

# Monomachine LFO speeds: multiplier and speed relations

Merlin

April 6, 2013

## Formula

- $(\text{multiplier value} \times \text{speed})/128 = \text{number of LFO cycles per bar}$

## Example: three LFO cycles per bar

- Multiplier value:  $\times 16$
- Speed: 24
- Result:  $16 \times 24 / 128 = 3$  LFO cycles per bar

Creating six cycles per bar is obtained by doubling the multiplier to 32 *or* by doubling the speed to 48.

## Notes: triggers, sync and LFO phase

- The LFO is always synced to the pattern. It's phase, however, is not. Therefore:
- Setting the trig parameter to "free" means the LFO is synced, but it's phase starts at a random position regardless of the presence and position of the LFO triggers.
- Letting an LFO start it's phase at a specific step is obtained by:
  - triggering the LFO at that step.
  - setting the trig parameter to "trig" at that step.
  - making sure that no combinations of LFO triggers and "step" parameters are placed on other steps.

### Notes: LFO, phase and the arpeggiator

- The arpeggiator resets the LFO cycle on every note it plays.
- By switching off the LFO option in the arp menu, the LFO is not reset anymore and the usual behaviour as described above applies.

LFO cycles per bar							
Speed	X1	X2	X4	X8	X16	X32	X64
1	0,008	0,016	0,031	0,063	0,125	0,250	0,500
2	0,016	0,031	0,063	0,125	0,250	0,500	1,000
3	0,023	0,047	0,094	0,188	0,375	0,750	1,500
4	0,031	0,063	0,125	0,250	0,500	1,000	2,000
5	0,039	0,078	0,156	0,313	0,625	1,250	2,500
6	0,047	0,094	0,188	0,375	0,750	1,500	3,000
7	0,055	0,109	0,219	0,438	0,875	1,750	3,500
8	0,063	0,125	0,250	0,500	1,000	2,000	4,000
9	0,070	0,141	0,281	0,563	1,125	2,250	4,500
10	0,078	0,156	0,313	0,625	1,250	2,500	5,000
11	0,086	0,172	0,344	0,688	1,375	2,750	5,500
12	0,094	0,188	0,375	0,750	1,500	3,000	6,000
13	0,102	0,203	0,406	0,813	1,625	3,250	6,500
14	0,109	0,219	0,438	0,875	1,750	3,500	7,000
15	0,117	0,234	0,469	0,938	1,875	3,750	7,500
16	0,125	0,250	0,500	1,000	2,000	4,000	8,000
17	0,133	0,266	0,531	1,063	2,125	4,250	8,500
18	0,141	0,281	0,563	1,125	2,250	4,500	9,000
19	0,148	0,297	0,594	1,188	2,375	4,750	9,500
20	0,156	0,313	0,625	1,250	2,500	5,000	10,000
21	0,164	0,328	0,656	1,313	2,625	5,250	10,500
22	0,172	0,344	0,688	1,375	2,750	5,500	11,000
23	0,180	0,359	0,719	1,438	2,875	5,750	11,500
24	0,188	0,375	0,750	1,500	3,000	6,000	12,000
25	0,195	0,391	0,781	1,563	3,125	6,250	12,500
26	0,203	0,406	0,813	1,625	3,250	6,500	13,000
27	0,211	0,422	0,844	1,688	3,375	6,750	13,500
28	0,219	0,438	0,875	1,750	3,500	7,000	14,000
29	0,227	0,453	0,906	1,813	3,625	7,250	14,500
30	0,234	0,469	0,938	1,875	3,750	7,500	15,000
31	0,242	0,484	0,969	1,938	3,875	7,750	15,500

LFO cycles per bar							
Speed	X1	X2	X4	X8	X16	X32	X64
32	0,250	0,500	1,000	2,000	4,000	8,000	16,000
33	0,258	0,516	1,031	2,063	4,125	8,250	16,500
34	0,266	0,531	1,063	2,125	4,250	8,500	17,000
35	0,273	0,547	1,094	2,188	4,375	8,750	17,500
36	0,281	0,563	1,125	2,250	4,500	9,000	18,000
37	0,289	0,578	1,156	2,313	4,625	9,250	18,500
38	0,297	0,594	1,188	2,375	4,750	9,500	19,000
39	0,305	0,609	1,219	2,438	4,875	9,750	19,500
40	0,313	0,625	1,250	2,500	5,000	10,000	20,000
41	0,320	0,641	1,281	2,563	5,125	10,250	20,500
42	0,328	0,656	1,313	2,625	5,250	10,500	21,000
43	0,336	0,672	1,344	2,688	5,375	10,750	21,500
44	0,344	0,688	1,375	2,750	5,500	11,000	22,000
45	0,352	0,703	1,406	2,813	5,625	11,250	22,500
46	0,359	0,719	1,438	2,875	5,750	11,500	23,000
47	0,367	0,734	1,469	2,938	5,875	11,750	23,500
48	0,375	0,750	1,500	3,000	6,000	12,000	24,000
49	0,383	0,766	1,531	3,063	6,125	12,250	24,500
50	0,391	0,781	1,563	3,125	6,250	12,500	25,000
51	0,398	0,797	1,594	3,188	6,375	12,750	25,500
52	0,406	0,813	1,625	3,250	6,500	13,000	26,000
53	0,414	0,828	1,656	3,313	6,625	13,250	26,500
54	0,422	0,844	1,688	3,375	6,750	13,500	27,000
55	0,430	0,859	1,719	3,438	6,875	13,750	27,500
56	0,438	0,875	1,750	3,500	7,000	14,000	28,000
57	0,445	0,891	1,781	3,563	7,125	14,250	28,500
58	0,453	0,906	1,813	3,625	7,250	14,500	29,000
59	0,461	0,922	1,844	3,688	7,375	14,750	29,500
60	0,469	0,938	1,875	3,750	7,500	15,000	30,000
61	0,477	0,953	1,906	3,813	7,625	15,250	30,500
62	0,484	0,969	1,938	3,875	7,750	15,500	31,000
63	0,492	0,984	1,969	3,938	7,875	15,750	31,500

LFO cycles per bar							
Speed	X1	X2	X4	X8	X16	X32	X64
64	0,500	1,000	2,000	4,000	8,000	16,000	32,000
65	0,508	1,016	2,031	4,063	8,125	16,250	32,500
66	0,516	1,031	2,063	4,125	8,250	16,500	33,000
67	0,523	1,047	2,094	4,188	8,375	16,750	33,500
68	0,531	1,063	2,125	4,250	8,500	17,000	34,000
69	0,539	1,078	2,156	4,313	8,625	17,250	34,500
70	0,547	1,094	2,188	4,375	8,750	17,500	35,000
71	0,555	1,109	2,219	4,438	8,875	17,750	35,500
72	0,563	1,125	2,250	4,500	9,000	18,000	36,000
73	0,570	1,141	2,281	4,563	9,125	18,250	36,500
74	0,578	1,156	2,313	4,625	9,250	18,500	37,000
75	0,586	1,172	2,344	4,688	9,375	18,750	37,500
76	0,594	1,188	2,375	4,750	9,500	19,000	38,000
77	0,602	1,203	2,406	4,813	9,625	19,250	38,500
78	0,609	1,219	2,438	4,875	9,750	19,500	39,000
79	0,617	1,234	2,469	4,938	9,875	19,750	39,500
80	0,625	1,250	2,500	5,000	10,000	20,000	40,000
81	0,633	1,266	2,531	5,063	10,125	20,250	40,500
82	0,641	1,281	2,563	5,125	10,250	20,500	41,000
83	0,648	1,297	2,594	5,188	10,375	20,750	41,500
84	0,656	1,313	2,625	5,250	10,500	21,000	42,000
85	0,664	1,328	2,656	5,313	10,625	21,250	42,500
86	0,672	1,344	2,688	5,375	10,750	21,500	43,000
87	0,680	1,359	2,719	5,438	10,875	21,750	43,500
88	0,688	1,375	2,750	5,500	11,000	22,000	44,000
89	0,695	1,391	2,781	5,563	11,125	22,250	44,500
90	0,703	1,406	2,813	5,625	11,250	22,500	45,000
91	0,711	1,422	2,844	5,688	11,375	22,750	45,500
92	0,719	1,438	2,875	5,750	11,500	23,000	46,000
93	0,727	1,453	2,906	5,813	11,625	23,250	46,500
94	0,734	1,469	2,938	5,875	11,750	23,500	47,000
95	0,742	1,484	2,969	5,938	11,875	23,750	47,500

LFO cycles per bar							
Speed	X1	X2	X4	X8	X16	X32	X64
96	0,750	1,500	3,000	6,000	12,000	24,000	48,000
97	0,758	1,516	3,031	6,063	12,125	24,250	48,500
98	0,766	1,531	3,063	6,125	12,250	24,500	49,000
99	0,773	1,547	3,094	6,188	12,375	24,750	49,500
100	0,781	1,563	3,125	6,250	12,500	25,000	50,000
101	0,789	1,578	3,156	6,313	12,625	25,250	50,500
102	0,797	1,594	3,188	6,375	12,750	25,500	51,000
103	0,805	1,609	3,219	6,438	12,875	25,750	51,500
104	0,813	1,625	3,250	6,500	13,000	26,000	52,000
105	0,820	1,641	3,281	6,563	13,125	26,250	52,500
106	0,828	1,656	3,313	6,625	13,250	26,500	53,000
107	0,836	1,672	3,344	6,688	13,375	26,750	53,500
108	0,844	1,688	3,375	6,750	13,500	27,000	54,000
109	0,852	1,703	3,406	6,813	13,625	27,250	54,500
110	0,859	1,719	3,438	6,875	13,750	27,500	55,000
111	0,867	1,734	3,469	6,938	13,875	27,750	55,500
112	0,875	1,750	3,500	7,000	14,000	28,000	56,000
113	0,883	1,766	3,531	7,063	14,125	28,250	56,500
114	0,891	1,781	3,563	7,125	14,250	28,500	57,000
115	0,898	1,797	3,594	7,188	14,375	28,750	57,500
116	0,906	1,813	3,625	7,250	14,500	29,000	58,000
117	0,914	1,828	3,656	7,313	14,625	29,250	58,500
118	0,922	1,844	3,688	7,375	14,750	29,500	59,000
119	0,930	1,859	3,719	7,438	14,875	29,750	59,500
120	0,938	1,875	3,750	7,500	15,000	30,000	60,000
121	0,945	1,891	3,781	7,563	15,125	30,250	60,500
122	0,953	1,906	3,813	7,625	15,250	30,500	61,000
123	0,961	1,922	3,844	7,688	15,375	30,750	61,500
124	0,969	1,938	3,875	7,750	15,500	31,000	62,000
125	0,977	1,953	3,906	7,813	15,625	31,250	62,500
126	0,984	1,969	3,938	7,875	15,750	31,500	63,000
127	0,992	1,984	3,969	7,938	15,875	31,750	63,500

Bars per LFO cycle							
Speed	X1	X2	X4	X8	X16	X32	X64
1	128,000	64,000	32,000	16,00	8,000	4,000	2,000
2	64,000	32,000	16,000	8,000	4,000	2,000	1,000
3	42,667	21,333	10,667	5,333	2,667	1,333	0,667
4	32,000	16,000	8,000	4,000	2,000	1,000	0,500
5	25,600	12,800	6,400	3,200	1,600	0,800	0,400
6	21,333	10,667	5,333	2,667	1,333	0,667	0,333
7	18,286	9,143	4,571	2,286	1,143	0,571	0,286
8	16,000	8,000	4,000	2,000	1,000	0,500	0,250
9	14,222	7,111	3,556	1,778	0,889	0,444	0,222
10	12,800	6,400	3,200	1,600	0,800	0,400	0,200
11	11,636	5,818	2,909	1,455	0,727	0,364	0,182
12	10,667	5,333	2,667	1,333	0,667	0,333	0,167
13	9,846	4,923	2,462	1,231	0,615	0,308	0,154
14	9,143	4,571	2,286	1,143	0,571	0,286	0,143
15	8,533	4,267	2,133	1,067	0,533	0,267	0,133
16	8,000	4,000	2,000	1,000	0,500	0,250	0,125
17	7,529	3,765	1,882	0,941	0,471	0,235	0,118
18	7,111	3,556	1,778	0,889	0,444	0,222	0,111
19	6,737	3,368	1,684	0,842	0,421	0,211	0,105
20	6,400	3,200	1,600	0,800	0,400	0,200	0,100
21	6,095	3,048	1,524	0,762	0,381	0,190	0,095
22	5,818	2,909	1,455	0,727	0,364	0,182	0,091
23	5,565	2,783	1,391	0,696	0,348	0,174	0,087
24	5,333	2,667	1,333	0,667	0,333	0,167	0,083
25	5,120	2,560	1,280	0,640	0,320	0,160	0,080
26	4,923	2,462	1,231	0,615	0,308	0,154	0,077
27	4,741	2,370	1,185	0,593	0,296	0,148	0,074
28	4,571	2,286	1,143	0,571	0,286	0,143	0,071
29	4,414	2,207	1,103	0,552	0,276	0,138	0,069
30	4,267	2,133	1,067	0,533	0,267	0,133	0,067
31	4,129	2,065	1,032	0,516	0,258	0,129	0,065

Bars per LFO cycle							
Speed	X1	X2	X4	X8	X16	X32	X64
32	4,000	2,000	1,000	0,500	0,250	0,125	0,063
33	3,879	1,939	0,970	0,485	0,242	0,121	0,061
34	3,765	1,882	0,941	0,471	0,235	0,118	0,059
35	3,657	1,829	0,914	0,457	0,229	0,114	0,057
36	3,556	1,778	0,889	0,444	0,222	0,111	0,056
37	3,459	1,730	0,865	0,432	0,216	0,108	0,054
38	3,368	1,684	0,842	0,421	0,211	0,105	0,053
39	3,282	1,641	0,821	0,410	0,205	0,103	0,051
40	3,200	1,600	0,800	0,400	0,200	0,100	0,050
41	3,122	1,561	0,780	0,390	0,195	0,098	0,049
42	3,048	1,524	0,762	0,381	0,190	0,095	0,048
43	2,977	1,488	0,744	0,372	0,186	0,093	0,047
44	2,909	1,455	0,727	0,364	0,182	0,091	0,045
45	2,844	1,422	0,711	0,356	0,178	0,089	0,044
46	2,783	1,391	0,696	0,348	0,174	0,087	0,043
47	2,723	1,362	0,681	0,340	0,170	0,085	0,043
48	2,667	1,333	0,667	0,333	0,167	0,083	0,042
49	2,612	1,306	0,653	0,327	0,163	0,082	0,041
50	2,560	1,280	0,640	0,320	0,160	0,080	0,040
51	2,510	1,255	0,627	0,314	0,157	0,078	0,039
52	2,462	1,231	0,615	0,308	0,154	0,077	0,038
53	2,415	1,208	0,604	0,302	0,151	0,075	0,038
54	2,370	1,185	0,593	0,296	0,148	0,074	0,037
55	2,327	1,164	0,582	0,291	0,145	0,073	0,036
56	2,286	1,143	0,571	0,286	0,143	0,071	0,036
57	2,246	1,123	0,561	0,281	0,140	0,070	0,035
58	2,207	1,103	0,552	0,276	0,138	0,069	0,034
59	2,169	1,085	0,542	0,271	0,136	0,068	0,034
60	2,133	1,067	0,533	0,267	0,133	0,067	0,033
61	2,098	1,049	0,525	0,262	0,131	0,066	0,033
62	2,065	1,032	0,516	0,258	0,129	0,065	0,032
63	2,032	1,016	0,508	0,254	0,127	0,063	0,032



Bars per LFO cycle							
Speed	X1	X2	X4	X8	X16	X32	X64
64	2,000	1,000	0,500	0,250	0,125	0,063	0,031
65	1,969	0,985	0,492	0,246	0,123	0,062	0,031
66	1,939	0,970	0,485	0,242	0,121	0,061	0,030
67	1,910	0,955	0,478	0,239	0,119	0,060	0,030
68	1,882	0,941	0,471	0,235	0,118	0,059	0,029
69	1,855	0,928	0,464	0,232	0,116	0,058	0,029
70	1,829	0,914	0,457	0,229	0,114	0,057	0,029
71	1,803	0,901	0,451	0,225	0,113	0,056	0,028
72	1,778	0,889	0,444	0,222	0,111	0,056	0,028
73	1,753	0,877	0,438	0,219	0,110	0,055	0,027
74	1,730	0,865	0,432	0,216	0,108	0,054	0,027
75	1,707	0,853	0,427	0,213	0,107	0,053	0,027
76	1,684	0,842	0,421	0,211	0,105	0,053	0,026
77	1,662	0,831	0,416	0,208	0,104	0,052	0,026
78	1,641	0,821	0,410	0,205	0,103	0,051	0,026
79	1,620	0,810	0,405	0,203	0,101	0,051	0,025
80	1,600	0,800	0,400	0,200	0,100	0,050	0,025
81	1,580	0,790	0,395	0,198	0,099	0,049	0,025
82	1,561	0,780	0,390	0,195	0,098	0,049	0,024
83	1,542	0,771	0,386	0,193	0,096	0,048	0,024
84	1,524	0,762	0,381	0,190	0,095	0,048	0,024
85	1,506	0,753	0,376	0,188	0,094	0,047	0,024
86	1,488	0,744	0,372	0,186	0,093	0,047	0,023
87	1,471	0,736	0,368	0,184	0,092	0,046	0,023
88	1,455	0,727	0,364	0,182	0,091	0,045	0,023
89	1,438	0,719	0,360	0,180	0,090	0,045	0,022
90	1,422	0,711	0,356	0,178	0,089	0,044	0,022
91	1,407	0,703	0,352	0,176	0,088	0,044	0,022
92	1,391	0,696	0,348	0,174	0,087	0,043	0,022
93	1,376	0,688	0,344	0,172	0,086	0,043	0,022
94	1,362	0,681	0,340	0,170	0,085	0,043	0,021
95	1,347	0,674	0,337	0,168	0,084	0,042	0,021

Bars per LFO cycle							
Speed	X1	X2	X4	X8	X16	X32	X64
96	1,333	0,667	0,333	0,167	0,083	0,042	0,021
97	1,320	0,660	0,330	0,165	0,082	0,041	0,021
98	1,306	0,653	0,327	0,163	0,082	0,041	0,020
99	1,293	0,646	0,323	0,162	0,081	0,040	0,020
100	1,280	0,640	0,320	0,160	0,080	0,040	0,020
101	1,267	0,634	0,317	0,158	0,079	0,040	0,020
102	1,255	0,627	0,314	0,157	0,078	0,039	0,020
103	1,243	0,621	0,311	0,155	0,078	0,039	0,019
104	1,231	0,615	0,308	0,154	0,077	0,038	0,019
105	1,219	0,610	0,305	0,152	0,076	0,038	0,019
106	1,208	0,604	0,302	0,151	0,075	0,038	0,019
107	1,196	0,598	0,299	0,150	0,075	0,037	0,019
108	1,185	0,593	0,296	0,148	0,074	0,037	0,019
109	1,174	0,587	0,294	0,147	0,073	0,037	0,018
110	1,164	0,582	0,291	0,145	0,073	0,036	0,018
111	1,153	0,577	0,288	0,144	0,072	0,036	0,018
112	1,143	0,571	0,286	0,143	0,071	0,036	0,018
113	1,133	0,566	0,283	0,142	0,071	0,035	0,018
114	1,123	0,561	0,281	0,140	0,070	0,035	0,018
115	1,113	0,557	0,278	0,139	0,070	0,035	0,017
116	1,103	0,552	0,276	0,138	0,069	0,034	0,017
117	1,094	0,547	0,274	0,137	0,068	0,034	0,017
118	1,085	0,542	0,271	0,136	0,068	0,034	0,017
119	1,076	0,538	0,269	0,134	0,067	0,034	0,017
120	1,067	0,533	0,267	0,133	0,067	0,033	0,017
121	1,058	0,529	0,264	0,132	0,066	0,033	0,017
122	1,049	0,525	0,262	0,131	0,066	0,033	0,016
123	1,041	0,520	0,260	0,130	0,065	0,033	0,016
124	1,032	0,516	0,258	0,129	0,065	0,032	0,016
125	1,024	0,512	0,256	0,128	0,064	0,032	0,016
126	1,016	0,508	0,254	0,127	0,063	0,032	0,016
127	1,008	0,504	0,252	0,126	0,063	0,031	0,016

LFO cycles per bar (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
1	1/128	1/64	1/32	1/16	1/8	1/4	1/2
2	1/64	1/32	1/16	1/8	1/4	1/2	1/1
3	3/128	3/64	3/32	3/16	3/8	3/4	3/2
4	1/32	1/16	1/8	1/4	1/2	1/1	2/1
5	5/128	5/64	5/32	5/16	5/8	5/4	5/2
6	3/64	3/32	3/16	3/8	3/4	3/2	3/1
7	7/128	7/64	7/32	7/16	7/8	7/4	7/2
8	1/16	1/8	1/4	1/2	1/1	2/1	4/1
9	9/128	9/64	9/32	9/16	9/8	9/4	9/2
10	5/64	5/32	5/16	5/8	5/4	5/2	5/1
11	11/128	11/64	11/32	11/16	11/8	11/4	11/2
12	3/32	3/16	3/8	3/4	3/2	3/1	6/1
13	13/128	13/64	13/32	13/16	13/8	13/4	13/2
14	7/64	7/32	7/16	7/8	7/4	7/2	7/1
15	15/128	15/64	15/32	15/16	15/8	15/4	15/2
16	1/8	1/4	1/2	1/1	2/1	4/1	8/1
17	17/128	17/64	17/32	17/16	17/8	17/4	17/2
18	9/64	9/32	9/16	9/8	9/4	9/2	9/1
19	19/128	19/64	19/32	19/16	19/8	19/4	19/2
20	5/32	5/16	5/8	5/4	5/2	5/1	10/1
21	21/128	21/64	21/32	21/16	21/8	21/4	21/2
22	11/64	11/32	11/16	11/8	11/4	11/2	11/1
23	23/128	23/64	23/32	23/16	23/8	23/4	23/2
24	3/16	3/8	3/4	3/2	3/1	6/1	12/1
25	25/128	25/64	25/32	25/16	25/8	25/4	25/2
26	13/64	13/32	13/16	13/8	13/4	13/2	13/1
27	27/128	27/64	27/32	27/16	27/8	27/4	27/2
28	7/32	7/16	7/8	7/4	7/2	7/1	14/1
29	29/128	29/64	29/32	29/16	29/8	29/4	29/2
30	15/64	15/32	15/16	15/8	15/4	15/2	15/1
31	31/128	31/64	31/32	31/16	31/8	31/4	31/2
32	1/4	1/2	1/1	2/1	4/1	8/1	16/1

LFO cycles per bar (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
33	33/128	33/64	33/32	33/16	33/8	33/4	33/2
34	17/64	17/32	17/16	17/8	17/4	17/2	17/1
35	35/128	35/64	35/32	35/16	35/8	35/4	35/2
36	9/32	9/16	9/8	9/4	9/2	9/1	18/1
37	37/128	37/64	37/32	37/16	37/8	37/4	37/2
38	19/64	19/32	19/16	19/8	19/4	19/2	19/1
39	39/128	39/64	39/32	39/16	39/8	39/4	39/2
40	5/16	5/8	5/4	5/2	5/1	10/1	20/1
41	41/128	41/64	41/32	41/16	41/8	41/4	41/2
42	21/64	21/32	21/16	21/8	21/4	21/2	21/1
43	43/128	43/64	43/32	43/16	43/8	43/4	43/2
44	11/32	11/16	11/8	11/4	11/2	11/1	22/1
45	45/128	45/64	45/32	45/16	45/8	45/4	45/2
46	23/64	23/32	23/16	23/8	23/4	23/2	23/1
47	47/128	47/64	47/32	47/16	47/8	47/4	47/2
48	3/8	3/4	3/2	3/1	6/1	12/1	24/1
49	49/128	49/64	49/32	49/16	49/8	49/4	49/2
50	25/64	25/32	25/16	25/8	25/4	25/2	25/1
51	51/128	51/64	51/32	51/16	51/8	51/4	51/2
52	13/32	13/16	13/8	13/4	13/2	13/1	26/1
53	53/128	53/64	53/32	53/16	53/8	53/4	53/2
54	27/64	27/32	27/16	27/8	27/4	27/2	27/1
55	55/128	55/64	55/32	55/16	55/8	55/4	55/2
56	7/16	7/8	7/4	7/2	7/1	14/1	28/1
57	57/128	57/64	57/32	57/16	57/8	57/4	57/2
58	29/64	29/32	29/16	29/8	29/4	29/2	29/1
59	59/128	59/64	59/32	59/16	59/8	59/4	59/2
60	15/32	15/16	15/8	15/4	15/2	15/1	30/1
61	61/128	61/64	61/32	61/16	61/8	61/4	61/2
62	31/64	31/32	31/16	31/8	31/4	31/2	31/1
63	63/128	63/64	63/32	63/16	63/8	63/4	63/2
64	1/2	1/1	2/1	4/1	8/1	16/1	32/1

LFO cycles per bar (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
65	65/128	65/64	65/32	65/16	65/8	65/4	65/2
66	33/64	33/32	33/16	33/8	33/4	33/2	33/1
67	67/128	67/64	67/32	67/16	67/8	67/4	67/2
68	17/32	17/16	17/8	17/4	17/2	17/1	34/1
69	69/128	69/64	69/32	69/16	69/8	69/4	69/2
70	35/64	35/32	35/16	35/8	35/4	35/2	35/1
71	71/128	71/64	71/32	71/16	71/8	71/4	71/2
72	9/16	9/8	9/4	9/2	9/1	18/1	36/1
73	73/128	73/64	73/32	73/16	73/8	73/4	73/2
74	37/64	37/32	37/16	37/8	37/4	37/2	37/1
75	75/128	75/64	75/32	75/16	75/8	75/4	75/2
76	19/32	19/16	19/8	19/4	19/2	19/1	38/1
77	77/128	77/64	77/32	77/16	77/8	77/4	77/2
78	39/64	39/32	39/16	39/8	39/4	39/2	39/1
79	79/128	79/64	79/32	79/16	79/8	79/4	79/2
80	5/8	5/4	5/2	5/1	10/1	20/1	40/1
81	81/128	81/64	81/32	81/16	81/8	81/4	81/2
82	41/64	41/32	41/16	41/8	41/4	41/2	41/1
83	83/128	83/64	83/32	83/16	83/8	83/4	83/2
84	21/32	21/16	21/8	21/4	21/2	21/1	42/1
85	85/128	85/64	85/32	85/16	85/8	85/4	85/2
86	43/64	43/32	43/16	43/8	43/4	43/2	43/1
87	87/128	87/64	87/32	87/16	87/8	87/4	87/2
88	11/16	11/8	11/4	11/2	11/1	22/1	44/1
89	89/128	89/64	89/32	89/16	89/8	89/4	89/2
90	45/64	45/32	45/16	45/8	45/4	45/2	45/1
91	91/128	91/64	91/32	91/16	91/8	91/4	91/2
92	23/32	23/16	23/8	23/4	23/2	23/1	46/1
93	93/128	93/64	93/32	93/16	93/8	93/4	93/2
94	47/64	47/32	47/16	47/8	47/4	47/2	47/1
95	95/128	95/64	95/32	95/16	95/8	95/4	95/2
96	3/4	3/2	3/1	6/1	12/1	24/1	48/1

LFO cycles per bar (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
97	97/128	97/64	97/32	97/16	97/8	97/4	97/2
98	49/64	49/32	49/16	49/8	49/4	49/2	49/1
99	99/128	99/64	99/32	99/16	99/8	99/4	99/2
100	25/32	25/16	25/8	25/4	25/2	25/1	50/1
101	101/128	101/64	101/32	101/16	101/8	101/4	101/2
102	51/64	51/32	51/16	51/8	51/4	51/2	51/1
103	103/128	103/64	103/32	103/16	103/8	103/4	103/2
104	13/16	13/8	13/4	13/2	13/1	26/1	52/1
105	105/128	105/64	105/32	105/16	105/8	105/4	105/2
106	53/64	53/32	53/16	53/8	53/4	53/2	53/1
107	107/128	107/64	107/32	107/16	107/8	107/4	107/2
108	27/32	27/16	27/8	27/4	27/2	27/1	54/1
109	109/128	109/64	109/32	109/16	109/8	109/4	109/2
110	55/64	55/32	55/16	55/8	55/4	55/2	55/1
111	111/128	111/64	111/32	111/16	111/8	111/4	111/2
112	7/8	7/4	7/2	7/1	14/1	28/1	56/1
113	113/128	113/64	113/32	113/16	113/8	113/4	113/2
114	57/64	57/32	57/16	57/8	57/4	57/2	57/1
115	115/128	115/64	115/32	115/16	115/8	115/4	115/2
116	29/32	29/16	29/8	29/4	29/2	29/1	58/1
117	117/128	117/64	117/32	117/16	117/8	117/4	117/2
118	59/64	59/32	59/16	59/8	59/4	59/2	59/1
119	119/128	119/64	119/32	119/16	119/8	119/4	119/2
120	15/16	15/8	15/4	15/2	15/1	30/1	60/1
121	121/128	121/64	121/32	121/16	121/8	121/4	121/2
122	61/64	61/32	61/16	61/8	61/4	61/2	61/1
123	123/128	123/64	123/32	123/16	123/8	123/4	123/2
124	31/32	31/16	31/8	31/4	31/2	31/1	62/1
125	125/128	125/64	125/32	125/16	125/8	125/4	125/2
126	63/64	63/32	63/16	63/8	63/4	63/2	63/1
127	127/128	127/64	127/32	127/16	127/8	127/4	127/2

Bars per LFO cycle (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
1	128/1	64/1	32/1	16/1	8/1	4/1	2/1
2	64/1	32/1	16/1	8/1	4/1	2/1	1/1
3	128/3	64/3	32/3	16/3	8/3	4/3	2/3
4	32/1	16/1	8/1	4/1	2/1	1/1	1/2
5	128/5	64/5	32/5	16/5	8/5	4/5	2/5
6	64/3	32/3	16/3	8/3	4/3	2/3	1/3
7	128/7	64/7	32/7	16/7	8/7	4/7	2/7
8	16/1	8/1	4/1	2/1	1/1	1/2	1/4
9	128/9	64/9	32/9	16/9	8/9	4/9	2/9
10	64/5	32/5	16/5	8/5	4/5	2/5	1/5
11	128/11	64/11	32/11	16/11	8/11	4/11	2/11
12	32/3	16/3	8/3	4/3	2/3	1/3	1/6
13	128/13	64/13	32/13	16/13	8/13	4/13	2/13
14	64/7	32/7	16/7	8/7	4/7	2/7	1/7
15	128/15	64/15	32/15	16/15	8/15	4/15	2/15
16	8/1	4/1	2/1	1/1	1/2	1/4	1/8
17	128/17	64/17	32/17	16/17	8/17	4/17	2/17
18	64/9	32/9	16/9	8/9	4/9	2/9	1/9
19	128/19	64/19	32/19	16/19	8/19	4/19	2/19
20	32/5	16/5	8/5	4/5	2/5	1/5	1/10
21	128/21	64/21	32/21	16/21	8/21	4/21	2/21
22	64/11	32/11	16/11	8/11	4/11	2/11	1/11
23	128/23	64/23	32/23	16/23	8/23	4/23	2/23
24	16/3	8/3	4/3	2/3	1/3	1/6	1/12
25	128/25	64/25	32/25	16/25	8/25	4/25	2/25
26	64/13	32/13	16/13	8/13	4/13	2/13	1/13
27	128/27	64/27	32/27	16/27	8/27	4/27	2/27
28	32/7	16/7	8/7	4/7	2/7	1/7	1/14
29	128/29	64/29	32/29	16/29	8/29	4/29	2/29
30	64/15	32/15	16/15	8/15	4/15	2/15	1/15
31	128/31	64/31	32/31	16/31	8/31	4/31	2/31
32	4/1	2/1	1/1	1/2	1/4	1/8	1/16

Bars per LFO cycle (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
33	128/33	64/33	32/33	16/33	8/33	4/33	2/33
34	64/17	32/17	16/17	8/17	4/17	2/17	1/17
35	128/35	64/35	32/35	16/35	8/35	4/35	2/35
36	32/9	16/9	8/9	4/9	2/9	1/9	1/18
37	128/37	64/37	32/37	16/37	8/37	4/37	2/37
38	64/19	32/19	16/19	8/19	4/19	2/19	1/19
39	128/39	64/39	32/39	16/39	8/39	4/39	2/39
40	16/5	8/5	4/5	2/5	1/5	1/10	1/20
41	128/41	64/41	32/41	16/41	8/41	4/41	2/41
42	64/21	32/21	16/21	8/21	4/21	2/21	1/21
43	128/43	64/43	32/43	16/43	8/43	4/43	2/43
44	32/11	16/11	8/11	4/11	2/11	1/11	1/22
45	128/45	64/45	32/45	16/45	8/45	4/45	2/45
46	64/23	32/23	16/23	8/23	4/23	2/23	1/23
47	128/47	64/47	32/47	16/47	8/47	4/47	2/47
48	8/3	4/3	2/3	1/3	1/6	1/12	1/24
49	128/49	64/49	32/49	16/49	8/49	4/49	2/49
50	64/25	32/25	16/25	8/25	4/25	2/25	1/25
51	128/51	64/51	32/51	16/51	8/51	4/51	2/51
52	32/13	16/13	8/13	4/13	2/13	1/13	1/26
53	128/53	64/53	32/53	16/53	8/53	4/53	2/53
54	64/27	32/27	16/27	8/27	4/27	2/27	1/27
55	128/55	64/55	32/55	16/55	8/55	4/55	2/55
56	16/7	8/7	4/7	2/7	1/7	1/14	1/28
57	128/57	64/57	32/57	16/57	8/57	4/57	2/57
58	64/29	32/29	16/29	8/29	4/29	2/29	1/29
59	128/59	64/59	32/59	16/59	8/59	4/59	2/59
60	32/15	16/15	8/15	4/15	2/15	1/15	1/30
61	128/61	64/61	32/61	16/61	8/61	4/61	2/61
62	64/31	32/31	16/31	8/31	4/31	2/31	1/31
63	128/63	64/63	32/63	16/63	8/63	4/63	2/63
64	2/1	1/1	1/2	1/4	1/8	1/16	1/32



Bars per LFO cycle (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
65	128/65	64/65	32/65	16/65	8/65	4/65	2/65
66	64/33	32/33	16/33	8/33	4/33	2/33	1/33
67	128/67	64/67	32/67	16/67	8/67	4/67	2/67
68	32/17	16/17	8/17	4/17	2/17	1/17	1/34
69	128/69	64/69	32/69	16/69	8/69	4/69	2/69
70	64/35	32/35	16/35	8/35	4/35	2/35	1/35
71	128/71	64/71	32/71	16/71	8/71	4/71	2/71
72	16/9	8/9	4/9	2/9	1/9	1/18	1/36
73	128/73	64/73	32/73	16/73	8/73	4/73	2/73
74	64/37	32/37	16/37	8/37	4/37	2/37	1/37
75	128/75	64/75	32/75	16/75	8/75	4/75	2/75
76	32/19	16/19	8/19	4/19	2/19	1/19	1/38
77	128/77	64/77	32/77	16/77	8/77	4/77	2/77
78	64/39	32/39	16/39	8/39	4/39	2/39	1/39
79	128/79	64/79	32/79	16/79	8/79	4/79	2/79
80	8/5	4/5	2/5	1/5	1/10	1/20	1/40
81	128/81	64/81	32/81	16/81	8/81	4/81	2/81
82	64/41	32/41	16/41	8/41	4/41	2/41	1/41
83	128/83	64/83	32/83	16/83	8/83	4/83	2/83
84	32/21	16/21	8/21	4/21	2/21	1/21	1/42
85	128/85	64/85	32/85	16/85	8/85	4/85	2/85
86	64/43	32/43	16/43	8/43	4/43	2/43	1/43
87	128/87	64/87	32/87	16/87	8/87	4/87	2/87
88	16/11	8/11	4/11	2/11	1/11	1/22	1/44
89	128/89	64/89	32/89	16/89	8/89	4/89	2/89
90	64/45	32/45	16/45	8/45	4/45	2/45	1/45
91	128/91	64/91	32/91	16/91	8/91	4/91	2/91
92	32/23	16/23	8/23	4/23	2/23	1/23	1/46
93	128/93	64/93	32/93	16/93	8/93	4/93	2/93
94	64/47	32/47	16/47	8/47	4/47	2/47	1/47
95	128/95	64/95	32/95	16/95	8/95	4/95	2/95
96	4/3	2/3	1/3	1/6	1/12	1/24	1/48

Bars per LFO cycle (fractions)							
Speed	X1	X2	X4	X8	X16	X32	X64
97	128/97	64/97	32/97	16/97	8/97	4/97	2/97
98	64/49	32/49	16/49	8/49	4/49	2/49	1/49
99	128/99	64/99	32/99	16/99	8/99	4/99	2/99
100	32/25	16/25	8/25	4/25	2/25	1/25	1/50
101	128/101	64/101	32/101	16/101	8/101	4/101	2/101
102	64/51	32/51	16/51	8/51	4/51	2/51	1/51
103	128/103	64/103	32/103	16/103	8/103	4/103	2/103
104	16/13	8/13	4/13	2/13	1/13	1/26	1/52
105	128/105	64/105	32/105	16/105	8/105	4/105	2/105
106	64/53	32/53	16/53	8/53	4/53	2/53	1/53
107	128/107	64/107	32/107	16/107	8/107	4/107	2/107
108	32/27	16/27	8/27	4/27	2/27	1/27	1/54
109	128/109	64/109	32/109	16/109	8/109	4/109	2/109
110	64/55	32/55	16/55	8/55	4/55	2/55	1/55
111	128/111	64/111	32/111	16/111	8/111	4/111	2/111
112	8/7	4/7	2/7	1/7	1/14	1/28	1/56
113	128/113	64/113	32/113	16/113	8/113	4/113	2/113
114	64/57	32/57	16/57	8/57	4/57	2/57	1/57
115	128/115	64/115	32/115	16/115	8/115	4/115	2/115
116	32/29	16/29	8/29	4/29	2/29	1/29	1/58
117	128/117	64/117	32/117	16/117	8/117	4/117	2/117
118	64/59	32/59	16/59	8/59	4/59	2/59	1/59
119	128/119	64/119	32/119	16/119	8/119	4/119	2/119
120	16/15	8/15	4/15	2/15	1/15	1/30	1/60
121	128/121	64/121	32/121	16/121	8/121	4/121	2/121
122	64/61	32/61	16/61	8/61	4/61	2/61	1/61
123	128/123	64/123	32/123	16/123	8/123	4/123	2/123
124	32/31	16/31	8/31	4/31	2/31	1/31	1/62
125	128/125	64/125	32/125	16/125	8/125	4/125	2/125
126	64/63	32/63	16/63	8/63	4/63	2/63	1/63
127	128/127	64/127	32/127	16/127	8/127	4/127	2/127