

ལྷ་མོ་བོད་ཡིག

## TSAMPA KEYBOARD FONT

Version: 1.11 (doc updated 18 August 2005)

Copyright © Kristoffer Lindqvist, 2001-2005  
Released under the GNU Lesser General Public License

<http://tsampa.org/tibetan/software/tsamkey/>

## CONTENTS

- I. INTRODUCTION [2](#)
- II. LICENSE [2](#)
- III. INSTALLING THE FONT [3](#)
  - Installing on Windows systems [3](#)
  - Installing on Linux systems [3](#)
  - Installing on Macintosh systems [3](#)
  
  - Installing on other platforms [3](#)
- IV. USING THE FONT IN WORDPROCESSORS [3](#)
- V. TYPING STANDARD TIBETAN [4](#)
  - Root letters and vowels [4](#)
  - Stacking [4](#)
  - Numerals [5](#)
- VI. TIBETANIZED SANSKRIT SUPPORT [5](#)
- VII. LIST OF SUPPORTED GLYPHS WITH INPUT KEYS AND WYLIE [6](#)
  - Root letters [6](#)
  - Superscribed letters [7](#)
  - Subscribed letters [8](#)
  - Stacks [9](#)
  - Vowels [9](#)
  - Numerals [9](#)
  - Punctuation and other signs [10](#)
  - Reversed letters [10](#)
  - Standard combinations with subscribed *ha* [10](#)
  - Subscribed *sha* for *k+sha* [11](#)
  - Subscribed *ma* [11](#)
  - Subscribed *a chung* [11](#)
  - Sanskrit vowels [11](#)
- VIII. TEXT SAMPLES [12](#)
  - Beginning of chapter 18 of *mi ro rtse sgrung* [12](#)
  - Beginning of the Four Medical Tantras (*rgyud bzhi'i rnam bshad*) [12](#)
- IX. APPENDIX A: GNU LESSER GENERAL PUBLIC LICENSE [13](#)

## I. INTRODUCTION

This is an attempt at creating a Tibetan font that can be used directly from the keyboard without an driver or any other external software; just change the font to Tsampa Keyboard and type away in Wylie transliteration. This lack of external drivers means that the font should work on any platform and in any software that supports True Type fonts. Good candidates are applications where input macros cannot be used, applications that support only one font (non-Unicode Tibetan fonts are typically divided into several font files) or where it is not practical to cut and paste from a Tibetan enabled word processor. The typographic limitations imposed by the keyboard mapping makes Tsampa Keyboard less than ideal for publishing, except where dictated by circumstance (such as database printouts). If you are considering using the font in printed matter, you might want to print out the sample texts in section VIII beforehand to make sure the quality is good enough for your purpose (although the scaling of some ligatures might be somewhat off at some point sizes, they should print properly).

The idea of a keyboard Tibetan font is not mine; the idea started brewing after I first saw the freeware font Ü-chan<sup>1</sup> sometimes in the late 90s. Its typographic virtues where nothing to brag about, but I found the way it was mapped to the keyboard brilliant. One rainy Tibetan day in the spring of 2001, I finally decided to try making a keyboard font that would retain the intuitiveness of Ü-chan while making fewer typographic compromises. I did not specifically need such a font for anything, and found the prototype of another Tibetan typeface I was working on adequate for this experiment. I rescaled the glyphs to work as individual building blocks and made the keyboard mapping slightly more complex to allow for better typography and basic Tibetanized Sanskrit support. At some point I might sit down and polish the glyphs, spacing and kerning, but for now I am happy with the result. I also warmly invite anyone interested to take the project from here and have licensed this work accordingly (see section II).

Besides honing the particulars, there are also a few empty slots where additional glyphs could be placed. It would also be possible to add about 80 additional glyphs into the higher slots accessible through their numeral values (ALT + the ASCII value). This would allow for quite extensive Sanskrit support suitable for work that only occasionally requires these; typing in several three-number combinations just to build one ligature is a tedious process. Let me know if you have any glyph suggestions or thoughts about the key mapping.

## II. LICENSE

Tsampa Keyboard and this document are released under the GNU Lesser General Public License (LGPL). The gist of it is that you are permitted to distribute them as you see fit, as well as make any modifications to them as long as they too are LGPL'd and attribution of the original work is given. The license also permits you to use and distribute them with any non-free software (such as databases). For the full license, see Appendix A.

---

<sup>1</sup> The Ü-chen font can be downloaded from <http://babel.uoregon.edu/yamada/fonts/tibetan.html>. I have no idea of its origin, if anyone knows where it came from I would be interested in hearing about it.

I warmly invite anyone to modify the font and documentation as they see fit in accordance with the license; if I like the modifications I might fold them back into the main release. I would appreciate it if you would let me know of any modifications you make.

A separate source package containing this document in rtf format and the Fontographer source file can be downloaded from the Tsampa Keyboard homepage at <http://tsampa.org/tibetan/software/tsamkey/>. If you have any suggestions regarding Tsampa Keyboard or the license, don't hesitate to contact me at [kris@tsampa.org](mailto:kris@tsampa.org).

### III. INSTALLING THE FONT

#### INSTALLING ON WINDOWS SYSTEMS

Go to the Font folder (*Control Panel* → *Fonts*) and select *Install New Font* from the File menu. Then locate the directory that holds the Tsampa Keyboard font file TSAMKEY.TTF and select it. In case you have any programs running you might have to restart them to get the font to appear in their font selection. If you have any problems refer to Windows help (usually available from the Start menu). If you still can't get the thing installed, don't hesitate to contact me at [kris@tsampa.org](mailto:kris@tsampa.org).

#### INSTALLING ON LINUX SYSTEMS

Using True Type fonts on Linux is becoming easier and easier. A good place to start is <http://www.xfree86.org/current/fonts.html>.

#### INSTALLING ON MACINTOSH SYSTEMS

In July 2005, Simon Wickham-Smith (<http://www.qamutiik.net/>), a fellow tibetanist and font designer, kindly converted the font for the Macintosh and bundled it with the documentation. The Mac version has the anusvara mapped onto all single quote signs, but is otherwise identical to the Windows/Linux version. To install the font, you need to decode the package and drag the .sit font file into the Systems folder.

#### INSTALLING ON OTHER PLATFORMS

Tsampa Keyboard should work on all platforms that support True Type fonts. If you get the font to work on other platforms than the ones listed above, I would appreciate it if you could send me a description of how you did it for possible inclusion into this manual. Screenshots would also be fun.

### IV. USING THE FONT IN WORDPROCESSORS

Some wordprocessors have autocorrection features for correcting improper use of capitals, spelling mistakes etc. While useful for typing English, they can really mess up what you type with Tsampa Keyboard and should be turned off. In both Word and WordPerfect they are found under the *Tools* main menu under *AutoCorrect* and *QuickCorrect* respectively.

Tsampa Keyboard might also not display correctly in some applications with poor font support, such as Microsoft's WordPad.

## V. TYPING STANDARD TIBETAN

### ROOT LETTERS AND VOWELS

The keys are mapped as closely as possible to Wylie transliteration; the general principle is that by typing Wylie you should get the corresponding Tibetan letters.

བོད་ཡིག bod.yig

ཡུལ་ yul.

Naturally, only letters that in Wylie correspond to a single key (such as *ka*, *ga*, *ca* and *ja*) can be mapped straight to the keyboard. To learn to type fluently you will need to learn the mapping of the eleven Tibetan letters that are represented by two (*kha*, *nga*, *cha*, *nya*, *tha*, *pha*, *tsa*, *dza*, *zha*, *sha*) or three letters (*tsha*) in Wylie. Section VIII of this document contains a full list of all supported glyphs along with their corresponding Wylie transliteration.

འིབ་ Ziv.

གའིས་ gfis.

Another deviation from Wylie is that the built-in *a chung* in all root letters is skipped in input (*a chung* ། itself is mapped to a, with *a chen* ། occupying A).

ནགས་ ngs. (not nags.)

འབ་ qb. (not qab.)

མདའ་ mda. (not mda' .)

ཨ་མ་ A.m. (not a.ma.)

### STACKING

All superscribed<sup>2</sup> or subscribed<sup>3</sup> ligatures are produced by typing normal Wylie with the SHIFT key pressed down (i.e. capitalized Wylie). For example, while the key combination རག would produce the

<sup>2</sup> Also commonly known as head or suprafixed letters.

<sup>3</sup> Also commonly known as subjoined or subfixed letters.

*rag* རག syllable, a capitalized RG outputs the *rga* རག ligature. If the ligature lacks a superscribed letter, the root letter takes the full form (i.e. hold down SHIFT only for the subscribed letters).

རྒྱལ་ RGYl

སྐད་ SKd

ཀྱུ་ kYv.

Subscribed letters pose a special problem, since they can occur at different heights depending on whether the letter they attach to is a high one (such as རམས་) or a tall one (such as ཀྱལ་). Here I have decided to let typographic correctness take precedence over easy input. Instead of having a single version used for all letters, the subscribed letters *ya*, *ra* and *wa* exist in high and low versions, as does the vowel *zhabs kyu* (ཟ).

འ་ b\* vs. འ་ gY

ཡ་ b, u vs. ཡ་ g+U

ས་ s- vs. ས་ gW

The input order is always the same as when writing Tibetan properly by hand (i.e. superscribed → root → subscribed → vowel). Although some combinations might be producible by other sequences, please try to adhere to the one laid out in the tables below. If you want to use a converter later on to convert back to Wylie transliteration or into another typeface the input order might be important.

#### NUMERALS

Tsampa Keyboard font contains the standard Tibetan numerals from 0 to 9 mapped to the equivalent key on the keyboard.

༡༩༠༧ 1607

## VI. TIBETANIZED SANSKRIT SUPPORT ཨོ་མཆི་པ་རྒྱ་རྩུ་

Tsampa Keyboard contains the building blocks the most basic Tibetanized Sanskrit combinations, including the five reversed letters རྩུ་རྩུ་རྩུ་, the subscribed letters *ha*, *Sha*, *ma* and *a chung*, plus the basic Sanskrit vowels. Even though it might not have been designed with other combinations in mind, it is often possible to create other ligatures (like རྩུ་, རྩུ་ or རྩུ་), but bear in mind that most of the myriad of Tibetanized Sanskrit ligatures won't be inputable with this font. If you want to do serious Sanskrit typing, you will need a driver-based font. In theory it could be possible to come closer to such a font by

splitting it up even more (like having to add the “leg” to a *ka* ཀྱ if you are not going to write anything below it), but this would make the mapping more complex and could never provide full support anyhow. Of course, it would be possible to create add-on fonts to support more of these ligatures, but that would defeat the basic purpose of this font, making you responsible for switching between them and requiring several font files.

Note that the Wylie transliteration itself doesn’t say how to transcribe Tibetanized Sanskrit; here the Extended Wylie method as proposed by the University of Virginia<sup>4</sup> is used. As a side note, I think “xWylie” would be a good abbreviation for Extended Wylie.

## VII. LIST OF SUPPORTED GLYPHS WITH INPUT KEYS AND WYLIE<sup>5</sup>

### ROOT LETTERS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>ka</i>	ཀྱ	k	<i>ma</i>	མ	m
<i>kha</i>	ཁྱ	q	<i>tsa</i> <sup>6</sup>	ཅ	cx
<i>ga</i>	གྱ	g	<i>tsha</i>	ཇ	]x
<i>nga</i>	ངྱ	v	<i>dza</i>	ཉ	jx
<i>ca</i>	ཅ	c	<i>wa</i>	མཱ	w
<i>cha</i>	ཅྱ	]	<i>zha</i>	ཉྱ	z
<i>ja</i>	ཇྱ	j	<i>za</i>	མྱ	z
<i>nya</i>	ཉྱ	f	<i>'</i> <sup>7</sup>	འ	a
<i>ta</i>	ཏྱ	t	<i>ya</i>	ཡ	y
<i>tha</i>	ཏྱ	[	<i>ra</i>	ར	r
<i>da</i>	དྱ	d	<i>la</i>	ལ	l
<i>na</i>	ནྱ	n	<i>sha</i>	ཤ	Q
<i>pa</i>	པྱ	p	<i>sa</i>	ས	s
<i>pha</i>	པྱ	\	<i>ha</i>	ཧྱ	h
<i>ba</i>	བྱ	b	<i>a</i> <sup>8</sup>	ཨ	A

<sup>4</sup> See <http://iris.lib.virginia.edu/tibet/tools/ewts.pdf>

<sup>5</sup> The keys not corresponding to Wylie are highlighted in red to make the anomalies easier to spot. This list should be complete when it comes to standard letters and ligatures, but naturally many non-standard ligatures can be created. If a ligature isn’t on the list, you won’t know whether it is producible with Tsampa Keyboard before you try.

<sup>6</sup> Note that *tsa*, *tsha* and *dza* consist of *ca*, *tsha* and *ja* respectively with an added *tsa phru*, eg. ཅ་ = ཅ་པཱ

This “loose” tsa phru can also be used to form uncommon combinations such as ཅ་པཱ་པཱ་ and ཅ་པཱ་པཱ་.

<sup>7</sup> In some quarters v is used for *a chung*.

## SUPERSCRIBED LETTERS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>rka</i>	ཀ	RK	<i>lta</i>	ལ	LT
<i>rga</i>	ག	RG	<i>lda</i>	ལ	LD
<i>rnga</i>	ང	RV	<i>lpa</i>	ལ	LP
<i>rja</i>	ར	RJ	<i>lba</i>	ལ	LB
<i>rnya</i> <sup>9</sup>	ལ	rF	<i>lha</i>	ལ	LH
<i>rta</i>	ཏ	RT	<i>ska</i>	ས	SK
<i>rda</i>	ད	RD	<i>sga</i>	ས	SG
<i>rna</i>	ན	RN	<i>snga</i>	ས	SV
<i>rba</i>	བ	RB	<i>snya</i> <sup>10</sup>	ས	sF
<i>rma</i>	མ	RM	<i>sta</i>	ས	ST
<i>rtsa</i>	ཚ	RCX	<i>sda</i>	ས	SD
<i>rdza</i>	ར	RJX	<i>sna</i>	ས	SN
<i>lka</i>	ལ	LK	<i>spa</i>	ས	SP
<i>lga</i>	ག	LG	<i>sba</i>	ས	SB
<i>lnga</i>	ང	LV	<i>sma</i>	ས	SM
<i>lca</i>	ལ	LC	<i>stsa</i>	ས	SCX
<i>lja</i>	ལ	LJ			

<sup>8</sup> Some people use x to mark out a *chen*.

<sup>9</sup> According to Tibetan convention, *rnya* always takes the full form of *ra mgo* (ར instead of ཏ).

<sup>10</sup> Although it would be more consistent to use the *sa mgo* for *snya*, the full *sa* looks better in my opinion. Possible conversion scripts should take both forms into account.

## SUBSCRIBED LETTERS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>kya</i>		kY	<i>zla</i>		z)
<i>khya</i>		q*	<i>rla</i>		r)
<i>gya</i>		gY	<i>sla</i>		s)
<i>pya</i>		p*	<i>kwa</i>		kW
<i>phya</i>		\*	<i>khwa</i>		q-
<i>bya</i>		b*	<i>gwa</i>		gW
<i>mya</i>		m*	<i>nywa</i>		fW
<i>kra</i>		k+	<i>dwa</i>		dW
<i>khra</i>		q,	<i>tshwa</i>		]x-
<i>gra</i>		g+	<i>zhwa</i>		ZW
<i>tra</i>		t+	<i>zwa</i>		z-
<i>thra</i>		[,	<i>rwa</i>		r-
<i>dra</i>		d+	<i>l+wa</i> <sup>11</sup>		l-
<i>pra</i>		p,	<i>shwa</i>		QW
<i>phra</i>		\,	<i>hwa</i>		hW
<i>bra</i>		b,	<i>grwa</i> <sup>12</sup>		g&
<i>sra</i>		s,	<i>h+pha</i> <sup>13</sup>		?
<i>hra</i>		h+			
<i>kla</i>		k)			
<i>gla</i>		g)			
<i>bla</i>		b)			

<sup>11</sup> Strictly speaking, *l+wa* is Extended Wylie, but is included here since the letter is in colloquial use.

<sup>12</sup> Note that subscribed *ra* + *wa* has its own sign accessible with the ampersand & key.

<sup>13</sup> *h+pha* is part of Extended Wylie, but has a strong foothold in colloquial writing at least in Amdo, where it is used in Chinese loanwords to render the /f/ sound. *h+pha* is also seen transliterated as f.

STACKS<sup>14</sup>

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>rkya</i>		RKY	<i>smra</i>		SM+
<i>rgya</i>		RGY	<i>skya</i>		SKY
<i>rmya</i>		RMY	<i>sgya</i>		SGY
<i>skra</i>		SK+	<i>spya</i>		SPY
<i>sgra</i>		SG+	<i>sbya</i>		SBY
<i>spra</i>		SP+	<i>smya</i>		SMY
<i>sbra</i>		SB+			

## VOWELS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>i</i>		i	<i>u<sup>15</sup></i>		u
<i>e</i>		e	<i>u<sup>16</sup></i>		U
<i>o</i>		o			

## NUMERALS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
<i>0</i>		0	<i>5</i>		5
<i>1</i>		1	<i>6</i>		6
<i>2</i>		2	<i>7</i>		7
<i>3</i>		3	<i>8</i>		8
<i>4</i>		4	<i>9</i>		9

<sup>14</sup> Sometimes called a folded letter.<sup>15</sup> High *zhabs kyu*.<sup>16</sup> Low *zhabs kyu*.

PUNCTUATION AND OTHER SIGNS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
@ <sup>17</sup>		@	_ <sup>18</sup>		space
# <sup>19</sup>		#	" <sup>20</sup>	"	“
(space) <sup>21</sup>	.	.	{	{	{
/		/	}	}	}

REVERSED LETTERS

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
Ta		!	Na		\$
Tha <sup>22</sup>		^	Sha		%
Da		`			

STANDARD COMBINATIONS WITH SUBSCRIBED HA<sup>23</sup>

Wylie	Tibetan	Keys	Wylie	Tibetan	Keys
g+ha		g_	dz+ha		jx_
d+ha		d_	D+ha		`_
b+ha		b_			

<sup>17</sup> Initial *yig mgo mdun ma*.

<sup>18</sup> White space. See footnote 21.

<sup>19</sup> Closing *yig mgo sgab ma*. Used with the initial form to create

<sup>20</sup> Quotation marks are commonly used in modern newspapers and novels, but most Tibetan fonts seem to be lacking them (which would require you to take them from another typeface, which might not be in very close harmony with the Tibetan typeface). In fact, a complete Tibetan font would probably need other standard Western punctuation marks as well.

<sup>21</sup> For some reason mapping the tsheg to the spacebar didn't work in Windows; both Word and WordPerfect continued to spit out white space. I have not ventured to figure out why this happens and how to possibly fix this issue. Whereas the version of Extended Wylie championed by the University of Virginia uses a space for a *tsheg* and an underscore `_` for white space, Tsampa Keyboard uses a dot `.` for a *tsheg* and the spacebar for white space. This usage follows that of those who use a dot for *tsheg* for transliteration (i.e. *bod.skad.* instead of *bod skad*), a usage I personally happen to like for ortographic reasons (the “a dot is a dot is a dot”-argument), although I would also be the first to agree that this makes for a muddled transliteration if there are more than a few words.

<sup>22</sup> Some people capitalize both letters for a reversed letter if the letter is represented by more than one letter in Wylie, giving *THa*, *SHa* etc. instead of *Tha* and *Sha*.

<sup>23</sup> Although this subscribed ha can also be used to form the standard combination *lha*, the general stacking principle calls for the use of the LH combination. Purism aside, feel free to chose the combination you like best. This possibility needs to be taken into account if anyone ever writes a font conversion script.

SUBSCRIBED *SHA* FOR *k+SHA*

Wylie	Tibetan	Keys
<i>k+sha</i>		k;

SUBSCRIBED *MA*

Wylie	Tibetan	Keys
<i>d+ma</i>		d (

SUBSCRIBED *A CHUNG*

Wylie	Tibetan	Keys
<i>swA</i>		s-<

Wylie	Tibetan	Keys
<i>kA</i>		k<

SANSKRIT VOWELS (SHOWN WITH *A CHEN*)<sup>24</sup>

Wylie	Tibetan	Keys
<i>aM</i>		A'
<i>aM^</i>		A' =
<i>oM</i>		AO'
<i>au</i>		AO
<i>-i</i> <sup>26</sup>		AI
<i>ai</i>		AE

Wylie	Tibetan	Keys
<i>aiM</i>		AE'
<i>aeM</i>		Ai'
<i>auM</i>		AO'
<i>-im</i>		AI' <sup>25</sup>
<i>aH</i>		A:

<sup>24</sup> Not every conceivable combination is shown here. Combinations such the half vowels (ex. *hRi* ཨྲི)

and the lengthened vowels (ex. *A* ཨྲ) should follow logically.

<sup>25</sup> Technically the *anusvara* is on the wrong side, but should be quite legible like this.

<sup>26</sup> The University of Virginia's Extended Wylie proposal uses the minus sign to indicate non-standard reversed letters; this is what distinguishes *i* ཨྲ from *-i* ཨྲ.

VIII. TEXT SAMPLES

BEGINNING OF CHAPTER 18 OF MI RO RTSE SGRUNG

བདེ་སྐྱོད་བཟང་པོ་སྐྱུར་ཡང་དུར་བྱོད་དེར་སོང་ནས་སྐར་ལྟར་ཁྱུར་འོངས་པ་ལ།  
 རོ་དངོས་གྲུབ་ཅན་ན་རེ། "ཐེ་ན་གཞོན། ལམ་ཐག་རིང་ཞིང་ཉི་མ་ཡང་  
 ཚ་བས། ང་ཚོས་སྐྱུང་ཞིག་བཤད་ནས་ཁམས་དྲུངས་པོ་ཞིག་གྱེད་"ཟེར་བ་ལ།  
 ཁོའི་བསམ་པར་"བྱོད་ཀྱིས་ང་ལ་མགོ་སྐོར་བཏང་ནས་འདུར་རྒྱུག་མང་པོ་བྱས། ད་  
 ཐེངས་ཅིས་ཀྱང་ངག་མི་ཤོར་བ་གྱེད་"སྐུམ་ནས་གོ་ཁུལ་ཙམ་ཡང་མ་བྱས་པར་ཁྱུར་  
 འོངས་པར། རོ་དངོས་གྲུབ་ཅན་ན་རེ་"བྱོད་ཀྱིས་བཤད་མི་འདོད་ན་ངས་བཤད་"  
 ཟེར་ནས་སྐྱུང་ཞིག་བཤད།

BEGINNING OF THE FOUR MEDICAL TANTRAS (RGYUD BZHI 'I RNAM BSHAD)

༡༡། །ཞོ་སྤྱི་ལྷོ་ལམ་ ལྷ། །བདུད་ཅི་སྐྱོང་པོ་ཡན་ལག་བརྒྱུད་པ་  
 གསང་བ་མན་ངག་གི་རྒྱུད་ཀྱི་འགྲེལ་བ་མཚམས་སུ་བབས་པ་ལས།  
 ཅུ་བའི་རྒྱུད་ཀྱི་རྣམ་བཤད་ལེགས་བཤད་སྐྱུར་བ་མཚོག་ཐོབ་ཅེས་བྱ་བ། ལྷ་  
 མ་དང་ལྷག་པའི་ལྷ་ལ་གྲུས་པས་སྤྲུག་འཚལ་ལོ། །རྒྱན་གྱི་དབང་པོ་མཚན་  
 དཔེས་ཡང་དག་སྤྱད། །སྐྱོད་བྱུངས་ཟབ་མོས་བརྒྱུད་ཁོའི་སྐོར་འཕར་འབྱེད། །  
 བྱོད་གསང་ཟབ་མོའི་འཛིང་ན་ཤེས་བྱའི་ཚོས།

## IX. APPENDIX A: GNU LESSER GENERAL PUBLIC LICENSE

### GNU LESSER GENERAL PUBLIC LICENSE Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.  
59 Temple Place, Suite 330, Boston, MA 02111-1307 USA  
Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also  
counts as the successor of the GNU Library Public License, version 2,  
hence the version number 2.1.]

#### Preamble

The licenses for most software are designed to take away your  
freedom to share and change it. By contrast, the GNU General Public  
Licenses are intended to guarantee your freedom to share and change  
free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some  
specially designated software packages--typically libraries--of the  
Free Software Foundation and other authors who decide to use it. You  
can use it too, but we suggest you first think carefully about  
whether this license or the ordinary General Public License is the  
better strategy to use in any particular case, based on the  
explanations below.

When we speak of free software, we are referring to freedom of use,  
not price. Our General Public Licenses are designed to make sure  
that you have the freedom to distribute copies of free software (and  
charge for this service if you wish); that you receive source code or  
can get it if you want it; that you can change the software and use  
pieces of it in new free programs; and that you are informed that you  
can do these things.

To protect your rights, we need to make restrictions that forbid  
distributors to deny you these rights or to ask you to surrender  
these rights. These restrictions translate to certain  
responsibilities for you if you distribute copies of the library or  
if you modify it.

For example, if you distribute copies of the library, whether  
gratis or for a fee, you must give the recipients all the rights that  
we gave you. You must make sure that they, too, receive or can get  
the source code. If you link other code with the library, you must  
provide complete object files to the recipients, so that they can  
relink them with the library after making changes to the library and  
recompiling it. And you must show them these terms so they know  
their rights.

We protect your rights with a two-step method: (1) we copyright the  
library, and (2) we offer you this license, which gives you legal  
permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that  
there is no warranty for the free library. Also, if the library is  
modified by someone else and passed on, the recipients should know  
that what they have is not the original version, so that the original  
author's reputation will not be affected by problems that might be  
introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

GNU LESSER GENERAL PUBLIC LICENSE  
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not.

Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for

reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could

satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

#### NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY

AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

#### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!