

Neutral thirds tuning for quartertones on conventionally fretted guitar

This tuning allows you to play the quartertone scale on a conventionally fretted guitar or bass guitar. The modification is cheap and reversible, only requiring a custom set of single strings. This is 'stealth microtonality', no-one would know by looking at your guitar it is microtonal.

Introduction to 24EDO

The quartertone scale is also known as: 24 Equal Divisions of the Octave (24EDO), 24 Equal Temperament (24ET), 24 Tone Equal Temperament (24TET) or just 24 equal. Use of the word 'temperament' is sloppy, the quartertone scale is not necessarily a temperament, so I use 24EDO. 24EDO is a division of the octave into 24 equal steps of pitch, each step being a quartertone = half a semitone = 50 cents. Our standard system of 12 equal temperament is contained within 24EDO. 24EDO is the standard tones plus 12 quartertones, each one added halfway between the standard tones.

When naming the new intervals, super = quartertone sharp, sub = quartertone flat, neutral = halfway between major and minor.

A popular ASCII notation is to use up and down arrows: ^ = quartertone sharp, v = quartertone flat.

Semitones - Interval name – Abbreviation - Notation example

| | | | |
|------|-------------------------------------|----------|----------|
| 12 | Octave | 8 | C |
| 11.5 | Supermajor seventh | ^7 | B^ |
| 11 | Major seventh | 7 | B |
| 10.5 | Neutral seventh | n7 | Bv |
| 10 | Minor seventh | b7 | Bb |
| 9.5 | Supermajor sixth / Subminor seventh | ^6 / vb7 | A^ / Bbv |
| 9 | Major sixth | 6 | A |
| 8.5 | Neutral sixth | n6 | Av |
| 8 | Minor sixth | b6 | Ab |
| 7.5 | Superfifth / Subminor sixth | ^5 / vb6 | G^ / Abv |
| 7 | Fifth | 5 | G |
| 6.5 | Subfifth | v5 | Gv |
| 6 | Augmented fourth / Diminished fifth | #4 / b5 | F# / Gb |
| 5.5 | Superfourth | ^4 | F^ |
| 5 | Fourth | 4 | F |
| 4.5 | Supermajor third / Subfourth | ^3 / v4 | E^ / Fv |
| 4 | Major third | 3 | E |
| 3.5 | Neutral third | n3 | Ev |
| 3 | Minor third | b3 | Eb |
| 2.5 | Supermajor second / Subminor third | ^2 / vb3 | D^ / Ebv |
| 2 | Major second | 2 | D |
| 1.5 | Neutral second | n2 | Dv |
| 1 | Minor second | b2 | Db |
| 0.5 | Subminor second | vb2 | Dbv |
| 0 | Unison | 1 | C |

Neutral thirds tuning

The intervals between the open strings are neutral thirds = 3.5 semitones = half a fifth.
For example with 6 strings:

Semitones - Interval name

| | |
|----------|-----------------|
| High | |
| 12 + 5.5 | Supereleveth |
| 12 + 2 | Ninth |
| 10.5 | Neutral seventh |
| 7 | Fifth |
| 3.5 | Neutral third |
| 0 | Unison |
| Low | |

The tuning follows the conventional chord structure of root - third - fifth - seventh - ninth - eleventh. The strings alternate between standard tones and quartertones. Immediately you can see that playing the open strings or straight across one fret results in a neutral triad, neutral seventh chord, neutral ninth chord or a neutral ninth supereleventh chord.

Because the tuning is all-neutral thirds, chords and scales can be transposed to any quartertone on the fretboard without changing shape, modulation to any key is possible.

String gauges and restringing

I have used the D'Addario tension charts to create a sequence of gauges suitable for this tuning and with a slight, steady fall in tension from lowest to highest string. This tuning reduces the range of the instrument so choose a sequence of gauges that covers the required range. Acoustic guitars have a fixed intonation bridge so you need to use similar gauges to an acoustic set, the closest match is 48 38 30 24w 17p 13p. Using strings thinner than the nut slots is not problematic as long as there is downforce at the nut and the slot floors retain their curvature.

Guitar

74 59 48 38 30 24w 17p 13p 10p 8p

Bass

125 95 75 60 45 35 25w 17p 13p 10p 8p

For example 6 string electric guitar equivalent to a 10-46 set:

| | |
|-----|----------------|
| 10p | D [^] |
| 13p | B (standard B) |
| 17p | G [^] |
| 24w | E |
| 30 | C [^] |
| 38 | A (standard A) |

4 string bass equivalent to 40-100 set (FACE tuning)

| | |
|----|----|
| 45 | Ev |
| 60 | C |
| 75 | Av |
| 95 | F |

Since with these gauge sequences the lowest string is the tightest, restring the lowest string first and tune it up to the highest tension you are comfortable with, this will set the pitch of your tuning. Because the gauges have changed you will need to move the saddles to reset the intonation.

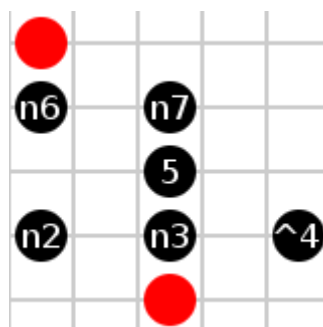
Tuning the quartertone strings

Most guitar tuners display pitch from -50 cents to +50 cents. -50 cents = quartertone flat , +50 cents = quartertone sharp. When correctly tuned to the quartertone midway between 2 semitones the display may jump back and forth from the lower semitone +50 cents to the higher semitone -50 cents, as these are the same pitch.

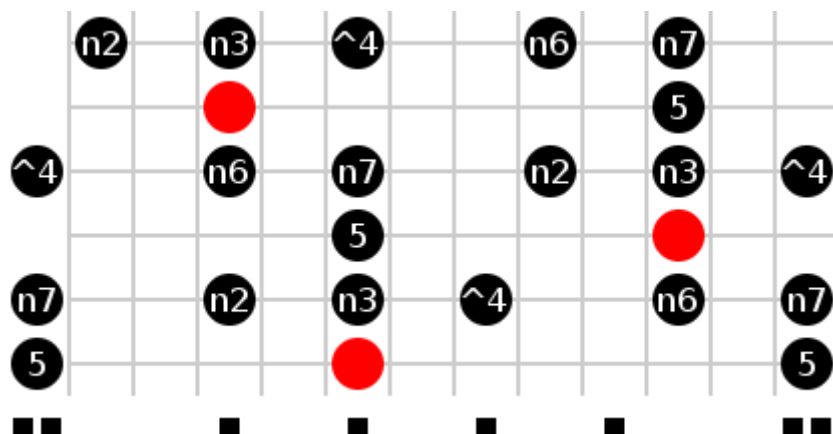
Example scale 1 n2 n3 ^4 5 n6 n7 8

This scale introduces all 4 neutral intervals and the superfourth / 11th harmonic.

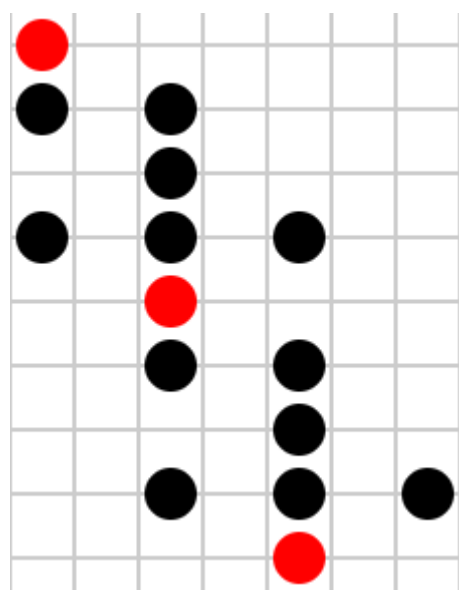
Scales in this tuning can be specified as the pattern of a 1 octave run through the scale. Red circles are the tonics.



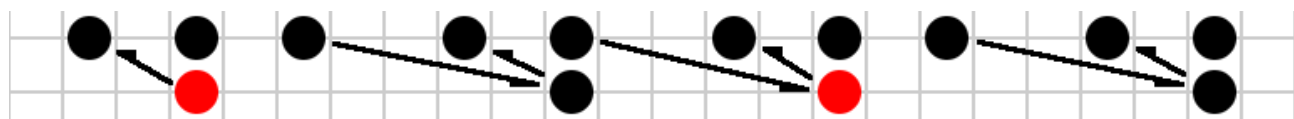
To cover the entire fretboard with the scale, first draw the tonics and use them to position copies of the pattern above.



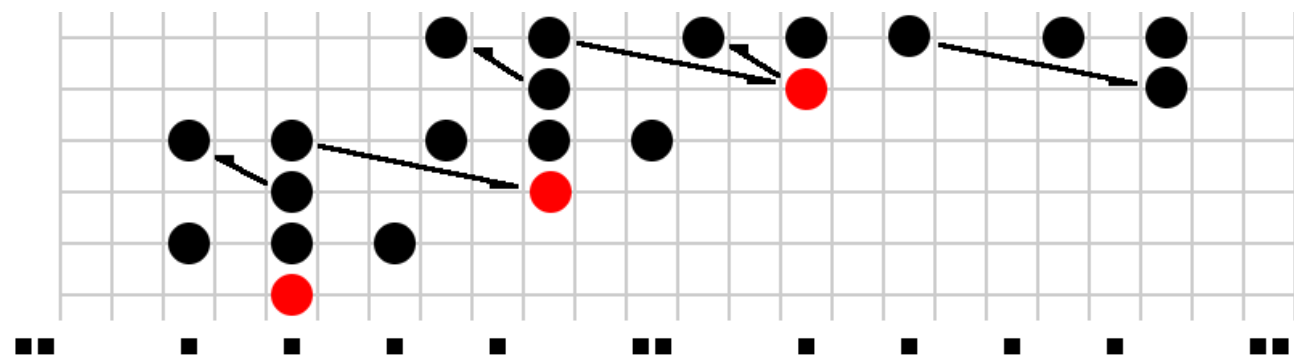
A 2 octave run through the scale on a 9 string guitar, showing how to play across the strings.



2 octave run through the scale playing up the strings. This involves skipping between 2 strings.



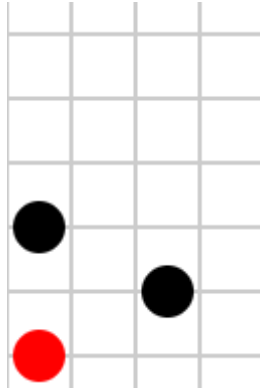
A diagonal 3 octave run through the scale on a 6 string guitar.



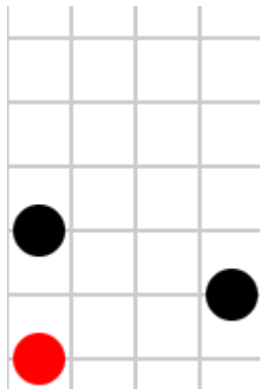
Chords

Red circles are the root tones.

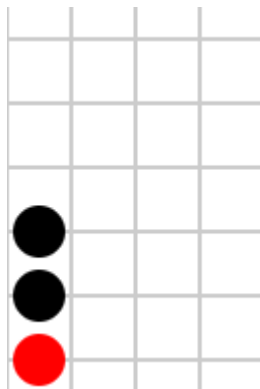
Suspended superfourth chord, sus^4 . A fundamental chord combining the 11th and 3rd harmonics.



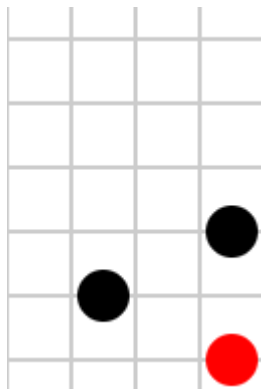
Suspended subfifth chord, $\text{susv}5$. The subfifth is the inversion of the 11th harmonic.



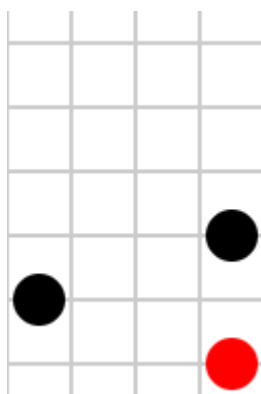
Neutral triad, n . Precisely midway between a major and a minor triad.



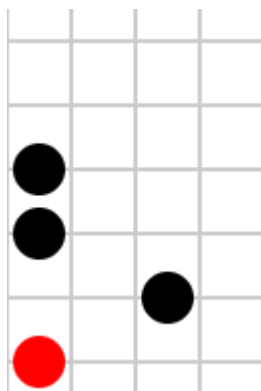
Suspended neutral second chord, susn2



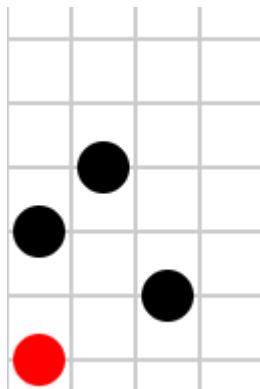
Suspended subminor second chord, susvb2



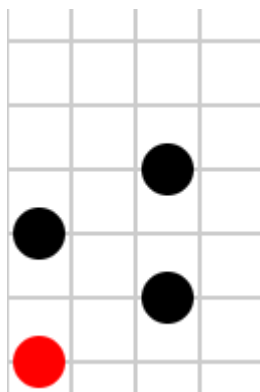
Suspended superfourth neutral seventh chord, sus⁴ n7



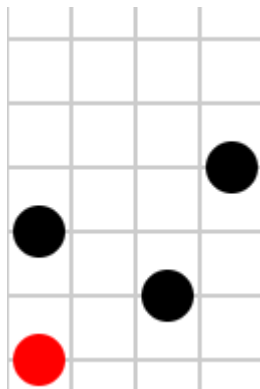
Suspended superfourth supermajor seventh chord, sus⁴ ^7



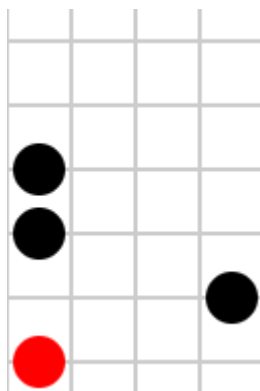
Suspended superfourth subminor ninth chord, sus⁴ vb9



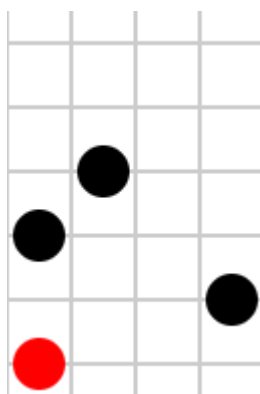
Suspended superfourth neutral ninth chord, sus⁴ n9



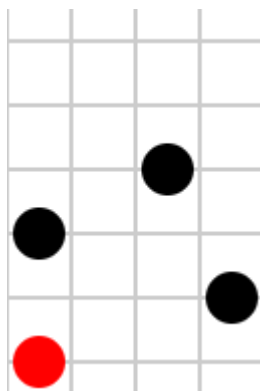
Suspended subfifth neutral seventh chord, susv5 n7



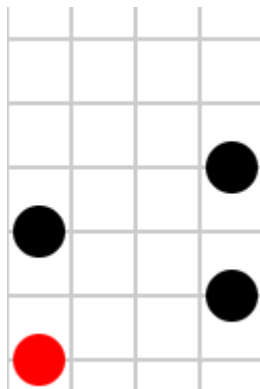
Suspended subfifth supermajor seventh chord, susv5 ^7



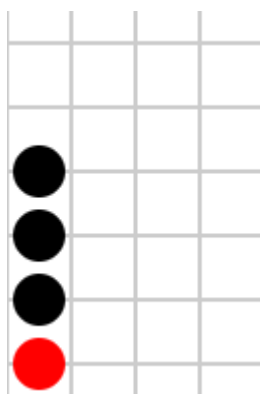
Suspended subfifth subminor ninth chord, susv5 vb9



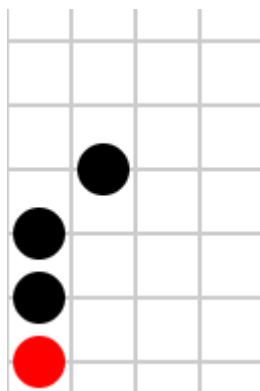
Suspended subfifth neutral ninth chord, susv5 n9



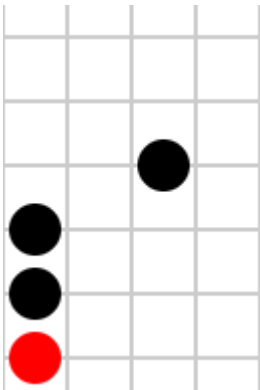
Neutral seventh chord, n7



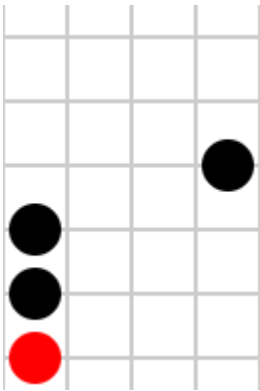
Neutral supermajor seventh chord, n ^7



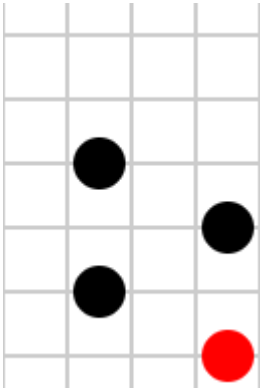
Neutral subminor ninth chord, n vb9



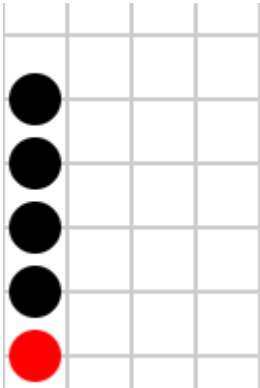
Neutral - neutral ninth chord, n n9



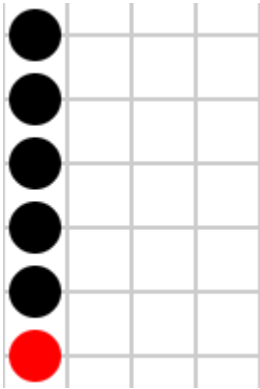
Suspended neutral second neutral sixth chord, susn2 n6



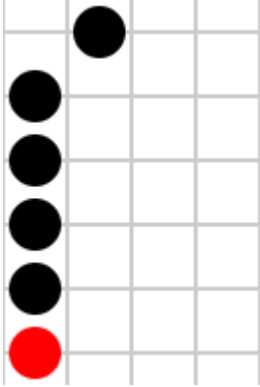
Neutral ninth chord, n9



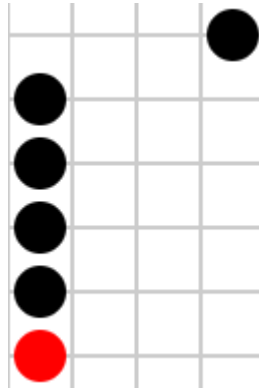
Neutral ninth supereleventh chord, n9 ^11



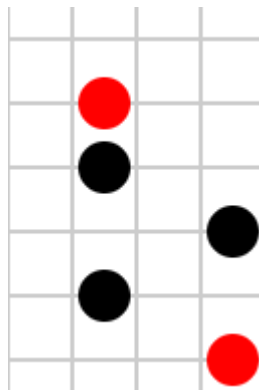
Neutral ninth subtwelfth chord, n9 v12



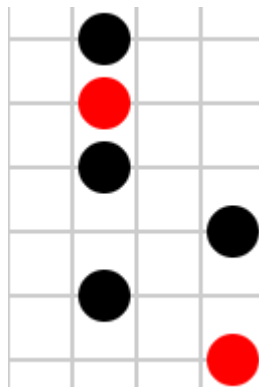
Neutral ninth neutral thirteenth chord, n9 n13



Suspended neutral second neutral sixth chord, susn2 n6



Suspended neutral second neutral sixth neutral tenth chord, susn2 n6 n10



Mat Cooper April 2011



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