#### LucyTuned Guitars



The first practical LucyTuned guitar was the Mk V, which was first made in 1986. It has twenty-five frets per octave.

The story of its design and construction can be found in <u>chapter one of Pitch, Pi</u>, <u>and Other Musical Paradoxes</u>. This is the design used by Arc-Angel and there are now a few hundred copies which have been made in all parts of the world. Although the design was patented, permission has been given for their non-commercial production for personal use. The design details have been evolving, and it is now proposed that new users start with the nineteen fret per octave model, and with experience add twelve further frets to make it thirty-one frets per octave.

### Playing LucyTuned guitars

## Diagram of LucyTuned and 12tET frettings

This design is intended to make the evolution from 12tET to LucyTuning as easy as possible for experienced musicians and new players. Although all frets, except the octave, are at different positions; the dots or marks found on the neck and fretboard of a conventional guitar are found at directly comparable positions on LucyTuned guitars. The familiar "landmarks" usually found at the 3, 5, 7, 9, and 12th frets on 12tET guitars, are placed at the bIII, IV, V, VI, and VIII positions. (i.e. C, D, E, and F# for the A (5th) string. This enables new users to use familiar open tunings and immediately navigate around the fretboard using familiar fingering.

When playing with more than 19 frets per

octave you will use pairs of close frets. Placing your fingers **below** (towards the nut from) **the pair** will sound the **flatter** note. Playing on **the pair** will sound the **sharper** of the two notes.

You will notice that all the **sharper** of the notes sounded from the pairs will be in **sharp keys**; the **lower of the pair** being in **flat keys**.

#### Tuning LucyTuned guitars

Any tuning of the open strings may be used: conventional (EADGBE), slack key, alternative etc. yet each string will need to be referenced to A4 = 440Hz. and other notes fine tuned (+/- a few cents). This may be done by matching to frets on adjacent strings, using "harmonics", or an electronic tuner. The tuning needs to be very precise, yet when you have got correct, it will be very apparent, for chords you play will sound very "in tune".

Using conventional tuning the changes are:

Getting your own LucyTuned guitar



## New Neck and fretboard

New necks can be manufactured for most solid guitars with any specified fretting by: John Carruthers, 346, Sunset Ave, Venice, California 90291. Phone1 (213) 392-3910 contact Jim Hetal.

## **Magnetic Fretboard Kits**

Mark Rankin, (last seen in Phoenix, AZ.), mail at: Franklin City, Greensbackville, VA 23356, phone contact numbers 1 (714) 688-9894 and 1 (415) 658-1889 can provide a kit for interchangeable fretboards, which are held in position by a magnetic laminate.

DIY: You can produce your own, using magnetic laminate available from: <u>Magna Visual Inc.</u> 9400, Watson Road, St. Louis, Missouri 63126-1598: Voice 1 (314) 843-9000 or Fax 1 (314) 843-0000. (\$15 for two sheets .045" x 12" x 24"). You will need to remove all frets and plane or sand down your fretboard to glue on a thin metal sheet (I have used thin galvanised roofing material), then cut the laminate to size, and attach the frets to the laminate.

You can then use the guitar fretless, or with a variety of interchangeable fretting systems.

## Refretting

You can get an existing guitar refretted by any competent luthier. I use and recommend: Colin Noden at <u>Andy's Guitar Shop</u>, Denmark St. London W1. He is very experienced and usually busy, yet does an excellent job. Most luthiers will charge a couple of hundred dollars for the work, and will need the exact fret positions which depend upon your nut to bridge distance.

In the US, you might also try <u>Glen Peterson</u>.

If your instrument has other than 650 mm from nut to bridge, you will need to pro-rata the distances, or <u>EMail Charles Lucy from here.</u> (lucy@harmonics.com) with your nut to bridge distance (in inches or millimeters) to get the AmigaBasic or spreadsheet program or a file of the output.

# DIY

Doing it yourself is the least expensive route. Remove all the frets. Fill the holes with Plastic Wood. Allow to dry overnight. Sand the board and stick masking tape over it so that you can mark out the fret positions. Draw a straight line from the centre of the nut to the centre of the bridge as a reference for fret alignment, and mark each fret position. Cut fret grooves; remove the masking tape, insert the frets; secure them; trim; file; dress; set up guitar and enjoy playing your LucyTuned guitar.

I suggest 19 frets per octave initially, so that you can add more frets later as you gain playing experience. Use mandolin fretwire for the second octave, so that there will be space for the extra frets later.

Fret positions for LucyTuned 19 & 31 frets per octave instruments

 Intervals
 Ratio
 Cents

 Large (L)
 1.116633
 190.9858

 small (s)
 1.073344
 122.5354

Distance from Nut to Bridge = 650 (millimetres) (for other other nut to bridge distances, values can be pro-rated)

Note Name Guitar Fifth String (* = marks)	Scale Position	Distance Nut to fret <b>First</b> <b>Octave</b>	Fret No of <b>19</b> for <b>First</b> <b>octave</b> (0-19)	Fret No.of <b>31</b> for <b>First</b> <b>octave</b> (0-31)	Large (L) and small (s) Intervals from nut. Add (5L+2s) for second octave	Distance Nut to fret Second Octave	Fret No of <b>19</b> for <b>Second</b> <b>octave</b> (19-38)	Fret No. of <b>31</b> for <b>Second</b> octave (31-62)
А	Ι	-	Nut	Nut	Zero & 5L+2s	325.0	19	31
Bbb	bbII	019.9923	-	1	2s-L	334.9962	-	32
A#	#I	025.1987	1	2	L-s	337.5994	20	33
Bb	bII	044.4160	2	3	S	347.2080	21	34
Ax	xI	049.4295	-	4	2L-2s	349.7103	-	35
В	II	067.8928	3	5	L	358.9464	22	36
Cb	bbIII	085.7970	-	б	2s	367.8985	-	37
B#	#II	090.4595	4	7	2L-s	370.2298	23	38
*C	bIII*	107.6696	*5	8*	L+s	378.8348	*24	39*
Dbb	bbIV	124.3503	-	9	3s	387.1751	-	40
C#	III	128.6942	б	10	2L	389.3471	25	41
Db	bIV	144.7283	7	11	L+2s	397.3641	26	42
Cx	#III	148.9038	-	12	3L-s	399.4519	-	43
*D	IV*	164.3163	*8	13*	2L+s	407.1581	*27	44*
Ebb	bbV	179.2546	-	14	L+3s	414.6273	-	45
D#	#IV	183.1449	9	15	3L	416.5724	28	46
Eb	bV	197.5042	10	16	2L+2s	423.7521	29	47

LucyTuning\*LucyScaleDevelopments\*LucyTuned Lullabies\*Pi tuning\*John Longitude Harisson

Dx	xIV	201.2436	-	17	4L-s	425.6218	-	48
*E	V*	215.9462	*11	18*	3L+s	432.5231	*30	49*
Fb	bbVI	228.4242	-	19	2L+3s	439.2121	-	50
E#	#V	231.9081	12	20	4L	440.9541	31	51
F	bVI	244.7676	13	21	3L+2s	447.3838	32	52
Ex	xV	248.1164	-	22	5L-s	449.0582	-	53
*F#	VI*	260.4773	*14	23*	4L+s	455.2387	*33	54*
Gb	bbVII	272.4580	15	24	3L+3s	461.2290	34	55
Fx	#VI	275.5781	-	25	5L	462.7890	-	56
G	bVII	287.0943	16	26	4L+2s	468.5472	35	57
Abb	bbVIII	298.2564	-	27	3L+4s	474.1282	-	58
G#	VII	301.1632	17	28	5L+s	475.5816	36	59
Ab	bVIII	311.8925	18	29	4L+3s	480.9462	37	60
Gx	#VII	314.6866	-	30	6L	482.3433	-	61
**A	VIII**	325.0000	19**	31**	5L+2s	487.5000	38**	62**