Piano key frequencies

This is a **virtual keyboard** showing the absolute frequencies in hertz (cycles per second) of the notes on a modern piano (typically containing 88 keys) in twelve-tone equal temperament, with the 49th key, the fifth A (called A4), tuned to 440 Hz (referred to as A440). Each successive pitch is derived by multiplying (ascending) or dividing (descending) the previous by the twelfth root of two (approximately 1.05946309435929...). For example, to get the frequency a semitone up from A4 (A♯4), multiply 440 by the twelfth root of two. To go from A4 to B4 (up a whole tone, or two semitones), multiply 440 twice by the twelfth root of two. For other tuning schemes refer to musical tuning.

This list of frequencies is for a theoretically ideal piano. On an actual piano the ratio between semitones is slightly larger, especially at the high and low ends, where string stiffness causes inharmonicity, i.e., the tendency for the harmonic makeup of each note to run sharp. To compensate for this, octaves are tuned slightly wide, stretched according to the inharmonic characteristics of each instrument. This deviation from equal temperament is called the Railsback curve.
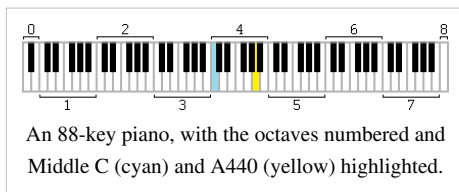
The following equation will give the frequency f of the nth key, as shown in the table:

$$f(n) = 440 \left(\sqrt[12]{2} \right)^{n-49}$$

Alternatively, this can be written as:

$$f(n) = 440 \times 2^{\frac{n-49}{12}}$$

Virtual keyboard

An 88-key piano, with the octaves numbered and Middle C (cyan) and A440 (yellow) highlighted.

Key number	Helmholtz name	Scientific name	Frequency (Hz)	Corresponding Open Strings				
				Violin	Viola	Cello	Bass	Guitar
88	c′′′′′ 5-line octave	C8 Eighth octave	4186.01					
87	b′′′′	B7	3951.07					
86	a♯′′′′/b♭′′′′	A♯7/B♭7	3729.31					
85	a′′′′	A7	3520.00					
84	g♯′′′′/a♭′′′′	G♯7/A♭7	3322.44					
83	g′′′′	G7	3135.96					
82	f♯′′′′/g♭′′′′	F♯7/G♭7	2959.96					
81	f′′′′	F7	2793.83					
80	e′′′′	E7	2637.02					
79	d♯′′′′/e♭′′′′	D♯7/E♭7	2489.02					
78	d′′′′	D7	2349.32					
77	c♯′′′′/d♭′′′′	C♯7/D♭7	2217.46					
76	c′′′′ 4-line octave	C7 Double high C	2093.00					

75	b'''	B6	1975.53					
74	a♯'''/b♭'''	A♯6/B♭6	1864.66					
73	a'''	A6	1760.00					
72	g♯'''/a♭'''	G♯6/A♭6	1661.22					
71	g'''	G6	1567.98					
70	f♯'''/g♭'''	F♯6/G♭6	1479.98					
69	f'''	F6	1396.91					
68	e'''	E6	1318.51					
67	d♯'''/e♭'''	D♯6/E♭6	1244.51					
66	d'''	D6	1174.66					
65	c♯'''/d♭'''	C♯6/D♭6	1108.73					
64	c''' 3-line octave	C6 Soprano C (High C)	1046.50					
63	b''	B5	987.767					
62	a♯''/b♭''	A♯5/B♭5	932.328					
61	a''	A5	880.000					
60	g♯''/a♭''	G♯5/A♭5	830.609					
59	g''	G5	783.991					
58	f♯''/g♭''	F♯5/G♭5	739.989					
57	f''	F5	698.456					
56	e''	E5	659.255	E				
55	d♯''/e♭''	D♯5/E♭5	622.254					
54	d''	D5	587.330					
53	c♯''/d♭''	C♯5/D♭5	554.365					
52	c'' 2-line octave	C5 Tenor C	523.251					
51	b'	B4	493.883					
50	a♯'/b♭'	A♯4/B♭4	466.164					
49	a'	A4 A440	440.000	A	A			
48	g♯'/a♭'	G♯4/A♭4	415.305					
47	g'	G4	391.995					
46	f♯'/g♭'	F♯4/G♭4	369.994					
45	f'	F4	349.228					
44	e'	E4	329.628					High E
43	d♯'/e♭'	D♯4/E♭4	311.127					
42	d'	D4	293.665	D	D			
41	c♯'/d♭'	C♯4/D♭4	277.183					
40	c' 1-line octave	C4 Middle C	261.626					
39	b	B3	246.942					B
38	a♯/b♭	A♯3/B♭3	233.082					
37	a	A3	220.000			A		

#	Helmholtz name	Scientific name	Frequency					
36	g♯/a♭	G♯3/A♭3	207.652					
35	g	G3	195.998	G	G			G
34	f♯/g♭	F♯3/G♭3	184.997					
33	f	F3	174.614					
32	e	E3	164.814					
31	d♯/e♭	D♯3/E♭3	155.563					
30	d	D3	146.832			D		D
29	c♯/d♭	C♯3/D♭3	138.591					
28	c small octave	C3 Low C	130.813		C			
27	B	B2	123.471					
26	A♯/B♭	A♯2/B♭2	116.541					
25	A	A2	110.000					A
24	G♯/A♭	G♯2/A♭2	103.826					
23	G	G2	97.9989			G	G	
22	F♯/G♭	F♯2/G♭2	92.4986					
21	F	F2	87.3071					
20	E	E2	82.4069					Low E
19	D♯/E♭	D♯2/E♭2	77.7817					
18	D	D2	73.4162				D	
17	C♯/D♭	C♯2/D♭2	69.2957					
16	C great octave	C2 Deep C	65.4064			C		
15	B͵	B1	61.7354					
14	A♯/B♭͵	A♯1/B♭1	58.2705					
13	A͵	A1	55.0000				A	
12	G♯/A♭͵	G♯1/A♭1	51.9131					
11	G͵	G1	48.9994					
10	F♯/G♭͵	F♯1/G♭1	46.2493					
9	F͵	F1	43.6535					
8	E͵	E1	41.2034				E	
7	D♯/E♭͵	D♯1/E♭1	38.8909					
6	D͵	D1	36.7081					
5	C♯/D♭͵	C♯1/D♭1	34.6478					
4	C͵ contra-octave	C1 Pedal C	32.7032					
3	B͵͵	B0	30.8677				B (5-string)	
2	A♯͵͵/B♭͵͵	A♯0/B♭0	29.1352					
1	A͵͵ sub-contra-octave	A0 Double Pedal A	27.5000					

External links

- interactive piano frequency table [1] — A php script allowing the reference pitch of A4 to be altered from 440 Hz.
- PySynth [2] — A simple Python-based software synthesizer that prints the key frequencies table and then creates a few demo songs based on that table.

References

[1] http://shakahara.com/pianopitch2.php

[2] http://home.arcor.de/mdoege/pysynth/

Article Sources and Contributors

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