

Ticks per Quarter Note

If result is an integer then the note value can be stored exactly by using the specified TPQN setting. Otherwise, the note will be quantized to the closest tick and will have timing off by at most one-half of the minimum tick resolution determined by the tempo setting.

Note Name	# per quarter	24	48	96	240	480	960	1680
Quarter	1	24	48	96	240	480	960	1680
8 th	2	12	24	48	120	240	480	840
8 th Triplet	3	8	16	32	80	160	320	560
16 th	4	6	12	24	60	120	240	420
	5	4.8	9.6	19.2	48	96	192	336
16 th Triplet	6	4	8	16	40	80	160	280
	7	3.43	6.86	13.71	34.29	68.57	137.14	240
32 nd	8	3	6	12	30	60	120	210
	9	2.67	5.33	10.67	26.67	53.33	106.67	186.67
	10	2.4	4.8	9.6	24	48	96	168
	11	2.18	4.36	8.73	21.82	43.64	87.27	152.73
32 nd Triplet	12	2	4	8	20	40	80	140
	13	1.85	3.69	7.38	18.46	36.92	73.85	129.23
	14	1.71	3.43	6.86	17.14	34.29	68.57	120
	15	1.6	3.2	6.4	16	32	64	112
64 th	16	1.5	3	6	15	30	60	105
64 th Triplet	24	1	2	4	10	20	40	70
128 th	32	0.75	1.5	3	7.5	15	30	52.5
128 th Triplet	48	0.5	1	2	5	10	20	35
256 th	64	0.38	0.75	1.5	3.75	7.5	15	26.25

Minimum Resolution (ms)

Tempo (BPM)	Ticks per Quarter Note							
	24	48	96	240	480	960	1680	
40	62.5	31.3	15.6	6.3	3.1	1.6	0.89	
60	41.7	20.8	10.4	4.2	2.1	1.0	0.60	
80	31.3	15.6	7.8	3.1	1.6	0.8	0.45	
100	25.0	12.5	6.3	2.5	1.3	0.6	0.36	
120	20.8	10.4	5.2	2.1	1.0	0.5	0.30	
140	17.9	8.9	4.5	1.8	0.9	0.4	0.26	
160	15.6	7.8	3.9	1.6	0.8	0.4	0.22	
180	13.9	6.9	3.5	1.4	0.7	0.3	0.20	
200	12.5	6.3	3.1	1.3	0.6	0.3	0.18	

Example: 7 even spaced notes over same time as four 16th notes with TPQN of 24 vs 960 at 100 BPM

Ticks	24 ticks	960 ticks	24 ticks	960 ticks
min resolution			25	0.6
Req'd TPQN	3.43	137.14		
	<i>Theoretical Tick Value</i>		<i>Difference from Theoretical (ms)</i>	
note 1	0	0	0	0
2	3.43	137.14	-10.75	-0.08
3	6.86	274.28	3.5	-0.17
4	10.29	411.42	-7.25	-0.25
5	13.72	548.56	7	0.26
6	17.15	685.7	-3.75	0.18
7	20.58	822.84	10.5	0.1

negative = ahead of theoretical (ie. early)

positive = behind theoretical (ie. late)