TeX Fonts and Suggested Magnifications

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Several tables follow that indicate my suggested grouping of the many fonts that are available in most TeX systems. These fonts are all in the cm family developed by Donald E. Knuth or are in some manner related to them. The data given for each font is a maximum magnification required or suggested. Blank columns are included so that all tables have the same layout.

In some of the tables I will indicate as different fonts the same typeface at different sizes. The numeric values in the data columns will indicate the maximum TeX magnification specified in plain.TeX, LaTeX, SLiTeX, and the distribution from Texas A&M for Data General systems. Numeric entries followed by a "p" indicate the magnification of plain.TeX's *preloaded* fonts.

Table 1 contains the sixteen fonts named in plain.TeX. Most fonts are furnished in *default* magnifications of 0, half (h), 1, and 2. Six of the sixteen are furnished in larger magnifications as well. These (except for cmex10) are intended for use in titles. Two additional fonts are also furnished in large magnifications for titles. These are the sans serif fonts, cmss10 (Table 2) and cmss17 (Table 4).

In Table 1 it is shown that LaTeX uses cmr10 scaled to \magstep5. I think it would have been more consistent to have made the larger fonts from lesser scaling of cmr17. Indeed, cmr12 and cmr17 are used in LaTeX only without magnification. See the last section of this article for more discussion on font design sizes.

Table 1. The Big Sixteen

font	TeX	LA	SLI	DG
cmbx5	0			2
cmbx7	0	0		2
cmbx10	0	3		8
cmex10	0	0	3	3
cmmi5,7	0	0		2
cmmi10	0	4		2
cmr5	0	0		2
cmr7	0,4p	0		2
cmr10	0	5		8
cmsl10	0	h		7
cmsy5,7	0	0		2
cmsy10	0	4		2
cmti10	0	h		7
cmtt10	0,2p	h		7

The fonts in Table 2 are required by LaTeX. These are all the fonts required by LaTeX except for those already indicated in Table 1. (I tried to make

sure that each font appeared in only one table.) The scatter of magnifications at first seems weird, but they are appropriate. This data is based on the files lfonts.TeX and sfonts.TeX.

In lfonts.TeX and sfonts.TeX, many more fonts are specified in lines that are commented out. You can access these additional fonts by removing the % from the beginning of the relevant lines; however, these fonts are not shown in the table, and may or may not be included in the distribution.

Table 2   LaTeX Fonts

font	TeX	LA	SLI	DG
cmbx9	0p	0		2
cmbx12		0		2
cmmi6,9	0p	0		2
cmmi8	0p	0	8	8
cmmi12		0		2
cmr6,8,9	0p	0		2
cmr12,17		0		2
cmsl12		0		2
cmss10		h		8
cmss12		0	1	2
cmsy6		0		2
cmsy8		0	8	8
cmsy9		0		2
cmti8,9	0p	0		2
cmti7,12		0		2
cmtt9	0p	0		2
cmtt12		0		2
circle10		0	0	2
circlew10		0	0	2
lasy5,6,7		0		2
lasy8		0	8	8
lasy9		0		2
lasy10		4		4
line10		0	0	2
linew10		0	0	2

The fonts in Table 3 are used only in SLiTeX. Many of us have attempted to be economical by modifying these by taking into account that scaled fonts could be replaced by larger point size fonts. For example, cmss17 scaled \magstep2 could be used rather than cmss10 scaled \magstep5. *However, the slides just won't look as good!* Thanks to Barbara Beeton for pointing this out to me.

You may also have noticed that the lcmss*8 fonts have rather large magnifications. The smaller magnifications are not referenced anywhere.

Table 3   SLiTeX Fonts

font	TeX	LA	SLI	DG
lcmss8			3..9	9
lcmssb8			3..8	8
lcmssi8			3..8	8
cmtt8	0p		3..8	8

The fonts in Table 4 are more often used for emphasis than for text in documents that I have seen. These fonts should be considered optional in most installations. Some of these fonts could be provided at larger magnifications to complement the title fonts shown in Table 1. The font `cmss17` is listed here and is furnished in large magnifications for use in titles. Glenn Vanderburg's `cmssdc40` and `cmincha` are included as well. (Please see his article on page 125.)

Table 4 Fonts for Emphasis

font	TEX	IA	SLI	DG
cmb10				2
cmcsc10				2
cmdunh10				2
cminch				2
cmincha				2
cmss17				8
cmssbx10	2p			2
cmssdc10				2
cmssdc40				2
cmssi10				2
cmssq8	0p			2
cmssqi8	0p			2
cmtcsc10				2
cmtex8,10				2
cmtt8				2
cmu10				2
cmvtt10				2

The fonts in Table 5 are definite candidates for saving disk space. They are mainly common fonts at different sizes that are not commonly used. The `cmff` and `cmfib` fonts are not related, other than being "cm". One is a "funny font" and the other is based on Fibonacci numbers.

Table 5 Some More Fonts

font	TEX	IA	SLI	DG
cmbx6,8	0p			2
cmbxsl10				2
cmbxti10				2
cmff10				2
cmfib8				2
cmit10				2
cmmib10				2
cmsl8,9	0p			2
cmsltt10				2
cmss8,9				2
cmssi8,9				2
cmtex9				2
lasyb5..10				0

Most users will probably not need the fonts in Table 6 unless they are playing around, using METAFONT, or creating documents about TEX and METAFONT. The font `manual` is sometimes referred to as `manfnt`. It is suggested that you make a copy and name it such; in the world of AOS/VS, we simply create it as a link.

The `logo10` and `manual` fonts are included at the magnification indicated because I give lots of talks about TEX and its components.

Table 6 Special Fonts

font	TEX	IA	SLI	DG
flogo				0
gray				0
logo8				0
logo9				0
logo10				4
sklogo				0
manual				4

The AMS fonts are also included in the DG distribution, though not in the tables.

Finally, you might notice that I don't show any invisible fonts. I explained how we handle these in TUGboat 8#3.

On font design sizes

Pierre MacKay has argued eloquently that using fonts designed for particular sizes improves the quality of a document's appearance. As TUG Site Coordinator for Unix-flavored TEX, he has provided a number of tools in the Unix distribution to provide TEX users the ability to decide for themselves what fonts to use. His opinion is clear in this quote from TEXhax 1988, #51:

> No less a person than Brian Reid has announced in an interview in the *Unix Review* that no one cares about distinctive design sizes any more, and that one 10 or 12 point master will do for all. I disagree, and it seems that a lot of TEX and LATEX users disagree. The undesirable aspects of using one design for all sizes are even more noticeable in 5, 6 and 7 point fonts than they are in 17, 20 and 25 point fonts, but they are noticeable at both ends. METAFONT makes it unnecessary to coarsen font designs in this way, and I look for it to infiltrate the printing world with considerations of quality just as TEX has.