



More About Hearing

Hearing senses sound frequencies.

Hearing-2

THE FREQUENCIES OF SOUND

The Hearing String identifies the sound frequencies (pitch) which a sophont can hear, and the sound frequencies of the sophont voice.

F Freq. The central frequency the ear can hear in Hertz (= cycles per second). F is a power of 2 (so, if $F=8$, $\text{Freq} = 2^8 = 256$). The difference between any two Freq values is an Octave.

S Span. The number of Octaves above and below Freq. If $S=1$, then the span of sound the sophont can hear is one octave above and below Freq.

V Voice. The central frequency of the voice in Hertz.

R Range. The number of Octaves above and below Voice.

THE FREQUENCIES OF SOUND

Flux	Code	Freq (Hz)	Formula	Description
-9	1	2	2^1	C d delta
-8	2	4	2^2	C th theta
-7	3	8	2^3	C a alpha
-6	4	16	2^4	C 0 beta
-5	5	32	2^5	C 1 gamma
-4	6	64	2^6	C 2 Low human audible.
-3	7	128	2^7	C 3
-2	8	256	2^8	C 4 Middle C
-1	9	512	2^9	C 5
0	A	1,000	2^{10}	C 6
+1	B	2,000	2^{11}	C 7
+2	C	4,000	2^{12}	C 8 High human audible.
+3	D	8,000	2^{13}	C 9
+4	E	16,000	2^{14}	C 10 Dog whistle
+5	F	32,000	2^{15}	C 11
+6	G	64,000	2^{16}	C 12
+7	H	128,000	2^{17}	C 13
+8	J	256,000	2^{18}	C 14
+9	K	512,288	2^{19}	C 15

Pitch is sound frequency (in Hertz; in cycles per second). Each increase in pitch is twice the frequency of the previous level and equals one octave.

Calculating What Sounds Can Be Heard

Human Hearing is H-16-9392.

Frequency = 9. Human hearing is centered on Frequency $= 9 = 2^9$ cycles per second = 512 hertz. This corresponds to C5 on the Musical Pitch Chart.

Span = 3. Human hearing extends 3 octaves above and below the central Frequency. A human can hear sounds from $2^6 (= 64)$ Hz to $2^{12} (= 4000)$ Hz.

Voice = 9. The human voice is centered on Voice $= 9 = 2^9$ cycles per second = 512 hertz. This corresponds to C5 on the Musical Pitch Chart (the Human male voice is one octave lower).

Range = 2. The human voice extends 2 octaves above and below the central Voice frequency. A human can make sounds from $2^7 (= 128)$ Hz to $2^{11} (= 2000)$ Hz. The Human Male is about one octave lower.

SPECIAL SOUNDS

Some frequencies of sound have additional effects outside of the sense of hearing (they have no effect on sophonts who hear the Frequency naturally).

F=1. Delta Waves. Induces or promotes sleep. After 5 minutes of exposure, Check C3: Failure = Character falls asleep for 1D minutes the first time; 1D hours the second time.

F=2. Theta Waves. Induces hypnotic or trance suggestive states. After 5 minutes, a Personal against the subject may include Mod = Good Flux.

F3. Apha Waves. Induces relaxation states. After 5 minutes, the subject is Sleepy.

F=4. Beta Waves. Induces alertness. After 1 minute of exposure, subject is Ordinary for 1 hour, followed by a return to previous attention level.

Many alarms include output at $F=4$ (overuse checks San).

F=5. Gamma Waves. Induces heightened productivity. After 5 minutes, subject is Optimal for 1 hour, followed by a return to previous attention level.

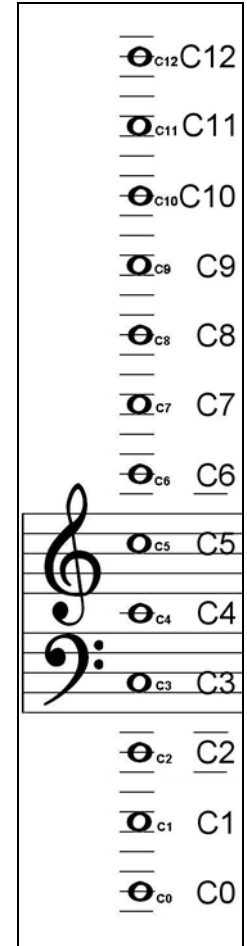
TECHNOLOGICAL HEARING

Many devices input, process, and output sound. A Hearing Device is identified with a Hearing String and may include an enhanced Hearing Constant, a Rang Mod, and alternate sound input and output.

Player-8 H-16-0093 is a TL-8 sound entertainer reproduces sound in the human hearing range.

Comm-9 H-16-9090 R=5 inputs and outputs sound (with a tinny quality) and communicates with similar communicators to Range=5.

MUSICAL PITCH



Musical Pitch. Pitch is most understandable in a musical format. The pitch levels shown correspond to musical C (Middle C = 256 Hertz). The typical human male voice centers on C4 or Middle C; the typical human female voice centers on C5.

