

**MTO 28.1 Examples: Rahn, Was Mesopotamian Tuning Diatonic?**

(Note: audio, video, and other interactive examples are only available online)

<https://mtosmt.org/issues/mto.22.28.1/mto.22.28.1.rahn.html>

Example 1. Numbers and names of strings

Number	Translation	Sumerian	Akkadian
1	Front	sa-di	<i>qudmû</i>
2	Following	sa-ús	<i>samuššu</i>
3	Third thin	sa-3-sa-sig	<i>šalšu qatnu</i>
4	Fourth small/Ea creator	sa-4-tur	<i>Ea-bānû</i>
5	Fifth	sa-di-5	<i>hamšu</i>
6	Fourth from behind	sa-4-a-ga-gul	<i>ribi uhrî</i>
7	Third from behind	sa-3-a-ga-gul	<i>šalši uhrî</i>
8	Second from behind	sa-2-a-ga-gul	<i>šini uhrî</i>
9	Back	[sa-1]-a-ga-gul	<i>uhrû</i>

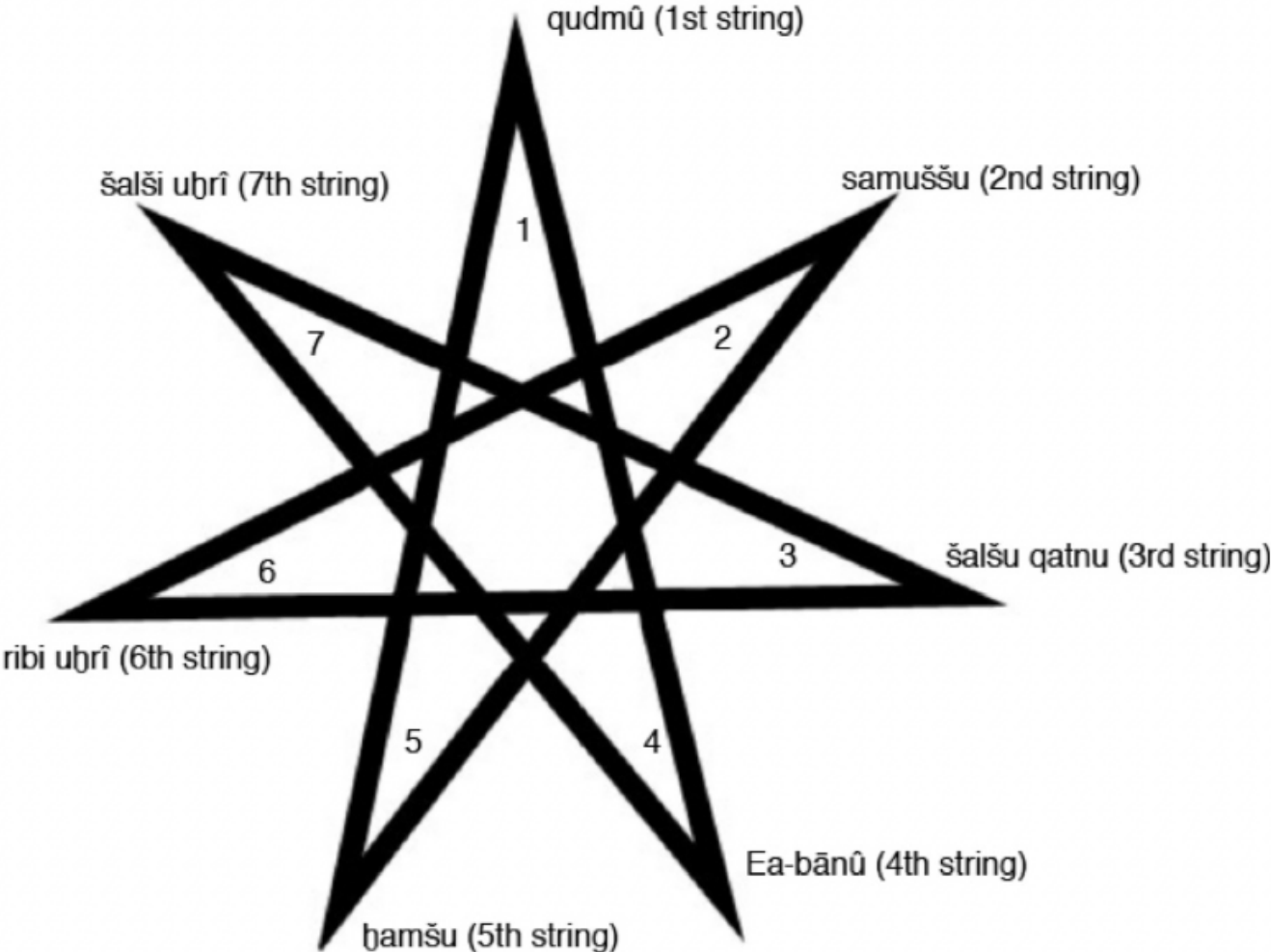
Example 2. Numbers and names of three- and four-string-step dichords

Number	Name
1&5	<i>nīš tuhrim</i>
2&6	<i>išartum</i>
3&7	<i>embūbum</i>
4&1	<i>nīd(i) qablim</i>
5&2	<i>qablītum</i>
6&3	<i>kitnum</i>
7&4	<i>pītum</i>

Example 3. *La-zakû* dichords in seven named tunings. For each tuning, C identifies the string that is to be changed to produce the next tuning, reading from top to bottom.

Tunings	Strings:						
	1	2	3	4	5	6	7
iřartum					C		
qablĭtum	C						
nĭř tuħrim				C			
nĭd(i) qablim							C
pĭtum			C				
embūbum						C	
kitmum		C					
embūbum						C	
pĭtum			C				
nĭd(i) qablim							C
nĭř tuħrim				C			
qablĭtum	C						
iřartum					C		

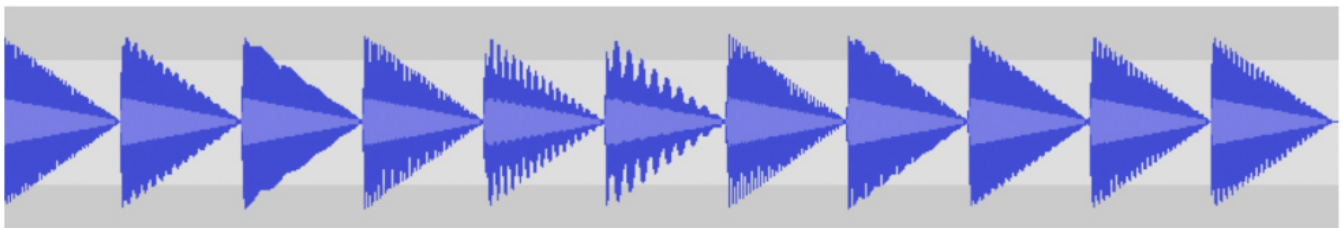
Example 4. Acute, "great," "star" heptagram



Example 5. Realizing seven tunings “from scratch”

		"Initial" <i>Zakû</i> Dichord if Tuning "From Scratch"					4- and 5-String Dichord Cycles: <i>Zakû</i> in Plain Typeface, <i>La-Zakû</i> in Bold									
		1	2	3	4	5	6	7								
Chapters:	Tuning Names:															
	Tightening															
	<i>išartum</i>	x					x									
	qablītum	x			x											
	nīš tuḥrim				x			x								
	nīd(i) qablim			x				x								
	pītum			x			x									
embūbum		x					x									
kitmum		x			x											
Loosening	<i>išartum</i>	x				x										
	kitmum		x			x										
	embūbum		x				x									
	pītum			x			x									
	nīd(i) qablim			x				x								
	nīš tuḥrim				x			x								
	qablītum	x			x											
<i>išartum</i>	x					x										

Example 6. Waveforms of 11 pairs of simultaneous tones



Example 9. Direction of fundamental frequencies from string 1 to string 7

		strings:						
		1	2	3	4	5	6	7
A	fundamental frequencies	x	x	0	0	0	0	$-x$
	directed string steps	$\langle 0 \rangle$	$\langle x \rangle$	0	0	0	$\langle x \rangle$	
B	fundamental frequencies	$-3x$	$-5x$	0	$-2x$	$-4x$	$-6x$	$-x$
	directed string steps	$\langle 2x \rangle$	$\langle -5x \rangle$	$\langle 2x \rangle$	$\langle 2x \rangle$	$\langle 2x \rangle$	$\langle -5x \rangle$	
	altered fundamental frequencies			$-5x$			$-x$	
C	fundamental frequencies	$-g+2s$	$-2g+3s$	0	$-g+s$	$-2g+2s$	$-3g+3s$	$-g$
	directed string steps	$\langle g-s \rangle$	$\langle -2g+3s \rangle$	$\langle g-s \rangle$	$\langle g-s \rangle$	$\langle g-s \rangle$	$\langle -2g+3s \rangle$	
	altered fundamental frequencies			$-3g+4s$			$-s$	
D	fundamental frequencies	$-g-2s$	$-2g-3s$	0	$-g-s$	$-2g-2s$	$-3g-3s$	$-g$
	directed string steps	$\langle g+s \rangle$	$\langle -2g-3s \rangle$	$\langle g+s \rangle$	$\langle g+s \rangle$	$\langle g+s \rangle$	$\langle -2g-3s \rangle$	
	altered fundamental frequencies			$-3g-2s$			$-s$	
E	fundamental frequencies	$-s+2g$	$-2s+3g$	0	$-s+g$	$-2s+2g$	$-3s+3g$	$-s$
	directed string steps	$\langle s-g \rangle$	$\langle -2s+3g \rangle$	$\langle s-g \rangle$	$\langle s-g \rangle$	$\langle s-g \rangle$	$\langle -2s+3g \rangle$	
F	fundamental frequencies	$-s-2g$	$-2s-3g$	0	$-s-g$	$-2s-2g$	$-3s-3g$	$-s$
	directed string steps	$\langle s+g \rangle$	$\langle -2s-3g \rangle$	$\langle s+g \rangle$	$\langle s+g \rangle$	$\langle s+g \rangle$	$\langle -2s-3g \rangle$	
	altered fundamental frequencies			$-2s-3g$			$-s$	

Example 11. Tuning “from scratch” with 4/3 and 3/2 and re-tuning by tightening

išartum



qablītum



Tightening

*

nīš tuḥrim



*

nīd(i) qablim



*

pītum



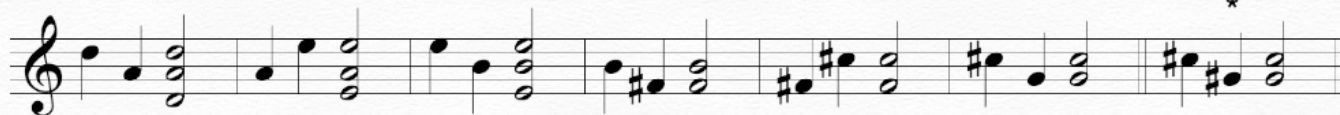
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embūbum



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kitmum



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Example 12. Re-tuning by loosening

iřartum

Loosening
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