.072	4.33		
6 926.03	27	0.14	8.66		
3 463.01	28	0.29	17.33	298.0	117.32
1 731.51	29	0.58	34.65	74.5	29.33
865.75	30	1.15	69.30	18.6	7.32
432.88	31	2.31	138.61	4.7	1.85
216.44	32	4.62	277.22		
108.22	33	9.24			

		Sound Frequency
54.11	34	18.48
27.05	35	36.96
13.53	36	73.92
6.76	37	**147.85**
3.38	38	295.70
1.69	39	591.39
0.85	40	1 182.78
	41	2 365.57
	42	4 731.14
	43	9 462.28
	44	18 924.56

Note name = **D**
Concert pitch = 443.04 Hz
Difference to 440 Hz = **11.93 cent**

Microtune (+/-64):	8
Pitch (64=0); Range I +/-64:	72
Pitch (64=0); Range II +/-32:	68
Pitchbend (+/-8192); Range 1	977
Pitch (8191 € +/-0); Range 1	9168
Pitch (8191 € +/-0); Range 2	8680
Pitch (8191 € +/-0); Range 8	8313

Color		Color Frequency	Wavelength
blue	79	6.5024×10^{14} Hz	461 nm

The sidereal solar orbital period of the ring planet Saturn is just under 30 years.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Saturn‘s sidereal orbit around the sun and audio sample:
www.planetware.de/octave/saturn.html

SATURN - Sideric Solar Orbit

Intervals to the Fundamental Frequency 147.85 Hz (D)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	147.85	D	D	443.04	11.93
81 / 80	Syntonic Comma	149.70	D	D	448.58	33.44
3^{12} / 2^{12}	Pythagorean Comma	149.87	D	D	449.09	35.39
128 / 125	Diesis	151.40	D	D#	428.21	-47.01
648 / 625	Greater Diessis	153.29	D#	D#	433.57	-25.50
25 / 24	Chroma	154.01	D#	D#	435.60	-17.39
$2^{1/12}$	Chromatic Semitone	156.64	D#			
16 / 15	Diatonic Semitone	157.70	D#	D#	446.06	23.67
10 / 9	Minor Whole Tone	164.28	E	E	438.56	-5.66
$2^{2/12}$	Chromatic Whole Tone	165.95	E			
9 / 8	Major Whole Tone	166.33	E	E	444.05	15.84
8 / 7	Chinese Whole Tone	168.97	E	E	451.09	43.11
$2^{3/12}$	Chromatic Minor Third	175.82	F			
6 / 5	Minor Third	177.42	F	F	447.06	27.58
5 / 4	Major Third	184.81	F#	F#	439.56	-1.75
$2^{4/12}$	Chromatic Major Third	186.28	F#			
4 / 3	Perfect Fourth	197.13	G	G	442.54	9.98
$2^{5/12}$	Chromatic Fourth	197.35	G			
$2^{6/12}$	Chromatic Tritone	209.09	G#			
$2^{7/12}$	Chromatic Fifth	221.52	A			
3 / 2	Perfect Fifth	221.77	A	A	443.54	13.89
$2^{8/12}$	Chromatic Minor Sixth	234.69	Bb			
8 / 5	Minor Sixth	236.56	Bb	Bb	446.56	25.62
5 / 3	Major Sixth	246.41	B	B	439.06	-3.71
$2^{9/12}$	Chromatic Major Sixth	248.65	B			
7 / 4	Perfect Seventh	258.73	C	C	435.14	-19.24
16 / 9	Diminished Seventh	262.84	C	C	442.04	8.02
$2^{10/12}$	Chromatic Minor Seventh	263.44	C			
9 / 5	Minor Seventh	266.13	C	C	447.57	29.53
15 / 8	Major Seventh	277.22	C#	C#	440.05	0.20
$2^{11/12}$	Chromatic Major Seventh	279.10	C#			
2 / 1	Octave	295.70	D	D	443.04	11.93

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

URANUS - Sideric Solar Orbit

Days	Octave	Hertz
30 685.93	0	3.7718×10^{-10} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
9 876.72	28	0.101	6.07		
4 938.36	29	0.20	12.15		
2 469.18	30	0.40	24.30	151.60	59.69
1 234.59	31	0.81	48.60	37.9	14.92
617.30	31	1.62	97.20	9.5	3.74
308.65	33	3.24	194.40	2.4	0.94
154.32	34	6.48	388.79		
77.16	35	12.96			

		Sound Frequency
38.58	36	25.92
19.29	37	51.84
9.65	38	103.66
4.82	39	**207.36**
2.41	40	414.71
1.21	41	829.42
0.60	42	1 658.85
	43	3 317.70
	44	6 635.39
	45	13 270.70
	46	26 541.58

Note name = **G#**
Concert pitch = 439.37 Hz
Difference to 440 Hz = **-2.47 cent**

Microtune (+/-64):	-2
Pitch (64=0); Range I +/-64:	62
Pitch (64=0); Range II +/-32:	63
Pitchbend (+/-8192); Range 1	-202
Pitch (8191 € +/-0); Range 1	7989
Pitch (8191 € +/-0); Range 2	8090
Pitch (8191 € +/-0); Range 8	8166

Color		Color Frequency	Wavelength
orange	80	4.5598×10^{14} Hz	658 nm

Uranus needs about 84 years for one sidereal solar orbit.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Uranus' sidereal orbit around the sun and audio sample:
www.planetware.de/octave/uranus.html

URANUS - Sideric Solar Orbit

Intervals to the Fundamental Frequency 207.36 Hz (G#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	207.36	G#	G#	439.37	-2.47
81 / 80	Syntonic Comma	209.95	G#	G#	444.86	19.03
3^{12} / 2^{12}	Pythagorean Comma	210.19	G#	G#	445.37	20.99
128 / 125	Diesis	212.33	G#	G#	449.92	38.59
648 / 625	Greater Diessis	214.99	A	A	429.97	-39.91
25 / 24	Chroma	216.00	A	A	431.99	-31.80
$2^{1/12}$	Chromatic Semitone	219.69	A			
16 / 15	Diatonic Semitone	221.18	A	A	442.36	9.26
10 / 9	Minor Whole Tone	230.40	Bb	Bb	434.93	-20.07
$2^{2/12}$	Chromatic Whole Tone	232.75	Bb			
9 / 8	Major Whole Tone	233.28	Bb	Bb	440.37	1.44
8 / 7	Chinese Whole Tone	236.98	Bb	Bb	447.36	28.70
$2^{3/12}$	Chromatic Minor Third	246.59	B			
6 / 5	Minor Third	248.83	B	B	443.36	13.17
5 / 4	Major Third	259.20	C	C	435.91	-16.16
$2^{4/12}$	Chromatic Major Third	261.25	C			
4 / 3	Perfect Fourth	276.47	C#	C#	438.88	-4.43
$2^{5/12}$	Chromatic Fourth	276.79	C#			
$2^{6/12}$	Chromatic Tritone	293.25	D			
$2^{7/12}$	Chromatic Fifth	310.68	D#			
3 / 2	Perfect Fifth	311.03	D#	D#	439.67	-0.52
$2^{8/12}$	Chromatic Minor Sixth	329.16	E			
8 / 5	Minor Sixth	331.77	E	E	442.86	11.21
5 / 3	Major Sixth	345.59	F	F	435.42	-18.11
$2^{9/12}$	Chromatic Major Sixth	348.73	F			
7 / 4	Perfect Seventh	362.87	F#	F#	431.53	-33.65
16 / 9	Diminished Seventh	368.63	F#	F#	438.38	-6.38
$2^{10/12}$	Chromatic Minor Seventh	369.47	F#			
9 / 5	Minor Seventh	373.24	F#	F#	443.86	15.12
15 / 8	Major Seventh	388.79	G	G	436.41	-14.20
$2^{11/12}$	Chromatic Major Seventh	391.44	G			
2 / 1	Octave	414.71	G#	G#	439.37	-2.47

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

NEPTUNE - Sideric Solar Orbit

Days	Octave	Hertz
60 187.64	0	1.923×10^{-10} Hz

Reverb, Delay & Loop Times		Tempo		Pendulum Length	
Milliseconds			bpm	cm	inch
9 686.15	29	0.103	6.19		
4 843.08	30	0.21	12.39		
2 421.54	31	0.41	24.78	145.6	57.32
1 210.77	32	0.83	49.56	36.4	14.33
605.38	33	1.65	99.11	9.1	3.58
302.69	34	3.30	198.22	2.3	0.91
151.35	35	6.61	396.44		
75.67	36	13.21			

		Sound Frequency
37.84	37	26.43
18.92	38	52.86
9.46	39	105.72
4.73	40	**211.44**
2.36	41	422.87
1.18	42	845.74
0.59	43	1 691.49
	44	3 382.97
	45	6 765.95
	46	13 531.90
	47	27 063.80

Note name = **G#**
Concert pitch = 448.02 Hz
Difference to 440 Hz = **31.26 cent**

Microtune (+/-64):	20
Pitch (64=0); Range I +/-64:	84
Pitch (64=0); Range II +/-32:	74
Pitchbend (+/-8192); Range 1	2569
Pitch (8191 € +/-0); Range 1	10760
Pitch (8191 € +/-0); Range 2	9476
Pitch (8191 € +/-0); Range 8	8512

Color		Color Frequency	Wavelength
orange	81	4.6495×10^{14} Hz	645 nm

A Neptune year lasts about 165 Earth years.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Neptune's sidereal orbit around the sun and audio sample:
www.planetware.de/octave/neptune.html

NEPTUNE - Sideric Solar Orbit

Intervals to the Fundamental Frequency 211.44 Hz (G#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	211.44	G#	G#	448.02	31.26
81 / 80	Syntonic Comma	214.08	G#	A	428.16	-47.23
3^{12} / 2^{12}	Pythagorean Comma	214.32	G#	A	428.64	-45.28
128 / 125	Diesis	216.51	G#	A	433.02	-27.68
648 / 625	Greater Diessis	219.22	A	A	438.43	-6.17
25 / 24	Chroma	220.25	A	A	440.49	1.93
$2^{1/12}$	Chromatic Semitone	224.01	A			
16 / 15	Diatonic Semitone	225.53	A	A	451.06	42.99
10 / 9	Minor Whole Tone	234.93	Bb	Bb	443.49	13.66
$2^{2/12}$	Chromatic Whole Tone	237.33	Bb			
9 / 8	Major Whole Tone	237.87	Bb	Bb	449.03	35.17
8 / 7	Chinese Whole Tone	241.64	Bb	B	430.56	-37.57
$2^{3/12}$	Chromatic Minor Third	251.44	B			
6 / 5	Minor Third	253.72	B	B	452.08	46.90
5 / 4	Major Third	264.29	C	C	444.49	17.57
$2^{4/12}$	Chromatic Major Third	266.39	C			
4 / 3	Perfect Fourth	281.91	C#	C#	447.51	29.31
$2^{5/12}$	Chromatic Fourth	282.23	C#			
$2^{6/12}$	Chromatic Tritone	299.02	D			
$2^{7/12}$	Chromatic Fifth	316.80	D#			
3 / 2	Perfect Fifth	317.15	D#	D#	448.52	33.22
$2^{8/12}$	Chromatic Minor Sixth	335.63	E			
8 / 5	Minor Sixth	338.30	E	E	451.57	44.95
5 / 3	Major Sixth	352.39	F	F	443.99	15.62
$2^{9/12}$	Chromatic Major Sixth	355.59	F			
7 / 4	Perfect Seventh	370.01	F#	F#	440.02	0.09
16 / 9	Diminished Seventh	375.89	F#	F#	447.01	27.35
$2^{10/12}$	Chromatic Minor Seventh	376.74	F#			
9 / 5	Minor Seventh	380.58	F#	F#	452.59	48.86
15 / 8	Major Seventh	396.44	G	G	444.99	19.53
$2^{11/12}$	Chromatic Major Seventh	399.14	G			
2 / 1	Octave	422.87	G#	G#	448.02	31.26

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

PLUTO - Sideric Solar Orbit

Days	Octave	Hertz
90 487.277	0	1.2791 x 10^{-10} Hz

Reverb, Delay & Loop Times			Tempo	Pendulum Length	
Milliseconds			bpm	cm	inch
14 562.35	29	0.068	4.12		
7 281.17	30	0.14	8.24		
3 640.59	31	0.27	16.48	329.3	129.62
1 820.29	32	0.55	32.96	82.3	32.40
910.15	33	1.10	65.92	20.5	8.07
455.07	34	2.20	131.85	5.1	2.01
227.54	35	4.39	263.69		
113.77	36	8.79			

		Sound Frequency
56.88	37	17.58
28.44	38	35.16
14.22	39	70.32
7.11	40	**140.64**
3.56	41	281.27
1.78	42	562.55
0.89	43	1 125.09
0.44	44	2 250.19
	45	4 500.37
	46	9 000.75
	47	18 001.49

Note name = **C#**
Concert pitch = 446.49 Hz
Difference to 440 Hz = **25.36 cent**

Microtune (+/-64):	16
Pitch (64=0); Range I +/-64:	80
Pitch (64=0); Range II +/-32:	72
Pitchbend (+/-8192); Range 1	2078
Pitch (8191 € +/-0); Range 1	10269
Pitch (8191 € +/-0); Range 2	9230
Pitch (8191 € +/-0); Range 8	8451

Color		Color Frequency	Wavelength
blue-green	82	6.1682 x 10^{14} Hz	484 nm

The Pluto solar orbit takes about 248 times as long as the Earth solar orbit.

Remark: In the 1984 published book „The Cosmic Octave“ Hans Cousto assumed an orbital period of 90737.2 Daysn for Pluto, which resulted in the frequency 140.25 Hz in the 40th octave. By more exact measuring data of the special eccentric orbit NASA determined an orbital period of 90487.277 Daysn (observation date 9.9.2004) which lead accordingly to slightly changed octave frequencies.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More on the tone of Pluto‘s sidereal orbit around the sun and audio sample:
www.planetware.de/octave/pluto.html

PLUTO - Sideric Solar Orbit

Intervals to the Fundamental Frequency 140.64 Hz (C#)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	140.64	C#	C#	446.49	25.35
81 / 80	Syntonic Comma	142.39	C#	C#	452.07	46.85
3^{12} / 2^{12}	Pythagorean Comma	142.55	C#	C#	452.58	48.80
128 / 125	Diesis	144.01	C#	D	431.55	-33.57
648 / 625	Greater Diessis	145.81	D	D	436.94	-12.08
25 / 24	Chroma	146.50	D	D	438.99	-3.98
$2^{1/12}$	Chromatic Semitone	149.00	D			
16 / 15	Diatonic Semitone	150.01	D	D	449.53	37.10
10 / 9	Minor Whole Tone	156.26	D#	D#	441.98	7.77
$2^{2/12}$	Chromatic Whole Tone	157.86	D#			
9 / 8	Major Whole Tone	158.21	D#	D#	447.50	29.26
8 / 7	Chinese Whole Tone	160.73	D#	D#	429.10	-43.43
$2^{3/12}$	Chromatic Minor Third	167.25	E			
6 / 5	Minor Third	168.76	E	E	450.55	41.02
5 / 4	Major Third	175.80	F	F	442.98	11.59
$2^{4/12}$	Chromatic Major Third	177.19	F			
4 / 3	Perfect Fourth	187.52	F#	F#	445.99	23.41
$2^{5/12}$	Chromatic Fourth	187.73	F#			
$2^{6/12}$	Chromatic Tritone	198.89	G			
$2^{7/12}$	Chromatic Fifth	210.72	G#			
3 / 2	Perfect Fifth	210.96	G#	G#	447.00	22.33
$2^{8/12}$	Chromatic Minor Sixth	223.25	A			
8 / 5	Minor Sixth	225.02	A	A	450.04	39.06
5 / 3	Major Sixth	234.39	Bb	Bb	442.48	9.73
$2^{9/12}$	Chromatic Major Sixth	236.52	Bb			
7 / 4	Perfect Seventh	246.11	B	B	438.53	-5.79
16 / 9	Diminished Seventh	249.33	B	B	445.49	21.47
$2^{10/12}$	Chromatic Minor Seventh	250.59	B			
9 / 5	Minor Seventh	253.15	B	B	451.05	38.94
15 / 8	Major Seventh	263.69	C	C	443.48	13.64
$2^{11/12}$	Chromatic Major Seventh	265.49	C			
2 / 1	Octave	281.27	C#	C#	446.49	25.35

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

SUN

Octave	Hertz
0	32.312.52 Hz

Reverb, Delay & Loop Times

Milliseconds		Sound Frequency
	-1	16 156.26
	-2	8 078.13
	-3	4 039.06
	-4	2 019.53
0.99	-5	1 009.77
1.98	-6	504.88
3.96	-7	252.44
7.92	-8	**126.22**
15.85	-9	63.11
31.69	-10	31.56
63.38	-11	15.78

Note name = **B**
Concert pitch = 449.80 Hz
Difference to 440 Hz = **38.13 cent**

Microtune (+/-64):	24
Pitch (64=0); Range I +/-64:	88
Pitch (64=0); Range II +/-32:	76
Pitchbend (+/-8192); Range 1	3124
Pitch (8191 € +/-0); Range 1	11315
Pitch (8191 € +/-0); Range 2	9753
Pitch (8191 € +/-0); Range 8	8581

			Tempo bpm	Pendulum Length	
				cm	inch
126.76	-12	7.89			
253.52	-13	3.94	236.66		
507.05	-14	1.97	118.33	6.4	2.52
1 014.10	-15	0.99	59.17	25.6	10.08
2 028.19	-16	0.49	29.58	102.4	40.31
4 056.38	-17	0.24	14.79	409.6	161.26
8 112.77	-18	0.12	7.40		
16 225.54	-19	0.062	3.70		

Color		**Color frequency**	Wavelength
yello-green	34	5.5512 x 10^{14} Hz	540 nm

The sun tone is expression of a limit value, similarly as the absolute temperature zero point represents a limit value in the physics of the existence. An imaginary planet which would orbit the center of the sun in the distance of the gravitational length with approximate speed of light would do this in the second well 32 000 times. The 8th sub-octave has then the frequency of 126.22 Hz.

bpm = beats per minute
The tone name refers to an A with 440 Hertz.
Concert pitch = The chromatic A corresponding to the original tone
Cent value = Deviation of the concert pitch from 440 Hz (one semitone corresponds to 100 cents)
Microtune = 64 units correspond to 100 cents (1 semitone)
Pitch = Pitchwheel; for range I, a rotation from the middle class to the top or bottom corresponds to a semitone (64 units), for range II to a whole tone (semitone = 32 units)
nm = Nanometer

More about the sun tone and audio sample:
www.planetware.de/octave/sun.html

SUN

Intervals to the Fundamental Frequency 126.22 Hz (B)

1	2	3	4	5	6	7
1 / 1	Perfect Unison (Prime)	126.22	H	H	449.80	39.13
81 / 80	Syntonic Comma	127.80	H	C	429.86	-40.36
3^{12} / 2^{12}	Pythagorean Comma	127.94	H	C	430.35	-38.41
128 / 125	Diesis	129.25	H	C	434.74	-20.81
648 / 625	Greater Diessis	130.87	C	C	440.18	0.70
25 / 24	Chroma	131.48	C	C	442.24	8.81
$2^{1/12}$	Chromatic Semitone	133.73	C			
16 / 15	Diatonic Semitone	134.64	C	C	452.86	49.87
10 / 9	Minor Whole Tone	140.25	C#	C#	445.25	20.54
$2^{2/12}$	Chromatic Whole Tone	141.68	C#			
9 / 8	Major Whole Tone	142.00	C#	C#	450.82	42.04
8 / 7	Chinese Whole Tone	144.25	C#	D	432.27	-30.69
$2^{3/12}$	Chromatic Minor Third	150.10	D			
6 / 5	Minor Third	151.46	D	D#	428.41	-46.22
5 / 4	Major Third	157.78	D#	D#	446.26	24.45
$2^{4/12}$	Chromatic Major Third	159.03	D#			
4 / 3	Perfect Fourth	168.29	E	E	449.29	36.18
$2^{5/12}$	Chromatic Fourth	168.48	E			
$2^{6/12}$	Chromatic Tritone	178.50	F			
$2^{7/12}$	Chromatic Fifth	189.12	F#			
3 / 2	Perfect Fifth	189.33	F#	F#	450.31	40.09
$2^{8/12}$	Chromatic Minor Sixth	200.36	G			
8 / 5	Minor Sixth	201.95	G	G#	427.92	-48.18
5 / 3	Major Sixth	210.37	G#	G#	445.75	22.49
$2^{9/12}$	Chromatic Major Sixth	212.28	G#			
7 / 4	Perfect Seventh	220.89	A	A	441.77	6.96
16 / 9	Diminished Seventh	224.39	A	A	448.78	34.22
$2^{10/12}$	Chromatic Minor Seventh	224.90	A			
9 / 5	Minor Seventh	227.20	A	Bb	428.89	-44.27
15 / 8	Major Seventh	236.66	Bb	Bb	446.76	26.40
$2^{11/12}$	Chromatic Major Seventh	238.27	Bb			
2 / 1	Octave	252.44	B	B	449.80	38.13

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Next chromatic tone
6. Corresponding chromatic A
7. Cent value difference between standard A and the corresponding chromatic A
   Chromatic intervals all have the same corresponding A frequency
   and the same cent value difference as the fundamental (perfect unison).

Diatonic and Chromatic Scale from C based on 440 hertz

1	2	3	4	5	6	7	8
1 / 1	Perfect Unison (Prime)	130.81	C	1.000	0.00	440.00	0.00
81 / 80	Syntonic Comma	132.45	C	1.013	21.51	445.50	21.51
3^{12} / 2^{12}	Pythagorean Comma	132.60	C	1.014	23.46	446.00	23.46
128 / 125	Diesis	133.95	C	1.024	41.06	450.56	41.06
648 / 625	Greater Diessis	135.63	C#	1.037	62.57	430.59	-37.43
25 / 24	Chroma	136.26	C#	1.042	70.67	432.61	-29.33
$2^{1/12}$	Chromatic Semitone	138.59	C#	1.059	100.00		
16 / 15	Diatonic Semitone	139.53	C#	1.067	111.73	442.99	11.73
10 / 9	Minor Whole Tone	145.35	D	1.111	182.40	435.55	-17.60
$2^{2/12}$	Chromatic Whole Tone	146.83	D	1.122	200.00		
9 / 8	Major Whole Tone	147.16	D	1.125	203.91	440.99	-3.91
8 / 7	Chinese Whole Tone	149.50	D	1.143	231.17	447.99	31.17
$2^{3/12}$	Chromatic Minor Third	155.56	D#	1.189	300.00		
6 / 5	Minor Third	156.98	D#	1.200	315.64	443.99	15.64
5 / 4	Major Third	163.52	E	1.250	386.31	436.54	-13.69
$2^{4/12}$	Chromatic Major Third	164.81	E	1.260	400.00		
4 / 3	Perfect Fourth	174.42	F	1.333	498.04	439.50	-1.95
$2^{5/12}$	Chromatic Fourth	174.61	F	1.335	500.00		
$2^{6/12}$	Chromatic Tritone	185.00	F#	1.414	600.00		
$2^{7/12}$	Chromatic Fifth	196.00	G	1.498	700.00		
3 / 2	Perfect Fifth	196.22	G	1.500	701.96	440.50	1.96
$2^{8/12}$	Chromatic Minor Sixth	207.65	G#	1.587	800.00		
8 / 5	Minor Sixth	209.30	G#	1.600	813.69	443.49	13.69
5 / 3	Major Sixth	218.02	A	1.667	884.36	436.04	-15.64
$2^{9/12}$	Chromatic Major Sixth	220.00	A	1.682	900.00		
7 / 4	Perfect Seventh	228.92	Bb	1.750	968.83	432.15	-31.17
16 / 9	Diminished Seventh	232.56	Bb	1.778	996.09	439.01	-3.91
$2^{10/12}$	Chromatic Minor Seventh	233.08	Bb	1.782	1000.00		
9 / 5	Minor Seventh	235.46	Bb	1.800	1017.60	444.49	17.60
15 / 8	Major Seventh	245.27	B	1.875	1088.27	437.03	-11.73
$2^{11/12}$	Chromatic Major Seventh	246.94	B	1.888	1100.00		
2 / 1	Octave	261.63	C	2.000	1200.00	440.00	0.00

1. Interval ratio
2. Interval name
3. Frequency in Hertz
4. Logical sound name
5. Interval factor
6. Cent value of the interval
7. Corresponding chromatic A
8. Cent value difference between standard A and the corresponding chromatic A

Source: Hans Cousto “Klänge Bilder Welten”. Simon + Leutner Verlag. Berlin 1989 (out of print).

Overview of the Solar System Tuning Data

	Earth		Meters			Tones					Colors		
	Cyles in days or years (y)		*Oc-tave*	*Tempo bpm*	*Pendel. cm*	*Oc-tave*	*Frequency Hertz*	*Tone name*	*Concert pitch A*	*Difference to 440 Hz*	*Oc-tave*	*Color name*	*Nano-meter*
3	Synodic day	1.0000	17	**91.0**	10.8	24	**194.18**	G	435.9	- 16.1	65	**red-orange**	702
5	Sideric day	0.99727	17	**91.3**	10.7	24	**194.71**	G	437.12	- 11.4	65	**red-orange**	700
7	Tropic year	365.2422	25	**63.8**	22.0	32	**136.10**	C#	432.10	- 31.4	74	**blue-green**	501
9	Platonic year	25.920 y	40	**80.6**	13.8	47	**172.06**	F#	433.56	- 25.5	77	**red-violet**	792

	Moon		Meters			Tones					Colors		
	Cyles in days		*Oc-tave*	*Tempo bpm*	*Pendel. cm*	*Oc-tave*	*Frequency Hertz*	*Tone name*	*Concert pitch A*	*Difference to 440 Hz*	*Oc-tave*	*Color name*	*Nano-meter*
11	Synodic month	29.5306	22	**98.6**	9.2	29	**210.42**	G#	445.86	+ 22.9	70	**orange**	648
13	Sideric month	27.3217	22	**106.6**	7.9	29	**227.43**	Bb	429.33	- 42.5	70	**yellow**	599
15	Culmination period	1.0305	17	**87.9**	11.6	24	**187.61**	F#	446.20	+ 24.2	65	**red**	727
17	Metonic cycle	6939.6882	30	**107.4**	7.4	37	**229.22**	Bb	432.71	-28.9	78	**yellow**	595
19	Saros periode	6585.3211	30	**113.2**	7.0	37	**241.56**	B	430.41	- 38.2	78	**yellow-green**	564
21	Apsides rotation	3232.6854	29	**115.3**	6.7	36	**246.04**	B	438.39	- 6.3	77	**yellow-green**	554
23	Knot circulation	6793.3951	30	**109.8**	7.4	37	**234.16**	Bb	442.03	- 8.0	78	**yellow**	582

	Planets			Meters			Tones					Colors		
	Siderischer Umlauf	*Cycles in years*	*Cycles in days*	*Oc-tave*	*Tempo bpm*	*Pendel. cm*	*Oc-tave*	*Frequency Hertz*	*Tone name*	*Concert pitch A*	*Difference to 440 Hz*	*Oc-tave*	*Color name*	*Nano-meter*
25	Mercury	0.2409	87.969	23	**66.2**	20.4	30	**141.27**	C#	448.51	+ 33.2	**74**	**blue-green**	483
27	Venus	0.6152	224.701	25	**103.7**	8.3	32	**221.23**	A	442.46	+ 9.6	**73**	**yellow-orange**	616
29	Mars	1.8809	686.98	26	**67.8**	19.4	33	**144.72**	D	433.67	- 25.1	**75**	**blue**	471
31	Jupiter	11.8622	4332.59	29	**86.1**	12.1	36	**183.58**	F#	436.68	- 13.3	**77**	**red**	743
33	Saturn	29.4577	10759.2	30	**69.3**	18.6	37	**147.85**	F	443.04	+ 11.9	**79**	**blue**	461
35	Uranus	84.0153	30685.9	32	**97.2**	9.5	39	**207.36**	G#	439.37	- 2.5	**80**	**orange**	658
37	Neptune	164.7883	60187.6	33	**99.1**	9.1	40	**211.44**	G#	448.02	+ 31.3	**81**	**orange**	645
39	Pluto	248.4301	90487.3	33	**65.9**	20.7	40	**140.64**	C#	446.49	+ 25.4	**82**	**blue-green**	486

41	SONNE	32312.5 Hz	-14	**118.3**	6.4	-8	**126.22**	B	449.80	+38.2	**34**	**yellow-green**	540

Clicks on the page numbers lead to the detailed tuning data.

The difference to 440 Hz is given in Cents (100 cents = 1 semitone)

Synodic Periods of the Planets

	Planets			Meters			Tones						Colors	
	Synodic cycle	*Mean value in days*	*Fluctuation in days*	*Oc-tave*	*Tempo in bpm*	*Pendel. in cm*	*Oc-tave*	*Frequency in Hertz*	*Fluctuation in Hertz*	*Tone name*	*Concert pitch A*	*Difference to 440 Hz*	*Oc-tave*	*Color name*
	Merkur	**115.8774**	104 - 132	24	**100.5**	8.9	31	**214.50**	239 - 188	A	432.26	-30.7	72	**yellow-orange**
	Venus	**583.9205**	577- 592	26	**79.9**	14.0	33	**170.53**	172 - 168	F	429.72	-40.9	75	**red-violet**
	Mars	**779.9382**	786 - 810	26	**59.8**	25.0	33	**127.63**	130 - 123	C	429.28	-42.7	75	**green**
	Jupiter	**398.8864**	395 - 404	25	**58.6**	26.1	33	**249.80**	126 - 123	H	445.09	19.9	74	**yellow-green**
	Saturn	**378.0929**	376 - 380	25	**61.6**	23.6	32	**131.51**	135 - 131	C	442.34	9.2	74	**green**
	Uranus	**369.66**	1	25	**63.1**	22.5	32	**134.72**	1/3 Hz	C#	427.70	-49.1	74	**blue-green**
	Neptune	**367.49**	1	25	**63.5**	22.2	32	**135.45**	1/3 Hz	C#	430.03	-39.7	74	**blue-green**
	Pluto	**366.73**	1	25	**63.7**	22.0	32	**135.82**	1/3 Hz	C#	431.20	-35.0	74	**blaugrün**

The synodic period of a planet is the duration after which it is again at the same angle to the Sun as seen from Earth, e.g. the duration from one conjunction (0°) to the next. In the table, next to the mean value of the periods and next to their octave tones, the variations are listed. For Mars the periods can deviate up to 3% from the mean value, for the other planets up to 1%.

More Tuning Data

Rotations of the Planets

Planets			Meters			Tones					Colors	
	Periode	*Hours*	*Oc-tave*	*Tempo in bpm*	*Pendel. in cm*	*Oc-tave*	*Frequency in Hertz*	*Tone name*	*Concert pitch A Hz*	*Centwert zu 440 Hz*	*Oc-tave*	*Color name*
Merkur	sidereal	**1407.6000**	23	**99.3**	9.1	30	**211.89**	G#	448.99	35.0	71	**orange**
	synodic	**4222.6000**	24	**66.2**	20.4	31	**141.27**	C#	448.50	33.1	72	**blue-green**
Venus	sidereal	**-5832.6000**	25	**95.9**	20.6	32	**204.55**	G#	433.42	-26.1	73	**orange**
	synodic	**2802.0000**	24	**99.8**	9.0	31	**212.89**	G#	451.14	43.1	72	**orange**
Erde	sidereal	**23.9345**	17	**91.0**	10.8	24	**194.71**	G	437.12	-16.1	65	**red-orange**
	synodic	**24.0000**	17	**91.3**	10.7	24	**195.18**	G	435.90	-11.4	65	**red-orange**
Mars	sidereal	**24.6230**	17	**88.7**	11.4	24	**189.27**	F#	450.16	39.5	65	**red**
	synodic	**24.6597**	17	**88.6**	11.4	24	**188.99**	F#	449.48	36.9	65	**red**
Jupiter	sidereal	**9.9250**	16	**110.0**	7.4	23	**234.78**	A#	443.20	12.6	64	**yellow**
	synodic	**9.9259**	16	**110.0**	7.4	23	**234.76**	A#	443.16	12.4	64	**yellow**
Saturn	sidereal	**10.6560**	16	**102.5**	8.5	23	**218.67**	A#	437.34	-10.0	64	**yellow**
	synodic	**10.6560**	16	**102.5**	8.5	23	**218.67**	A#	437.34	-10.0	64	**yellow**
Uranus	sidereal	**-17.2400**	16	**63.4**	22.3	23	**135.16**	C#	429.11	-43.4	65	**blue-green**
	synodic	**17.2400**	16	**63.4**	22.3	23	**135.16**	C#	429.11	-43.4	65	**blue-green**
Neptun	sidereal	**16.1100**	16	**67.8**	19.5	23	**144.64**	D	433.43	-26.0	65	**blue**
	synodic	**16.1100**	16	**67.8**	19.5	23	**144.64**	D	433.43	-26.0	65	**blue**

The **sidereal period** is the duration of a rotation relative to the fixed stars. Venus and Uranus rotate opposite to their solar orbital direction. The **synodic period** is the duration of rotation in relation to the Sun (the planet's day length).

Minor Planets and Moons in the Solar System

Besides the 8 planets, dwarf and minor planets (planetoids) orbit the Sun. These include asteroids, Trojans, Centaurs, and transneptunian objects. As of 2019, about 800,000 planetoids have been discovered. The „Minor Planets" tuning data PDF contains the octave frequencies of about 160 minor plnets; see www.planetware.de/download/tuning_data_dwarf_planets.pdf

Many planets are themselves orbited by one or more satellites. Mercury and Venus have no moon, Earth one, Mars two, and Jupiter 79, and the others several more. The PDF available on the following web page contains the tuning data of 33 moons; see www.planetware.de/download/tuning_data_planet_moons.pdf

Accuracy of Astronomical Data and their Octave Frequencies

If science obtains more detailed data about a distant space object, it may lead to a more accurate determination of the orbital period, resulting in slightly different octave frequencies.

Molecule Tuning Data

The cycles of the space bodies have the lowest frequencies. At the other end of the spectrum of all vibrations are the high frequencies of the molecules and atoms. Tuning data of some molecules documented in detail by Hans Cousto are available for download on the following German websites:

Hydrogen: www.planetware.de/tune_in/Wasserstoff.html

THC / CBD: www.planetware.de/tune_in/thc.html

MDMA: www.planetware.de/tune_in/mdma.html

LSD: www.planetware.de/tune_in/lsd.html

Instructions for Measuring and Tuning with an Electronic Tuner

The planetary octave tones all correspond to a different concert pitch A, which deviates from the usual 440 Hz standard tone. This deviation is given from minus to plus 50 cents (a semitone has 100 cents). For example, the 32nd octave of the Earth Year is a C# with 136.10 Hz. The corresponding A has 432.10 Hz. The deviation from 440 Hz is -31 cents.

Tone measurement:

First, the tuner is set (calibrated) to the concert pitch A = 440 Hz.

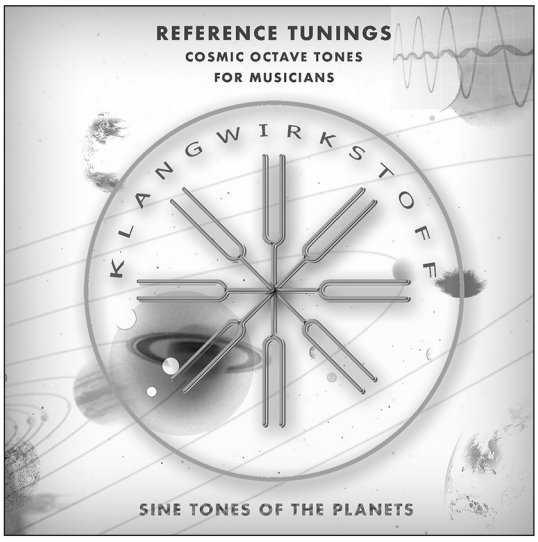
When measuring, the tone name is displayed (e.g. C#) and the deviation from the 440 Hz tuning from -50 to +50 cents. In chromatic tuning (guitar, piano, etc.) all tones (intervals) have the same cent value deviation. In diatonic tunings, e.g. an Indian sitar, each interval has a different cent value.

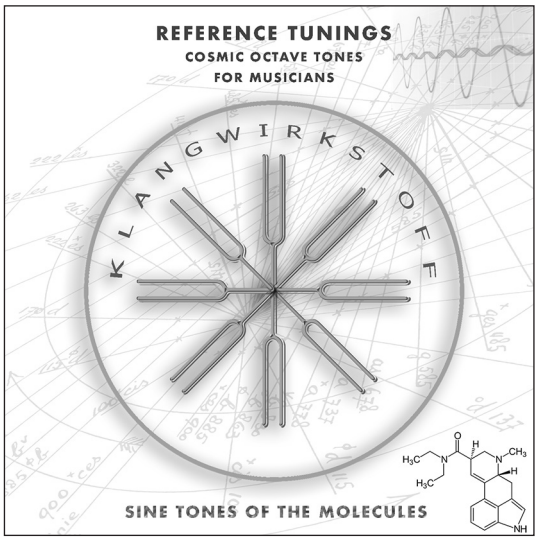
During the measurement, the display does not always remain stable on a cent value. For example, with a singing bowl, the display jumps back and forth, because depending on the attack, this or that of its numerous overtones becomes more prominent. After repeated measurements, an approximate average value can be recognized.

Audio Albums with Sine Tones of Planetary and Molecular Octave Frequencies

The Berlin-based music label Klangwirkstoff Records, which exclusively publishes cosmically tuned music, has released an album with sine tones in the octave analog frequencies of the earth, moon and planets, and another with the molecular octave frequencies of hydrogen, THC, CBD, LSD, MDMA and DMT. In addition to the octave frequency itself, the audio album includes the corresponding concert pitch A frequency. The sine tones are a way for musicians to tune their instruments to tones of the Cosmic Octave.

The albums are available for download in selectable quality on the Bandcamp website of Klangwirkstoff Records. Since MP3s can produce slight overtone shifts, downloading as WAV, AIFF, or FLAC files is recommended. The tuning data PDF provided here is included with both albums. The download is free of charge or for a self-determined fee.





https://www.klangwirkstoff.de

Sine Tones of the Planets

https://klangwirkstoff-records.bandcamp.com/album/reference-tunings-sine-tones-of-the-planets-kwdigi015

Sine Tones of Molecules

https://klangwirkstoff-records.bandcamp.com/album/reference-tunings-sine-tones-of-the-molecules-kwdigi016

The Cosmic Octave Information Pool

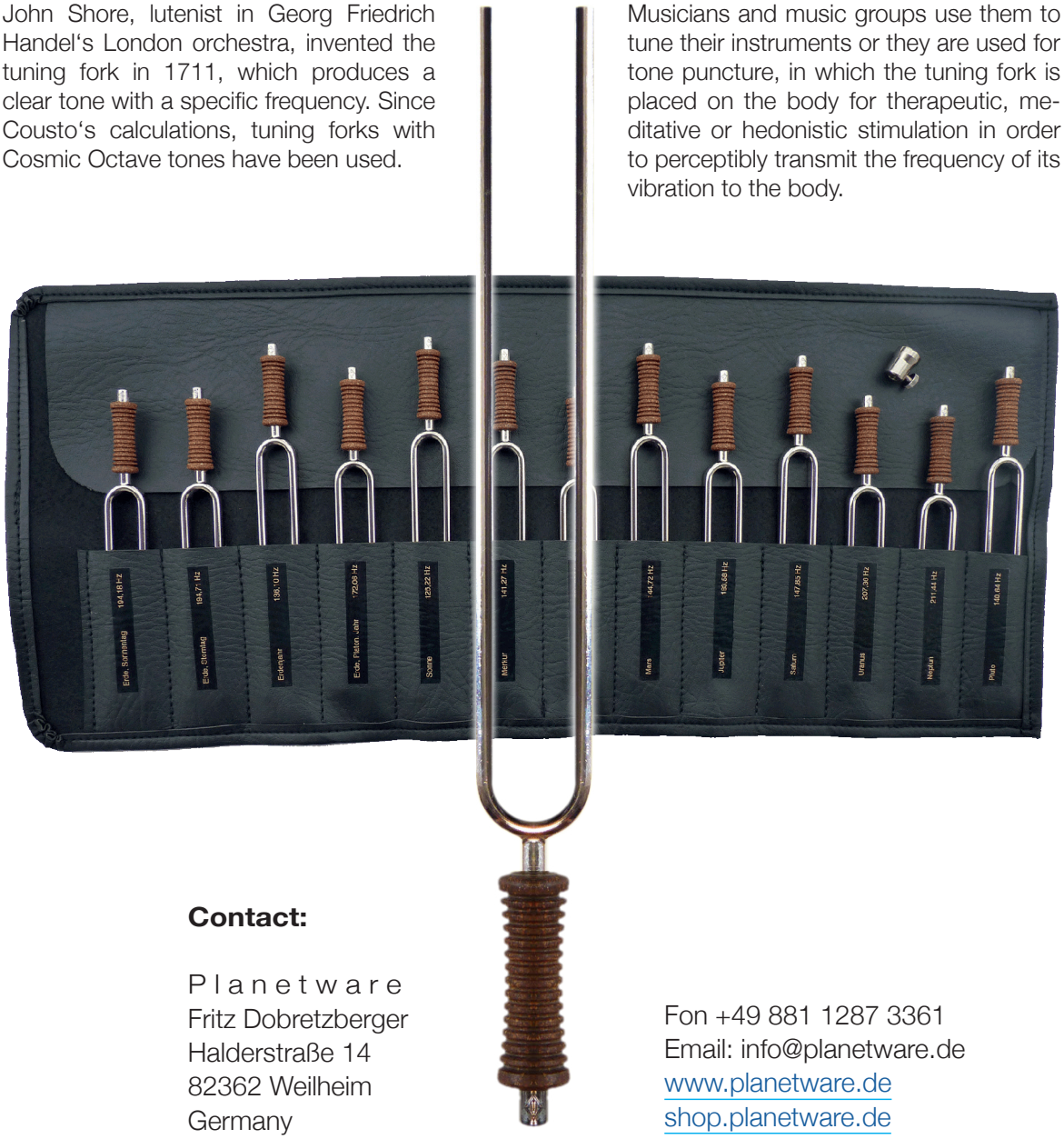
On October 2, 1978, in a shared apartment in Munich, the Swiss mathematician and music researcher Hans Cousto had the ingenious idea of applying the musical law of the octave beyond the auditory range to all harmonic oscillations and initially determined the octave frequencies of the earth, the moon, the planets and the sun from astronomical rhythms.

Fritz Dobretzberger, a member of this community, founded Planetware in 1990 as a Cosmic Octave information pool. In contact with Cousto, researchers, musicians, artists and other creative people, whose work is influenced by the topic of the Cosmic Octave, Planetware offers a lot of related information and instruments for practical use.

Tuning Forks with Planetary Tones

John Shore, lutenist in Georg Friedrich Handel‘s London orchestra, invented the tuning fork in 1711, which produces a clear tone with a specific frequency. Since Cousto‘s calculations, tuning forks with Cosmic Octave tones have been used.

Musicians and music groups use them to tune their instruments or they are used for tone puncture, in which the tuning fork is placed on the body for therapeutic, meditative or hedonistic stimulation in order to perceptibly transmit the frequency of its vibration to the body.



Contact:

Planetware
Fritz Dobretzberger
Halderstraße 14
82362 Weilheim
Germany

Fon +49 881 1287 3361
Email: info@planetware.de
www.planetware.de
shop.planetware.de