New 2nd Edition

CHARTS 2

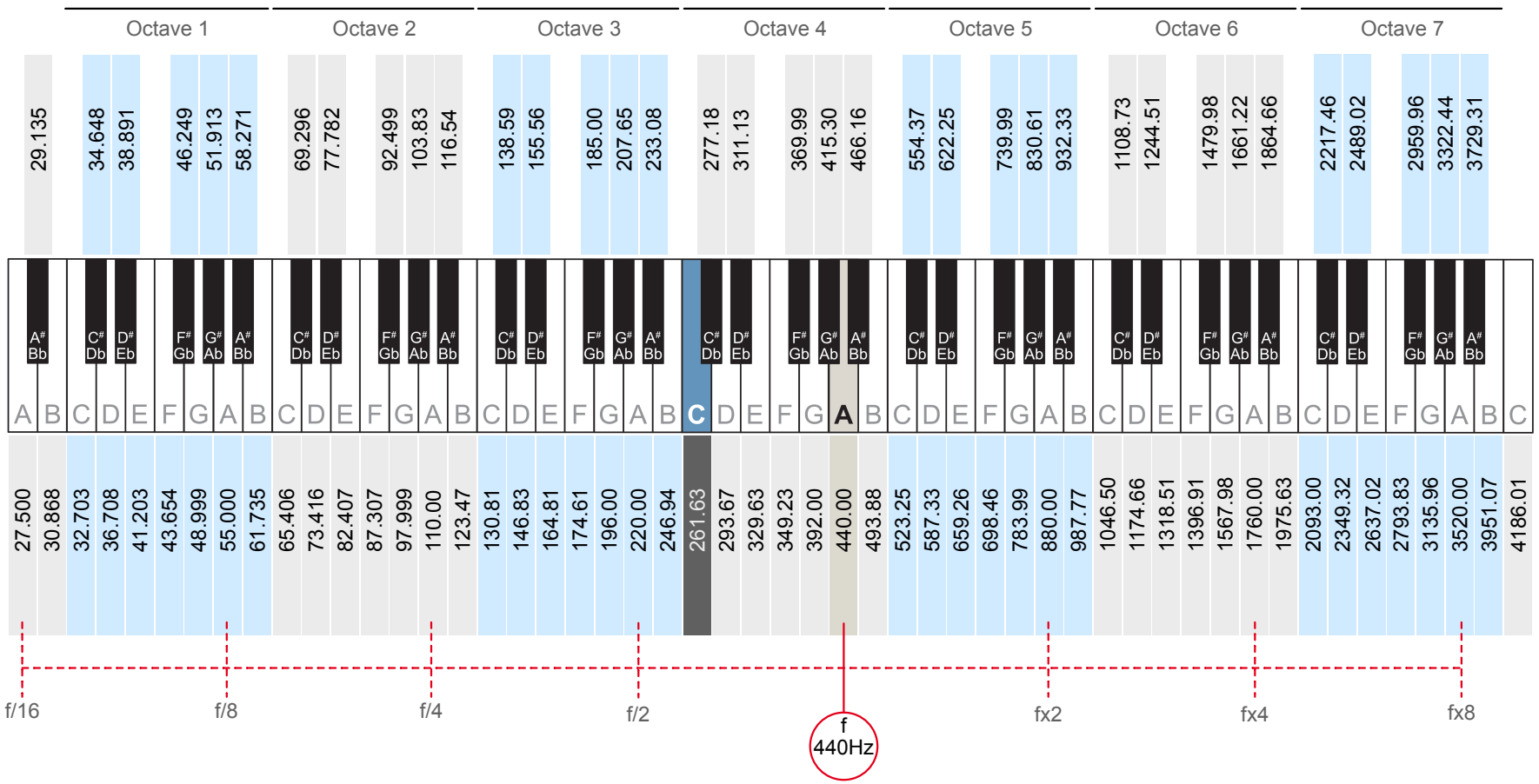
A collection of music and audio production charts, references, cheat sheets, templates and the occasional fun stuff.

FREE

SYNTHDAWG
PRODUCER GUIDES

www.synthdawg.com

		Title
Blank page of course.....		Info
Charts	Page	2



Fundamental Frequencies in Hz.

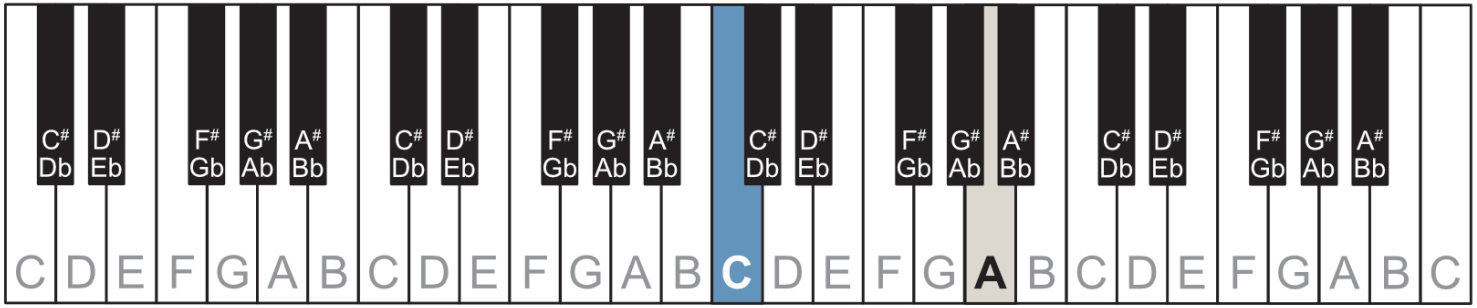
Fundamental in musical terms is the Note pitch set by the lowest partial in the waveform

Middle C

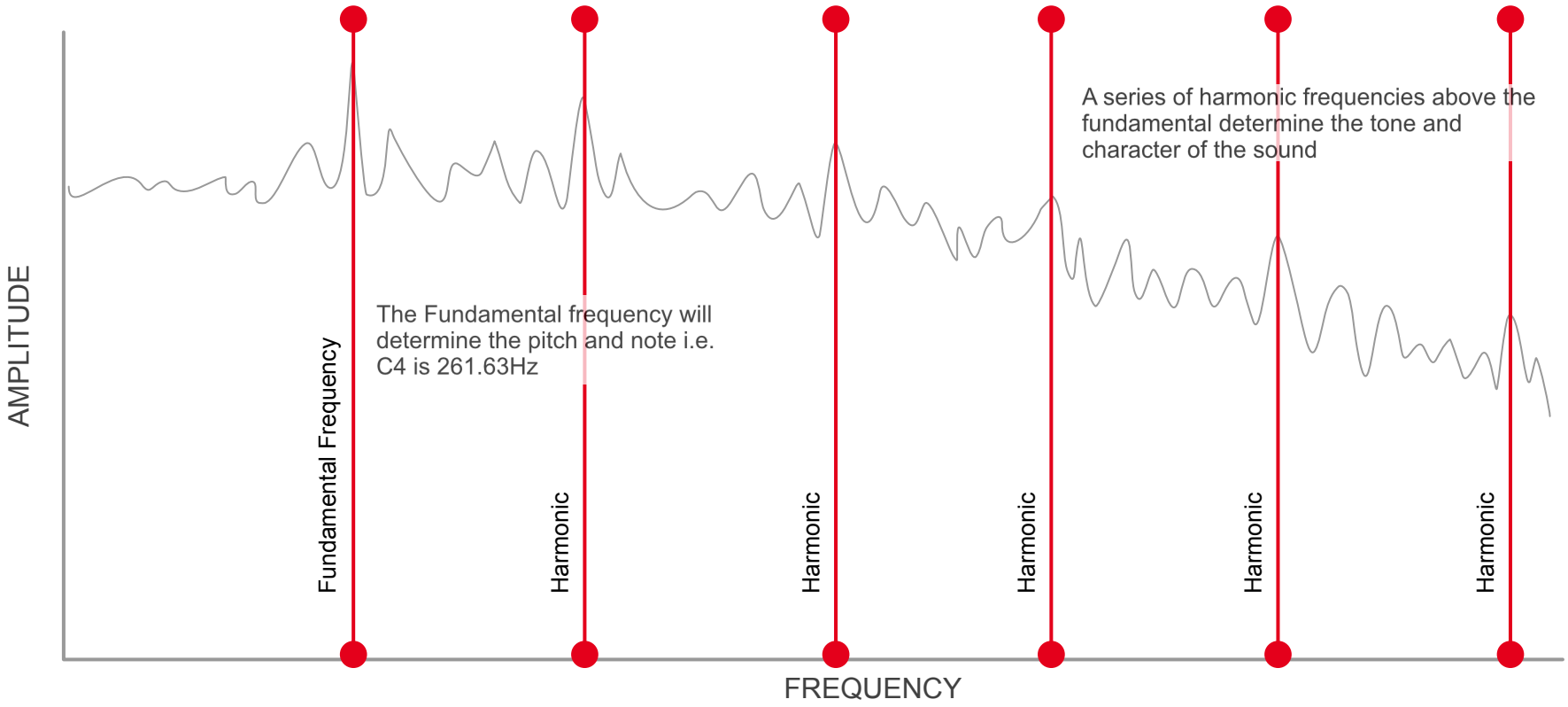
Middle C or C4 at 261.625565Hz is the nearest C to the middle of a piano keyboard

A440

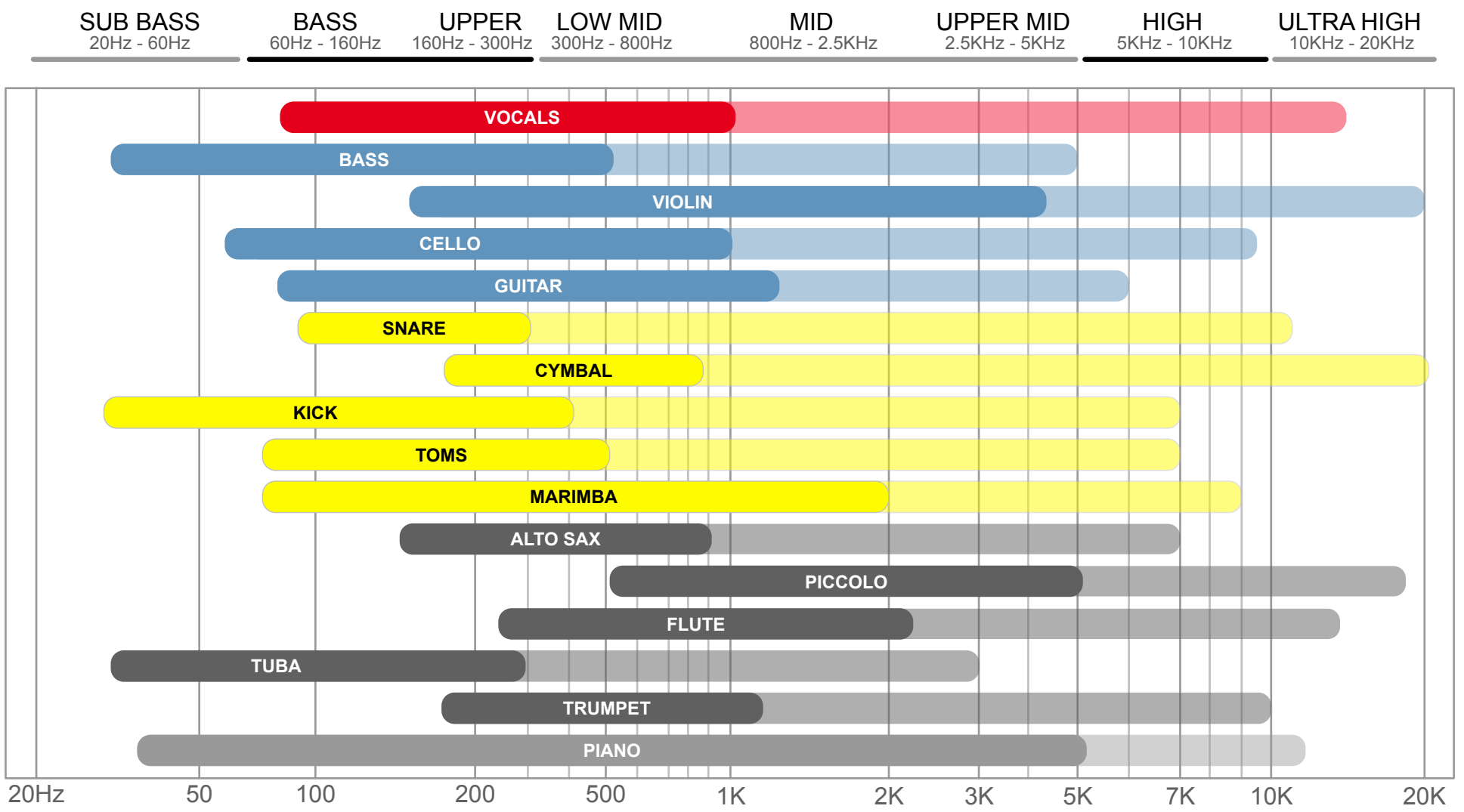
The standard tuning reference on a piano. This is 440Hz, the first A note above middle c. Sometimes called the Stuttgart Pitch



Title	49 KEYBOARD		
Info	49 Key Keyboard Layout		
Page	5	Charts	



Different waveforms have different harmonic characteristics. Pure sine wave - Only contains a fundamental frequency with no harmonics while noise carries full harmonic energy. Square waves have only odd harmonics



Fundemental Freq's | Harmonic Freq's

Title	GENERAL FREQUENCIES	
Info	Overview of Instrument frequency ranges	
Page	7	Charts

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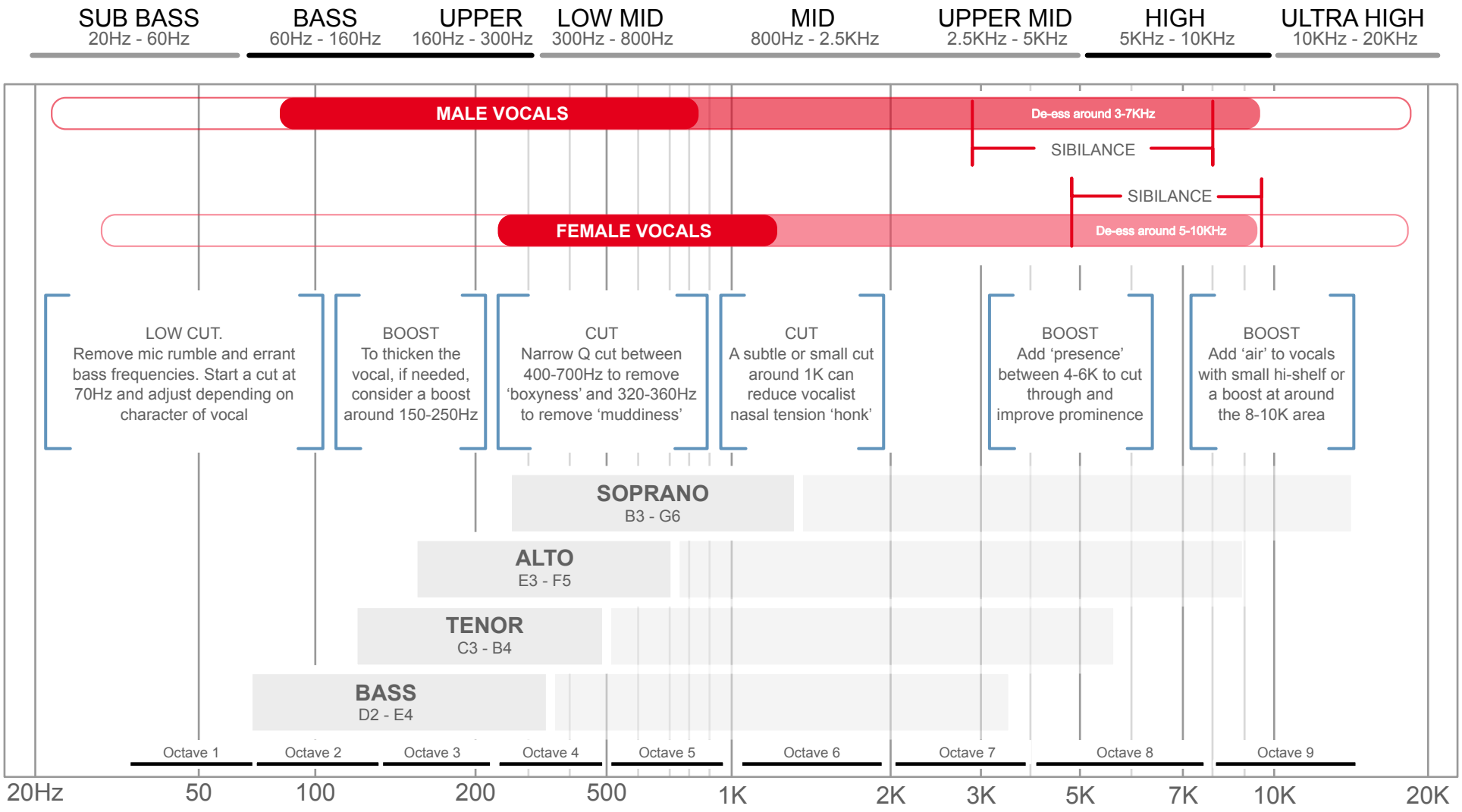

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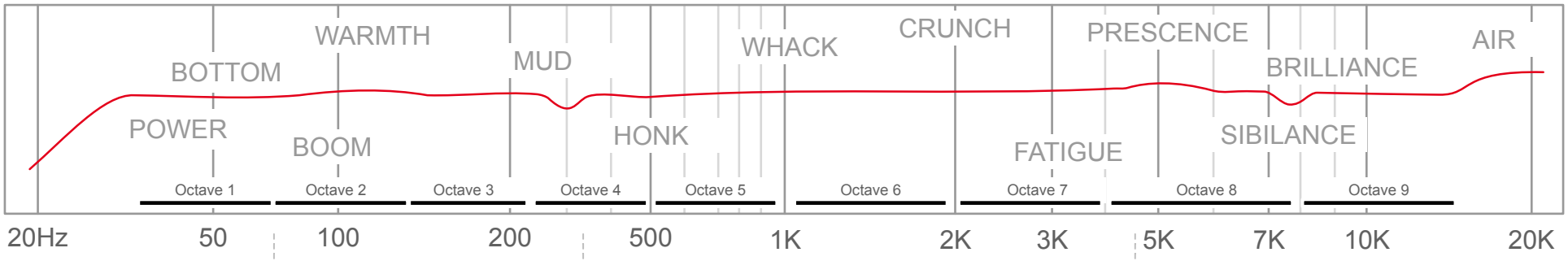
VOCAL FREQUENCIES	Title
Vocal frequency characteristics	Info
Charts	Page 8

SUB BASS	BASS	UPPER	LOW MID	MID	UPPER MID	HIGH	ULTRA HIGH
20Hz - 60Hz	60Hz - 160Hz	160Hz - 300Hz	300Hz - 800Hz	800Hz - 2.5KHz	2.5KHz - 5KHz	5KHz - 10KHz	10KHz - 20KHz



SUB BASS
High levels of energy, often a low cut removes some 'unheard' energy and helps create headroom.Typically frequencies would be cut in this area to create clarity. Emphasis for Sub Bass, Bass and Kick Drums

BASS
Typically an area which contains melodic and rhythmic elements. The mix can be changed to be fat or thin by adjustments around this area. Muddyness occurs around 300Hz so a small cut can help clarity of the mix. The mix can be warmed up around 120Hz.

MIDS
Low Mids can be overloaded with frequencies as many instruments cover this range and muddyness is a common outcome. Honkyness can creep in around 500-1K and tinnyness 1-2K. Cuts can help. Vocal frequencies appear in the high mid range around normal words. 3K boost on vocals can help push through the mix. Ensure the balance between instruments and vocals is correct.

HIGH
Sibilance occurs between 5-10K and letters such as S, T can stand out. De-essing can help. Typically a high shelf can add air and presence to the mix around 6K+. EQ'ing around 4-6K will affect the definition and bring the sound closer or push them further back.

Golden Rule of EQ Mixing. Cut first and boost second. Cuts are used to correct, improve and manage the mix definition and help correct problems. Boosting would normally change the overall sound. The general arrangement should have the balance correct.

Title	EQ FREQUENCIES	
Info	Overview of important EQ areas.	
Page	9	Charts

SONG NUMBER	SONG TITLE	STUDIO
	ARTIST	ENGINEER
ALBUM NAME		DATE

Bit Depth ☐ 16 Bit ☐ 24 Bit Sample Rate ☐ 44.1K ☐ 48K ☐ 96K Tempo _____ BPM Track Time _____

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24

Comments

 S

2 x Subs
Mark 1 Square

 C C

3 x Cruisers
Mark 2 Squares

 B B B

4 x Battleships
Mark 3 Squares

 A A A A

1 x Aircraft Carrier
Mark 4 Squares

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

Rules

Fill In squares with the letters representing the 10 ships based on the size for each as stated.

Mark horizontal or vertical cells

Each participant holds their own chart and takes it in turns to target the oponents ships by calling a Column and Row i.e. C9

Winner is whoever destroys the opponents ships first.

Why would we need a Battleship game in a music chart guide?
We all know that studio engineers get loads of downtime, right !!!

Title	BATTLESHIPS	
Info	Fun & Games	
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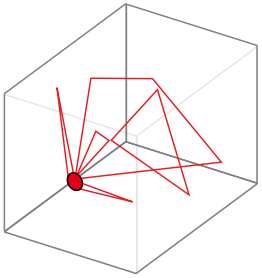
REVERB		Title
My 1980's Bedroom		Info
Charts	Page 12	

Why a design of an 80's indie, electronic, punk loving lads room? Well, 1, it looks cool. 2, reverberation is created from sound ricocheting and bouncing around a room, sound is absorbed in the furniture and some reflects from hard surfaces. Room size and shape are of course factors too. The combined original, delayed and echoed sound produced is called the reverberation and can be simulated in modern audio production.

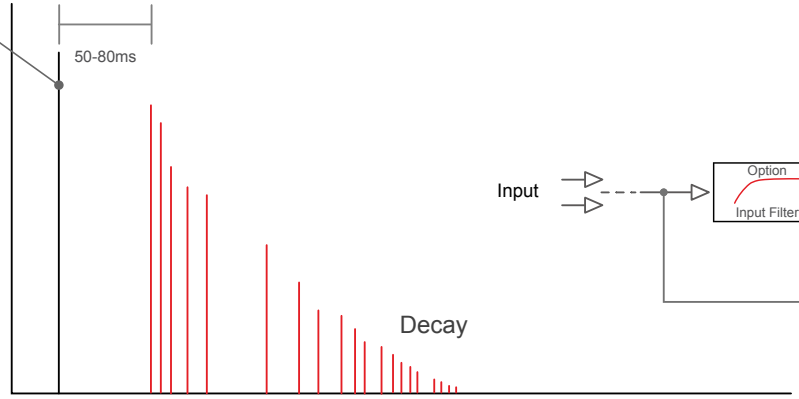


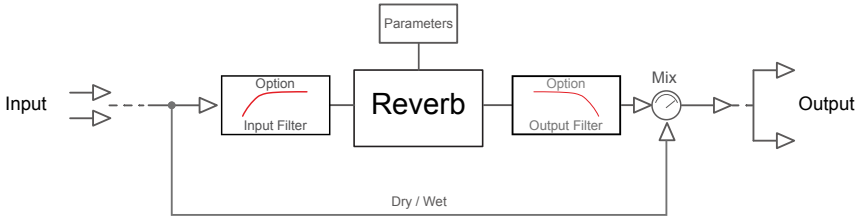
Traditionally Reverb was simulated using devices such as physical springs and metal plates. Modern software reverbs can have filtering, feedback, dry / wet control and more built in. Convolution reverb even uses real recordings of space characteristics to be applied in software to simulate a real room and environment.

Initial Original Signal

The original and initial signal emitted which will be heard. This will also ricochet, bounce and be absorbed by the walls and contents of the room

Room Size: The size of the room to emulate is a typical parameter / setting. Often this can also be in the form of the algorithm description for example Hall, Small Room, Cathederal etc.





Early Reflections

It takes time to hear the sound once emitted. Depending on the listener and position from the emitter. Psychologically you will develop a sense of room size from the early reflections. In Audio production 80-100ms is a typical range of delay.

Pre-delay: Time, usually in mS from the initial sound to the first early reflections.

Diffusion: Distance between each of the early reflections waves. Closer together thickens the sound.

Subsequent Reflections

As the sound reflects and is absorbed then more reflections will occur. Given the amount of waves and short time period these echos give the sense of space and confinement or emptiness

Damping: Represents a softer environment and more sound absorption.

Reverb Tail

The reflections will dissipate over time and reduce in level. The room size will also determine the length of the tail. This is an area in audio product that needs careful attention as this can muddy a mix or tails can be cut accidentally and not give the full realistic effect.

Decay Time: This is the time in seconds for the sound to fully dissipate.

Title	REVERB	
Info	Reverb Overview & Typical Parameters	
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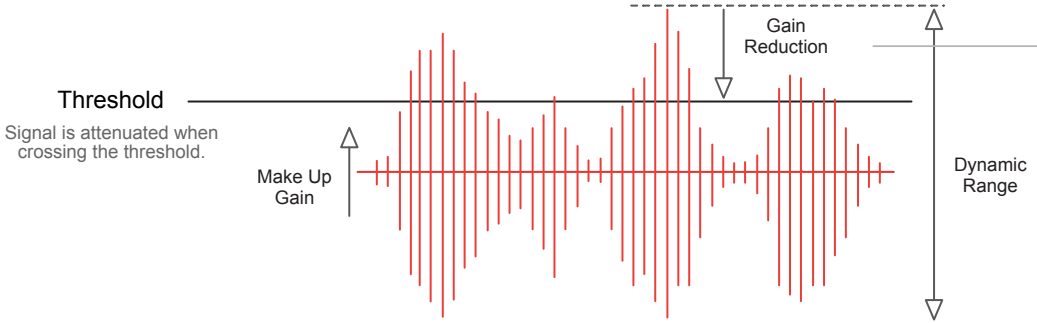
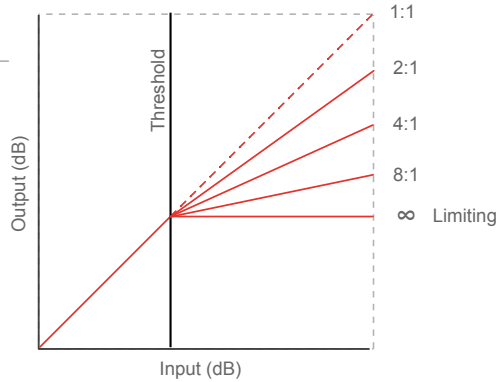
Think of a compressor like an automatic volume control. It can be used as a mixing and mastering tool to level or control audio dynamics and also as a creative effect for example to give a pumping rhythm when used with a sidechain trigger.



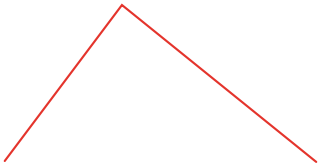
Audio over Time



MAKE UP GAIN: Allows the level to be increased to compensate for the gain reduction in the compressor. This is typically set back to the same level as the gain reduction but the overall average will now be perceived louder as the peaks have been reduced giving more headroom.

Sidechain compression uses a separate / external input to trigger the compressor. This can be used for example to 'duck' - dip the level, of a bass track by using a kick drum as the sidechain source. This can provide a pumping effect or simply be a tool to create harmonic space in a mix to site various instruments together.

Some compressors have an envelope to control the speed at which the compression kicks in and out. This is more likely to be a AR envelope



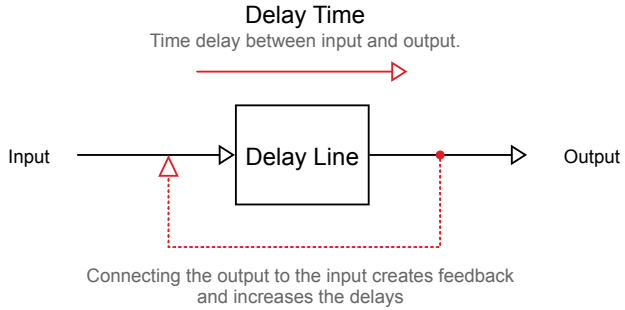
Gain reduction will be based on the RATIO setting and the amount of level that exceeds the THRESHOLD.

Gain Reduction is made using a Ratio. Ratio attenuates signal above threshold by an amount based on the ratio setting.

2:1 ratio (gentle) attenuates the signal to 1dB above the threshold for 2dB that exceeds the threshold. With a 4:1 ratio (medium) , if the signal exceeds by 8dB then reduction will be down to 2dB above threshold. 20:1 ratio (strong) would be considered limiting

A Soft or Hard Knee can govern how aggressive the compression affects the audio at the point of the threshold.

A delay is a common production effect used to delay an incoming signal to the output. While this is a simple principle there are many effects that use delay as a foundation. Some examples are echo (creating defined repeats) and chorus (short delay taps to give a thicker rather than echo style feel) as well as delay types such as ping-pong delay spreading the delay points across the stereo field left to right and slap-back delay emulating old tape delays which are used successfully to thicken vocals.



Slap-back Delay Technique:
To thicken vocals or on a lead guitar.

1. Create a second vocal or guitar track
2. Set a delay with short delay time on the right channel (say 100ms).
3. Set a slightly different delay on the left (say 130ms) to that of the right channel. Don't use increments of each other i.e. 64ms and 128ms as this isn't a slap-back and will be on the beat.
4. Use a high level of wet mix.
5. Try a high pass and low pass filter to create the right tone on the delayed signal.
6. Use the delay track as a secondary track to the main dry vocal.
7. Iterate and experiment with delay times and mix accordingly.

Being a time based effect the delay time should be synchronised with the track. Some delays will allow this to be automatically synchronised with the tempo. Manual delay times however can be set up to align to the feel and sound desired.

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
60	4000	3000	2000	1500	1333	1000	750	666	500	333	250	166
61	3934	2951	1967	1475	1311	984	738	655	492	328	246	163
62	3871	2903	1935	1452	1290	968	726	645	484	322	242	161
63	3810	2857	1905	1429	1270	952	714	634	476	317	238	158
64	3750	2813	1875	1406	1250	938	703	624	469	312	234	156
65	3692	2769	1846	1385	1230	923	692	615	462	307	231	153
66	3636	2727	1818	1364	1212	909	682	605	455	303	227	151
67	3582	2687	1791	1343	1194	896	672	596	448	298	224	149
68	3529	2647	1765	1324	1176	882	662	588	441	294	221	146
69	3478	2609	1739	1304	1159	870	652	579	435	290	217	144
70	3429	2571	1714	1286	1143	857	643	571	429	285	214	142
71	3380	2535	1690	1268	1126	845	634	563	423	281	211	140
72	3333	2500	1667	1250	1111	833	625	555	417	278	208	138
73	3288	2466	1644	1233	1096	822	616	547	411	274	205	136
74	3243	2432	1622	1216	1081	811	608	540	405	270	203	135
75	3200	2400	1600	1200	1066	800	600	533	400	266	200	133
76	3158	2368	1579	1184	1052	789	592	526	395	263	197	131
77	3117	2338	1558	1169	1039	779	584	519	390	259	195	129
78	3077	2308	1538	1154	1025	769	577	512	385	256	192	128
79	3038	2278	1519	1139	1012	759	570	506	380	253	190	126
80	3000	2250	1500	1125	1000	750	563	500	375	250	188	125

Delay times shown in milliseconds

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
80	3000	2250	1500	1125	1000	750	563	500	375	250	188	125
81	2963	2222	1481	1111	987	741	556	493	370	247	185	123
82	2927	2195	1463	1098	975	732	549	487	366	244	183	121
83	2892	2169	1446	1084	964	723	542	481	361	241	181	120
84	2857	2143	1429	1071	952	714	536	476	357	238	179	119
85	2824	2118	1412	1059	941	706	529	470	353	235	176	117
86	2791	2093	1395	1047	930	698	523	465	349	232	174	116
87	2759	2069	1379	1034	919	690	517	459	345	230	172	114
88	2727	2045	1364	1023	909	682	511	454	341	227	170	113
89	2697	2022	1348	1011	899	674	506	449	337	224	169	112
90	2667	2000	1333	1000	889	667	500	444	333	222	167	111
91	2637	1978	1319	989	879	659	495	439	330	220	165	109
92	2609	1957	1304	978	869	652	489	434	326	217	163	108
93	2581	1935	1290	968	860	645	484	430	323	215	161	107
94	2553	1915	1277	957	851	638	479	425	319	213	160	106
95	2526	1895	1263	947	842	632	474	421	316	210	158	105
96	2500	1875	1250	938	833	625	469	416	313	208	156	104
97	2474	1856	1237	928	825	619	464	412	309	206	155	103
98	2449	1837	1224	918	816	612	459	408	306	204	153	102
99	2424	1818	1212	909	808	606	455	404	303	202	152	101
100	2400	1800	1200	900	800	600	450	400	300	200	150	100

Delay times shown in milliseconds

Title	DELAY TIMES 80-100	
Info	Delay times used to sync to tempo BPM	
Page	17	Charts

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
100	2400	1800	1200	900	800	600	450	400	300	200	150	100
101	2376	1782	1188	891	792	594	446	396	297	198	149	99
102	2353	1765	1176	882	784	588	441	392	294	196	147	98
103	2330	1748	1165	874	777	583	437	388	291	194	146	97
104	2308	1731	1154	865	769	577	433	384	288	192	144	96
105	2286	1714	1143	857	762	571	429	381	286	190	143	95
106	2264	1698	1132	849	755	566	425	377	283	188	142	94
107	2243	1682	1121	841	747	561	421	373	280	187	140	93
108	2222	1667	1111	833	741	556	417	370	278	185	139	92
109	2202	1651	1101	826	734	550	413	367	275	183	138	91
110	2182	1636	1091	818	727	545	409	363	273	182	136	91
111	2162	1622	1081	811	721	541	405	360	270	180	135	90
112	2143	1607	1071	804	714	536	402	357	268	178	134	89
113	2124	1593	1062	796	708	531	398	354	265	177	133	88
114	2105	1579	1053	789	702	526	395	351	263	175	132	87
115	2087	1565	1043	783	695	522	391	347	261	174	130	87
116	2069	1552	1034	776	689	517	388	344	259	172	129	86
117	2051	1538	1026	769	684	513	385	342	256	171	128	85
118	2034	1525	1017	763	678	508	381	339	254	169	127	84
119	2017	1513	1008	756	672	504	378	336	252	168	126	84
120	2000	1500	1000	750	667	500	375	333	250	167	125	83

Delay times shown in milliseconds

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
120	2000	1500	1000	750	667	500	375	333	250	167	125	83
121	1983	1488	992	744	661	496	372	330	248	165	124	82
122	1967	1475	984	738	656	492	369	328	246	164	123	82
123	1951	1463	976	732	650	488	366	325	244	162	122	81
124	1935	1452	968	726	645	484	363	322	242	161	121	80
125	1920	1440	960	720	640	480	360	320	240	160	120	80
126	1905	1429	952	714	635	476	357	317	238	159	119	79
127	1890	1417	945	709	630	472	354	315	236	157	118	78
128	1875	1406	938	703	625	469	352	312	234	156	117	78
129	1860	1395	930	698	620	465	349	310	233	155	116	77
130	1846	1385	923	692	615	462	346	307	231	154	115	77
131	1832	1374	916	687	611	458	344	305	229	153	115	76
132	1818	1364	909	682	606	455	341	303	227	151	114	75
133	1805	1353	902	677	601	451	338	300	226	150	113	75
134	1791	1343	896	672	597	448	336	298	224	149	112	74
135	1778	1333	889	667	592	444	333	296	222	148	111	74
136	1765	1324	882	662	588	441	331	294	221	147	110	73
137	1752	1314	876	657	584	438	328	292	219	146	109	73
138	1739	1304	870	652	580	435	326	290	217	145	109	72
139	1727	1295	863	647	575	432	324	287	216	144	108	72
140	1714	1286	857	643	571	429	321	285	214	143	107	71

Delay times shown in milliseconds

Title	DELAY TIMES 120-140	
Info	Delay times used to sync to tempo BPM	
Page	19	Charts

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
140	1714	1286	857	643	571	429	321	285	214	143	107	71
141	1702	1277	851	638	567	426	319	283	213	142	106	71
142	1690	1268	845	634	563	423	317	281	211	141	106	70
143	1678	1259	839	629	559	420	315	279	210	140	105	70
144	1667	1250	833	625	555	417	313	278	208	139	104	69
145	1655	1241	828	621	552	414	310	276	207	138	103	69
146	1644	1233	822	616	548	411	308	274	205	137	103	68
147	1633	1224	816	612	544	408	306	272	204	136	102	68
148	1622	1216	811	608	540	405	304	270	203	135	101	67
149	1611	1208	805	604	537	403	302	268	201	134	101	67
150	1600	1200	800	600	533	400	300	266	200	133	100	66
151	1589	1192	795	596	530	397	298	265	199	132	99	66
152	1579	1184	789	592	526	395	296	263	197	131	99	66
153	1569	1176	784	588	523	392	294	261	196	131	98	65
154	1558	1169	779	584	519	390	292	259	195	130	97	65
155	1548	1161	774	581	516	387	290	258	194	129	97	64
156	1538	1154	769	577	513	385	288	256	192	128	96	64
157	1529	1146	764	573	509	382	287	255	191	127	96	63
158	1519	1139	759	570	506	380	285	253	190	126	95	63
159	1509	1132	755	566	503	377	283	251	189	126	94	63
160	1500	1125	750	563	500	375	281	250	188	125	94	62

Delay times shown in milliseconds

BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
160	1500	1125	750	563	500	375	281	250	188	125	94	62
161	1491	1118	745	559	497	373	280	248	186	124	93	62
162	1481	1111	741	556	494	370	278	247	185	123	93	61
163	1472	1104	736	552	491	368	276	245	184	123	92	61
164	1463	1098	732	549	488	366	274	244	183	122	91	61
165	1455	1091	727	545	485	364	273	242	182	121	91	60
166	1446	1084	723	542	482	361	271	241	181	120	90	60
167	1437	1078	719	539	479	359	269	239	180	120	90	60
168	1429	1071	714	536	476	357	268	238	179	119	89	59
169	1420	1065	710	533	473	355	266	236	178	118	89	59
170	1412	1059	706	529	470	353	265	235	176	118	88	59
171	1404	1053	702	526	468	351	263	234	175	117	88	58
172	1395	1047	698	523	465	349	262	232	174	116	87	58
173	1387	1040	694	520	462	347	260	231	173	115	87	58
174	1379	1034	690	517	460	345	259	230	172	115	86	57
175	1371	1029	686	514	457	343	257	228	171	114	86	57
176	1364	1023	682	511	454	341	256	227	170	114	85	57
177	1356	1017	678	508	452	339	254	226	169	113	85	56
178	1348	1011	674	506	449	337	253	224	169	112	84	56
179	1341	1006	670	503	447	335	251	223	168	112	84	56
180	1333	1000	667	500	444	333	250	222	167	111	83	55

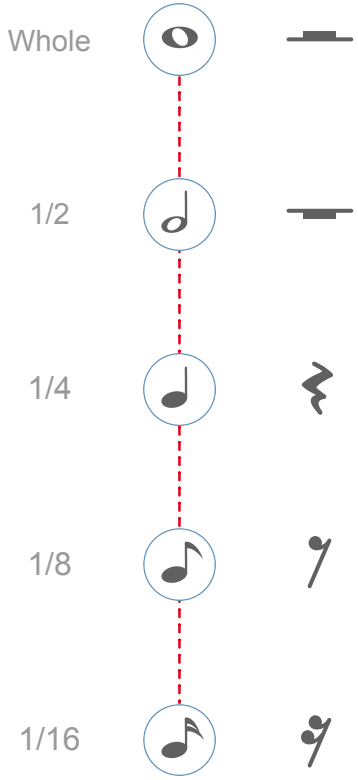
Delay times shown in milliseconds

Title	DELAY TIMES 160-180	
Info	Delay times used to sync to tempo BPM	
Page	21	Charts

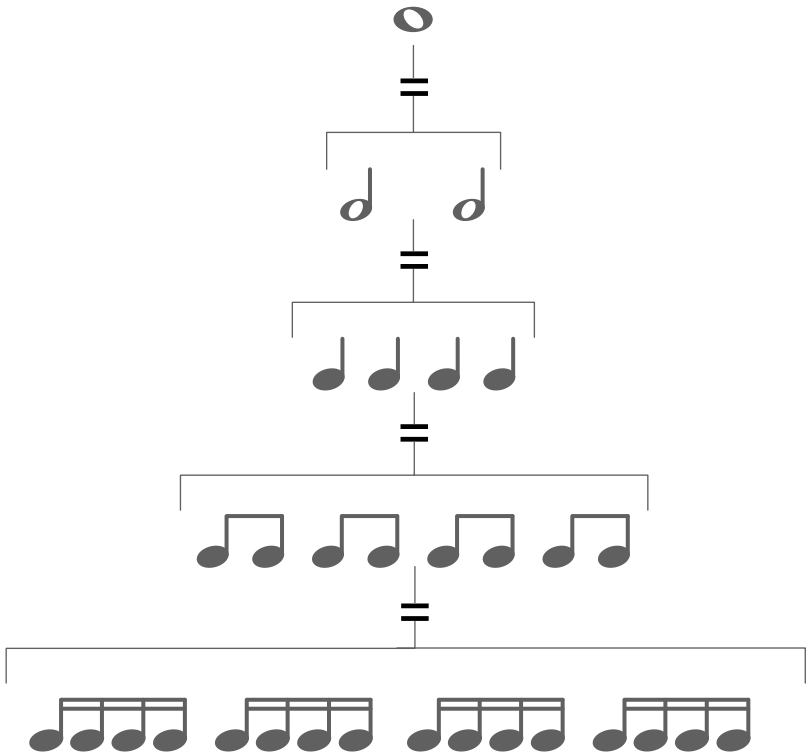
BPM	Whole	½ Dotted	1/2	¼ Dotted	½ Triplet	1/4	⅛ Dotted	¼ Triplet	1/8	⅛ Triplet	1/16	1/16
180	1333	1000	667	500	444	333	250	222	167	111	83	55
181	1326	994	663	497	442	331	249	221	166	110	83	55
182	1319	989	659	495	439	330	247	220	165	110	82	55
183	1311	984	656	492	437	328	246	218	164	109	82	54
184	1304	978	652	489	435	326	245	217	163	109	82	54
185	1297	973	649	486	432	324	243	216	162	108	81	54
186	1290	968	645	484	430	323	242	215	161	107	81	54
187	1283	963	642	481	428	321	241	214	160	107	80	53
188	1277	957	638	479	425	319	239	213	160	106	80	53
189	1270	952	635	476	423	317	238	211	159	106	79	53
190	1263	947	632	474	421	316	237	210	158	105	79	52
191	1257	942	628	471	419	314	236	209	157	105	79	52
192	1250	938	625	469	417	313	234	208	156	104	78	52
193	1244	933	622	466	414	311	233	207	155	104	78	52
194	1237	928	619	464	412	309	232	206	155	103	77	51
195	1231	923	615	462	410	308	231	205	154	102	77	51
196	1224	918	612	459	408	306	230	204	153	102	77	51
197	1218	914	609	457	406	305	228	203	152	101	76	51
198	1212	909	606	455	404	303	227	202	152	101	76	50
199	1206	905	603	452	402	302	226	201	151	100	75	50
200	1200	900	600	450	400	300	225	200	150	100	75	50

Delay times shown in milliseconds

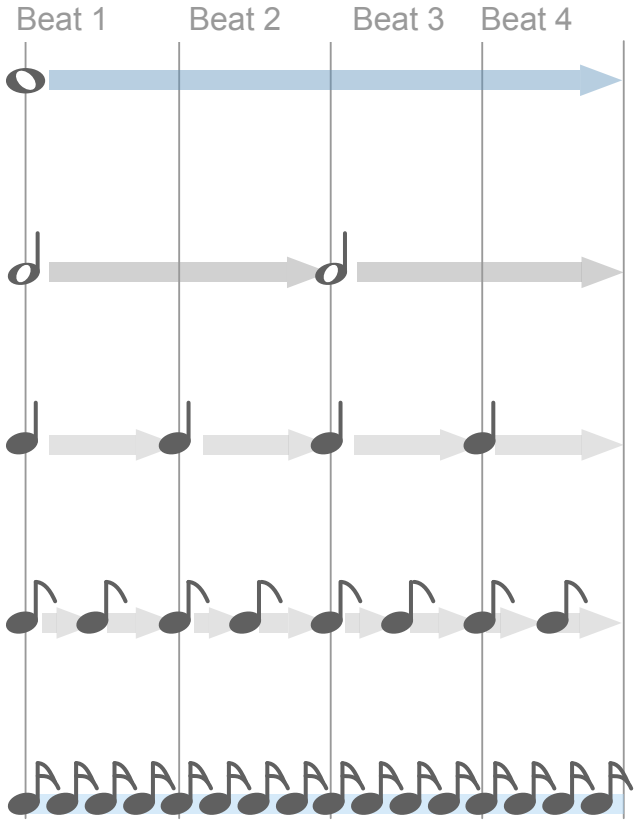
NOTE & REST VALUES



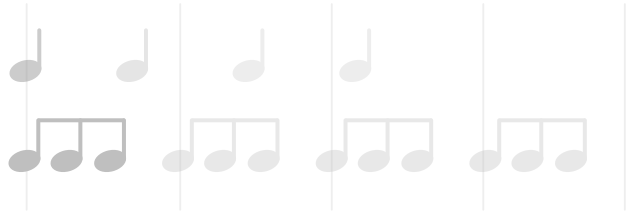
NOTE DURATIONS



DURATION OVER 1 BAR

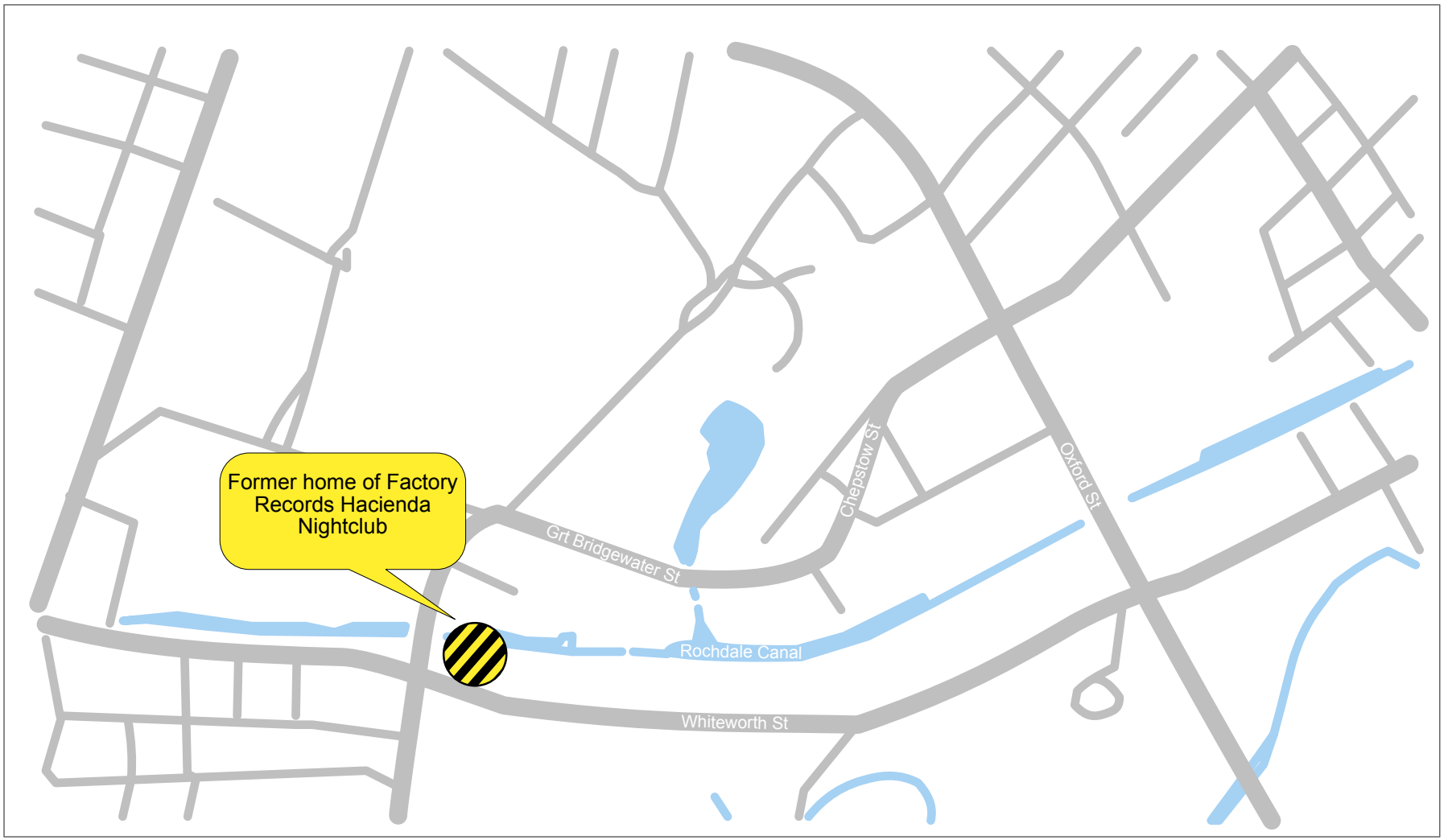


Dotted Note Value: Indicated by a dot after the note increases its duration by 50% of its original duration. An eight would be



Triplets: Triplets play 3 notes across the duration of the original value. So an eighth note triplet will play 3 notes across its normal 2 note duration.

Title	NOTE DURATION	
Info	Overview of Note Theory	
Page	23	Charts



www.synthdawg.com	MANCHESTER, UK	Title
	First Street	Info
	Charts	Page 24

Q. What does a map of Manchester's First St Area have to do with Musical charts?

A. Nothing. But its good to see where the Hacienda used to be! Its now apartments by the way.

ADDITIVE SYNTHESIS: A synthesizer which develops sounds by adding and manipulating sine waves.

ADSR: Attack, Decay, Sustain, Release describe the 4 elements of an envelope.

AMP: Amplification circuit. Controls the volume level, amplitude of the sound. Also sometimes VCA - Voltage controlled Amplifiers are seen in analogue synths.

ANALOGUE: The older classic synths were developed using electronic components and driven by voltage settings. These gave the synth a unique sound and character through the natural variation of components.

ARPEGGIATOR: A function which automates a sequence of notes played in an arpeggio style. Typically this could include a series of notes from a chord in an up / down/ up-down / random format.

CLOCK: An internal feature or external device which governs or manages the timing of the synth functions and synchronises with externally connected devices.

CV: Control Voltage is a technology which allows synths to communicate control signals, typically pitch and an associated GATE controls note on/off. Standards are either Volts/Octave as used in Moog and Roland synths and Hertz/Volt used by manufactures such as Korg and Yamaha.

DIGITAL: In modern electronics synths can be digitally driven meaning software algorithms control sound and parameters. This can emulate Analogue characteristics or create unique digital sounds.

ENVELOPE: A control function which affects a parameter or sound over a period of time. For example to create a fade in

FM SYNTHESIS: Frequency Modulation synthesizers operate by modulating a waveform (carrier) by another frequency wave (modulator)

FILTER: A device that controls the frequency of the generated sound. Typically used to ‘carve’ out frequencies and shape the sound.

FILTER CUT OFF: The frequency at which a filter starts to attenuate the sound.

FILTER RESONANCE: Resonance is when the sound is changed due to enhanced frequencies at the cutoff point on a filter.

JUNK: Term normally preceded with ‘Pile of..’ or ‘Heap of..’. Used by producers during periods of creative block or midi sync problems to blame the poor old synth for all the ills of the studio.

KEY TRACKING: The ability to set how the linear notes on a keyboard affect a parameter. Typically the higher a key is played the more its affects a parameter such as cut off freq.

LEGATO: A function which allows one key note to be retained while another is being played allowing overlapping notes.

LFO: Low Frequency Oscillator - A waveform which operates slower that the frequency normally within the audible range (typically less than 20Hz) and used to modulate other parameters i.e. Cut-off frequency, creatively

MIDI: Musical Instrument Digital Interface is a connectivity standard used often in synth technology old and new. MIDI enables devices to communicate together for example for a separate keyboard to control a modular synth.

MIXER: Although the mixer can refer to the audio output missing, In synth terms a mixer would typically combine together a number of oscillators to develop sound structures.

MOD WHEEL: A physical device on a midi controller or synth that modulates parameters to form expression.

MONOPHONIC: A synth that produces only one note at a time, typically used for bass synths.

NOISE: Some synths generate a sound (like an oscillator) called noise. White noise contains all frequency harmonics and has a wind like sound.

OCTAVE: Whilst an Octave refers to the range of notes across a range, in synth terms octave would normally refer to the range associated with the oscillators.

OSCILLATOR: An electronic device that generates a waveform and is the initial source for the initial synth sound. VCO - Voltage controlled oscillators were the fundamental.

POLYPHONIC: A Synth that can produce multiple notes simultaneously. Normally this is dependant on the number of voices available (for each note).

PORTAMENTO: A function that glides between two notes rather than making a step change.

RE-TRIGGER: Refers to the term used to describe how a waveform, note, envelope, LFO etc is started / re-started. If a note is played re-trigger will explain if it restarts from the beginning or an alternative state.

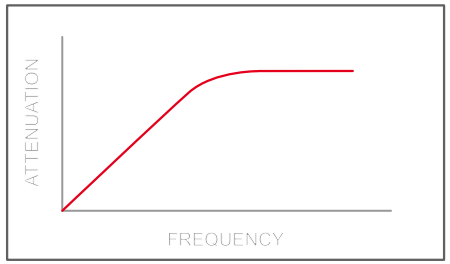
RING MODULATION: A function that takes the sound of two oscillators and multiplies them together to create unique sounds.

SEQUENCER: A feature in some synths that allows note sequences to be recorded step by step and then replayed automatically.

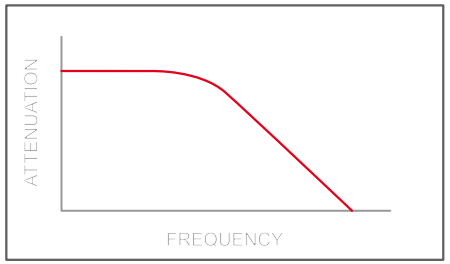
SUBTRACTIVE SYNTHESIS: A synthesizer which develops sounds by carving out (filtering) frequencies to shape the sound

VELOCITY: Synths usually respond to the sensitivity and how hard the keyboard is played.

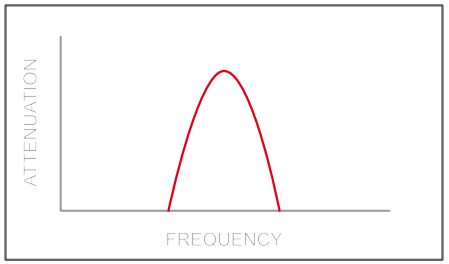
EFFECTS: Some synths contain a number of effects that are used on the synthesised sound. Typical effects found in synths include Delay, Chorus, Distortion and some contain EQ and Reverb features. These are normally provided at the AMP or Output stage.



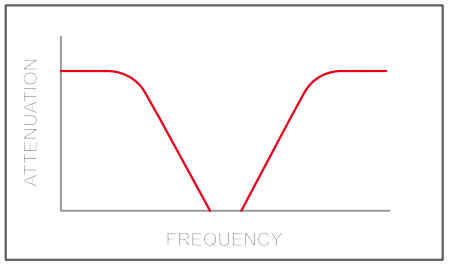
HIGH PASS FILTER



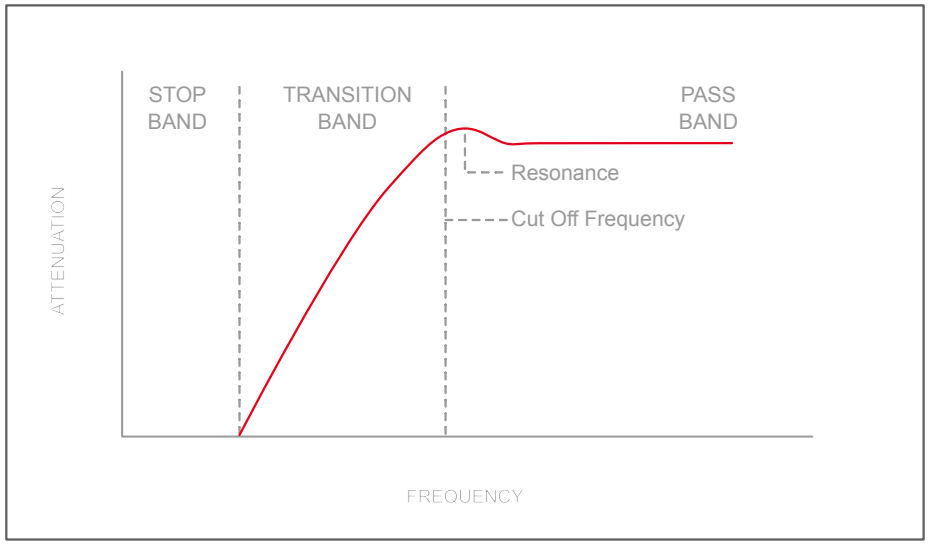
LOW PASS FILTER



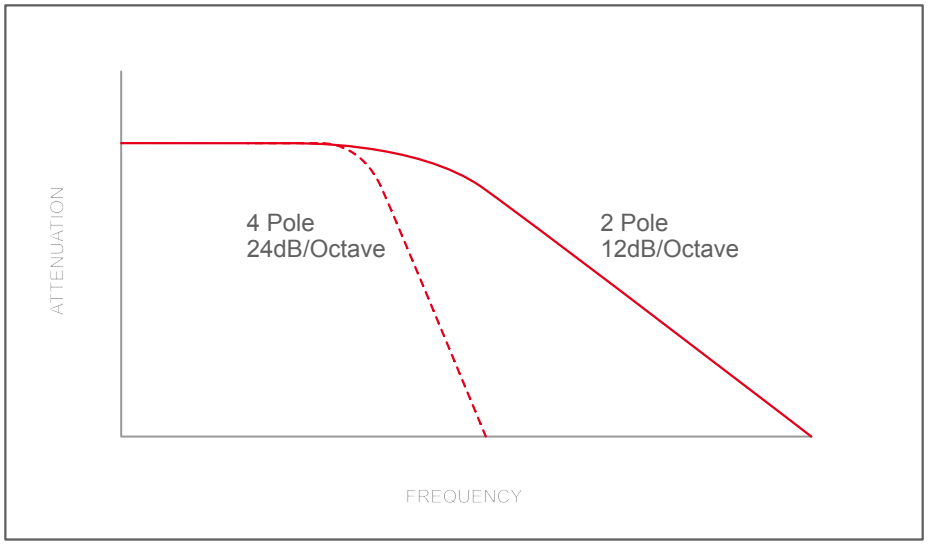
BAND PASS FILTER



NOTCH FILTER



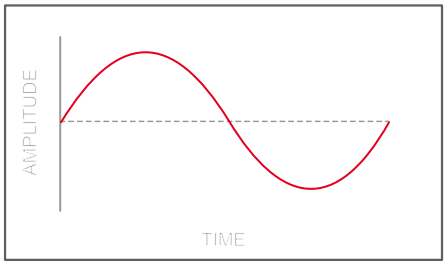
HIGH PASS FILTER



LOW PASS FILTER

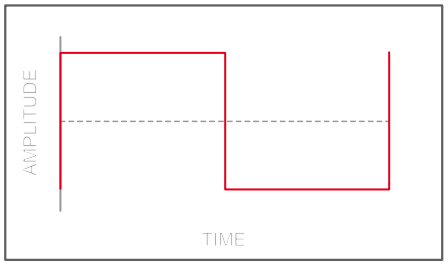
www.synthdawg.com

FILTERS		Title
Overview of Filter curves and terms		Info
Charts	Page 26	



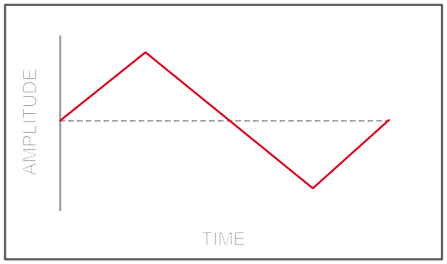
SINE WAVE

Pure Tone, No Harmonics, Whistle, Sub Bass



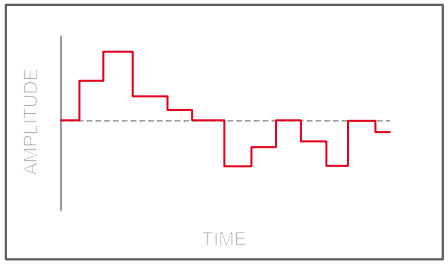
SQUARE WAVE

Hollow, Odd Harmonics, Clarinet and Wind instruments



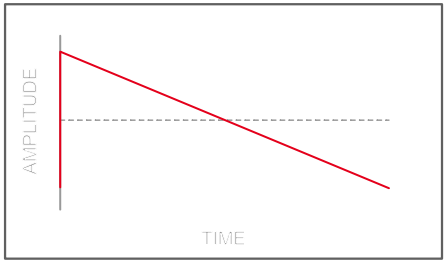
TRIANGLE WAVE

Silky and Smooth, Few Harmonics, Wind instruments, Wood, Mellow



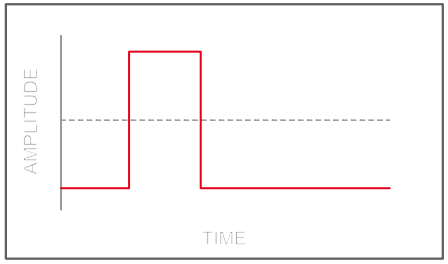
SAMPLE & HOLD WAVE

Stutter, Glitchy, Variable, Unpredictable, mix of waves and harmonics



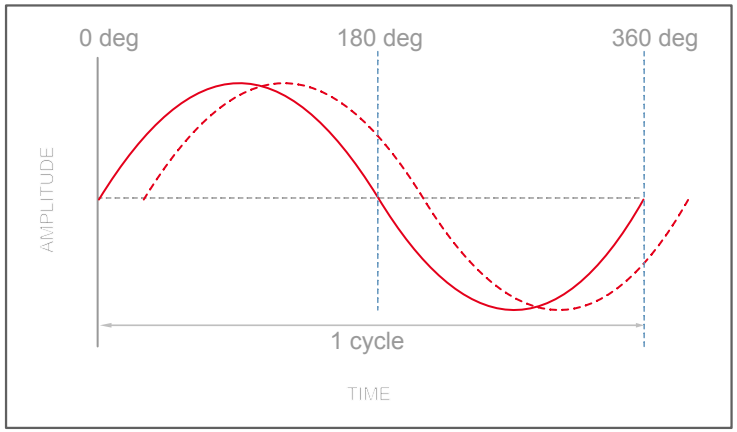
SAW TOOTH WAVE

Highly harmonic, church organ and flutes, brass instruments



PULSE WAVE

Hollow, Odd Harmonics, Nasal, chorus like when modulated



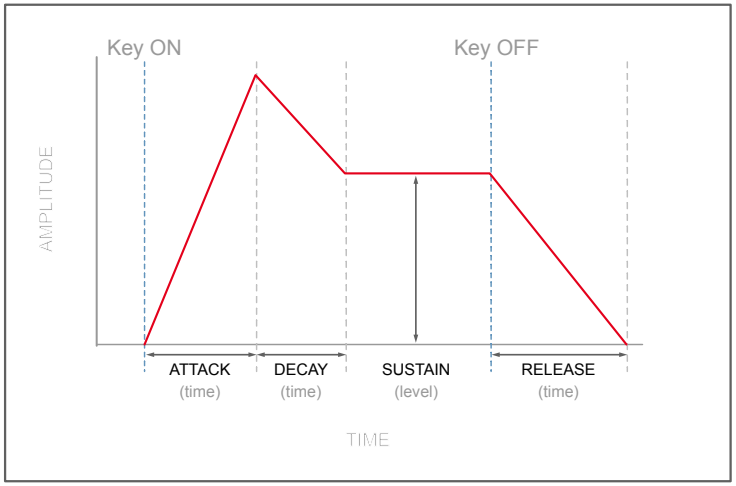
PHASE AND FREQUENCY

Frequency can be shifted for the Sine wave to affect the sound and tone. With square waves, the pulse width is often modulated to affect the sound and generate pulse waves. Frequency is the number of cycles per second, indicated as Hertz (Hz).

NOISE

Noise basically contains ALL frequencies. White Noise has a constant energy level across the frequency range. This sounds high pitched and wind like. Pink noise has equal energy for every octave and sounds deeper and more bass orientated

Title	WAVEFORMS	
Info	Common Waveform Characteristics	
Page	27	Charts



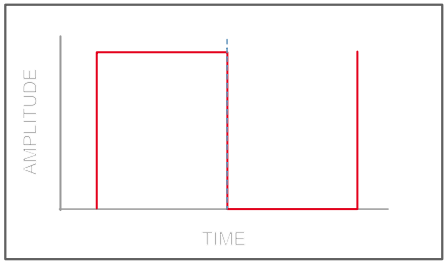
ADSR ENVELOPE

ATTACK: Time from pressing a key or triggering the envelope for the signal to reach its maximum level. Long attack times will give a slow, evolving ramp up sound while a short time will give an immediate full on sound. Often a small attack time will negate any filter / oscillator / sample start 'clicks'

DECAY: The time based evolution of the sound after reaching its maximum level to reach the sustain level when the key press is maintained.

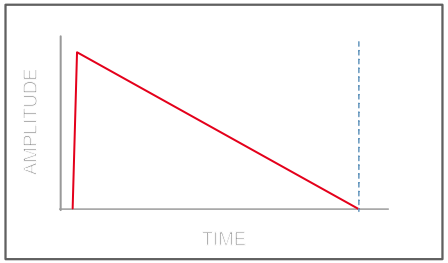
SUSTAIN: Sets the level that the sound will remain while the key is retained after the decay time is exceeded.

RELEASE: The time from releasing the keyboard key for the sound to fall from the sustain level to reach zero level. Gives a fade out effect.



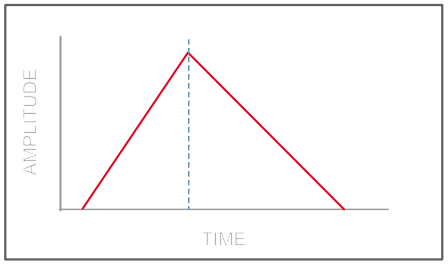
NO ENVELOPE: ON / OFF

Signal fully on or fully off.



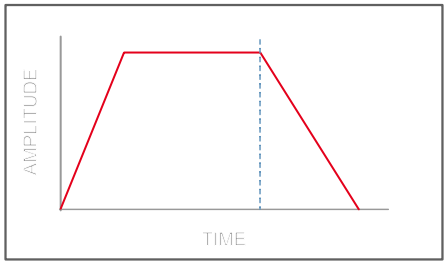
NATURAL ENVELOPE

Piano has a natural short attack with a natural release (after the hammer hits the strings)



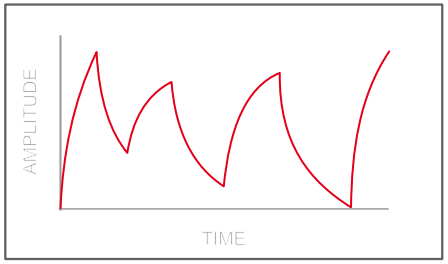
AR ENVELOPE

Attack and Release time only.



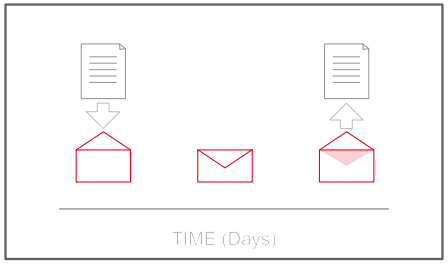
ASR ENVELOPE

Attack, Sustain, Release (No Decay)



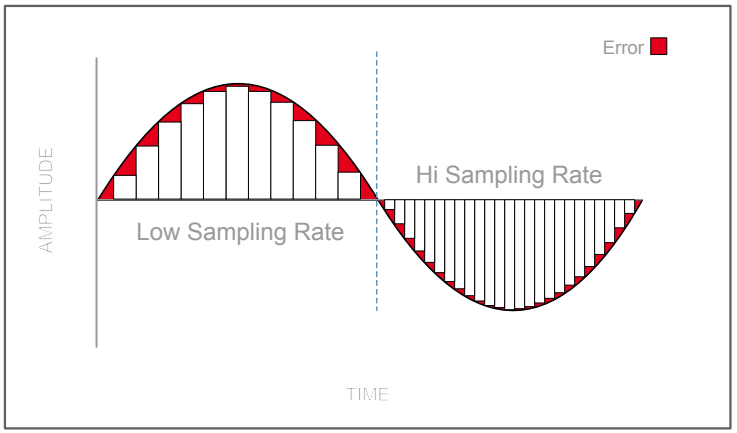
CUSTOM ENVELOPE

Some synths such as NI Massive allow custom envelopes to be created



ENVELOPE

In the old days, before email, SMS messaging and social media streams. Hand written letters were posted in a paper envelope



Bit Depth	Sample Rate	Bit Rate	3 Min Song
16	41,100	1.35 Mbit/Sec	30.3MB
16	48,000	1.46 Mbit/Sec	33MB
24	96,000	4.39 Mbit/Sec	99MB

SAMPLING RATE

Sample rate, measured in samples per second, indicates the number of times the analogue signal is sampled and hence converted to a digital replication. The higher the sampling rate the less error in the A to D conversion

44.1KHz This means the audio is sampled 44,100 times per second. 44.1KHz, 16 bit is a standard format used for Audio CD production. This is the most common sampling rate used.

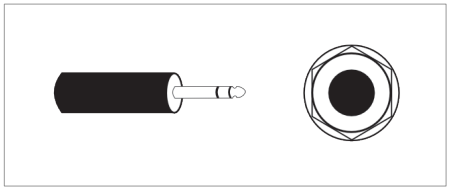
Other sample rates include 48K which is a standard used in audio for video production.

Sample rates of 88.2K, 96K, 192K are also used. While higher sample rates are technically carry less error other complications such as standardised equipment, data storage etc.

Nyquist theory states that sampling rate should be twice that of the signal to be reproduced. As human hearing is limited to around 20KHz then a sample rate of 44.1KHz would suggest this is an acceptable sampling rate for audio production.

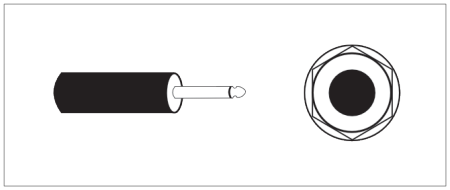
So if Sample rate is the number of samples per second of the audio converted, bit depth refers to the resolution of each sample. 16 Bit offers 65,536 maximum values while 24 bit offer 16,777,216 values.

Dither is a process in digital production used as the very last step in 16 bit production. This introduces noise into the final processing to compensate for errors through a A to D process.



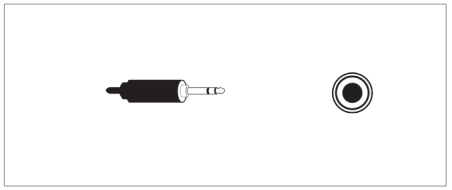
TRS ¼ inch (6.35mm) Jack

Tip - Ring - Sleeve connector (3 wire) typically used for Mono, Balanced or Stereo audio signals



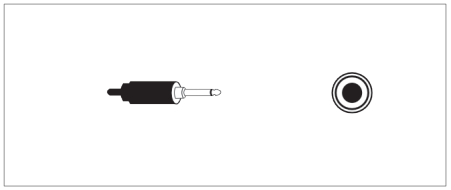
TS ¼ inch (6.35mm) Jack

Tip - Sleeve connector (2 wire) typically used for Mono, Unbalanced audio signals eg guitar leads



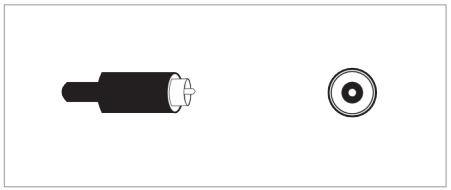
Stereo Mini ⅛ inch (3.5mm) Jack

Mini Stereo connector used for general audio signals eg portable music players, iPod etc also for modular CV/Gate signals



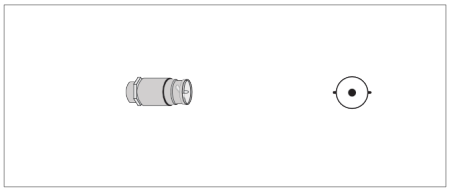
Mono Mini (3.5mm) Jack

Mini jack typically used for Mono audio signals and some modular / eurorack CV / Gate Signals



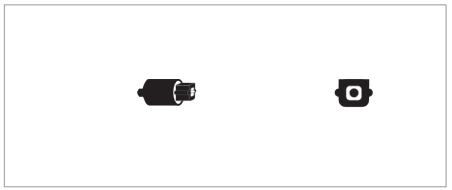
RCA Phono Jack

Mono, screened coaxial cable used typically for individual signals such as the L/R speaker connections on CD, Turntable set ups and digital audio S/PDIF connections



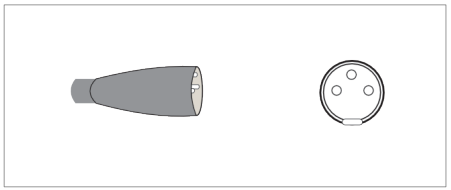
BNC Connector

Coaxial cable connections usually 50 or 75ohm impedance matched. Typically used for world clock signals in a studio and occasionally S/PDIF.



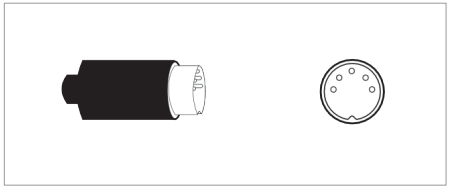
ADAT Connector

ADAT is a digital audio optical interface that connects up to 8 Channels of audio signals Together as well as TOSlink S/PDIF.



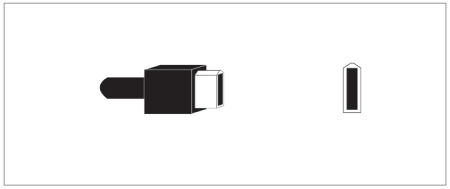
XLR

XLR is a 3 wire balanced audio connector. Common and accepted standard for microphone connections and also used with monitors



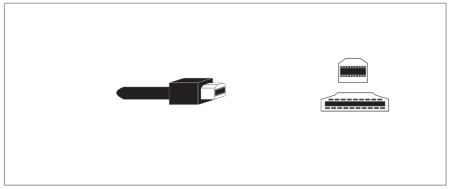
5 Pin DIN

The original 5 Pin MIDI connector used for connecting electronic audio devices together under the Musical Instrument Digital Interface protocols



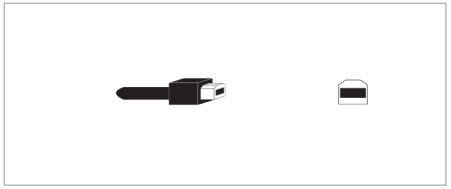
Firewire

Developed by Apple Standard EE1394 for connecting devices such as audio interfaces under firewire 400 & 800 Protocols to Apple Mac products



Thunderbolt

High speed communications technology that connects computed devices such as display monitors, storage devices etc. Has integrated Display port and USB into the technology.



USB

Available in a variety of connector formats USB is an industry standard for connecting devices such as audio interfaces and PC's and can also carry MIDI protocols. Illustration is Type-B

Title	NOTES		
Info	Yeah, Yeah, another blank page		
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