

The IEEEconf class*

Scott Pakin
scott+ltx@pakin.org

January 15, 2004

1 Introduction

The IEEEconf class implements the formatting dictated by the IEEE Computer Society Press for conference proceedings (<http://www.computer.org/cspress/instruct.htm>). IEEEconf.cls replaces latex8.sty and latex8.bst. The goal was to produce a more faithful implementation of the formatting rules and to do so with cleaner L^AT_EX code than that provided by the latex8.* files:

- IEEEconf is written as a class, which makes more sense than implementing it as a style file.
- IEEEconf uses the geometry package to construct the page layout rather than setting L^AT_EX registers directly.
- IEEEconf selects fonts using the L^AT_EX 2_ε font commands instead of T_EX primitives. This lets an author redefine \rmdefault, \sfdefault, and \ttdefault and have those changes honored by IEEEconf.
- IEEEconf uses the titlesec package to redefine \section, \subsection, and \subsubsection as dictated by the guidelines. latex8 required that authors use \Section, which internally called \section then backspaced to add the required period after the section number. Yuck!
- IEEEconf changes bibliography formatting by redefining the thebibliography environment instead of by requiring the author to use a particular BIB_TE_X style file.

Caveat: IEEEconf does not correspond exactly to the IEEE Computer Society Press guidelines. See Section 3 for details.

2 Usage

`\documentclass` Begin your document by loading the IEEEconf class:

*This document corresponds to IEEEconf v1.0, dated 2004/01/14.

`\documentclass{IEEEconf}`

Although IEEEconf is derived from article and accepts the same class options, you should not, in general, pass any extra options to `\documentclass`. IEEEconf will automatically set two-column mode, a 10 pt. Times Roman font, and a paper size of U.S. Letter ($8\frac{1}{2} \times 11$ " or 215.9×279.4 mm), as this is what the IEEE Computer Society requires.

`\title` The `\title` command behaves identically to the one in the article class. Just remember to follow what the guidelines say about capitalization of words in the title.

`\author` The guidelines specify different formatting for an author's name and for an author's affiliation and e-mail address. For convenience, IEEEconf provides an `\affiliation` environment for typesetting affiliations and an `\email` macro for typesetting e-mail addresses. The following examples show how to format an author list:

```
% Individual author
\author{%
  Amy Author \
  \begin{affiliation}
    Fancy Text Processing Department \
    University of Llanfairpwllgwyngyllgogerychwyrndrobwlllllantysiliogogoch
  \end{affiliation} \
  \email{author@llanfairPG.ac.uk}
}
```

```
% Multiple authors
\author{%
  Ray Writer \
  \begin{affiliation}
    International Giant Mega-Corporation, Inc.
  \end{affiliation} \
  \email{writer@giantmegaco.com}
\and
  Kim Composer \
  \begin{affiliation}
    Department of Reading, 'Riting, and 'Rithmetic
    \LaTeX{} State University
  \end{affiliation} \
  \email{composer@latexstate.edu}
}
```

`\date` The date macro is implemented but doesn't actually typeset anything.

3 Limitations

There are some requirements in the Computer Society's guidelines that IEEEconf is unable to enforce:

- "All manuscripts must be in English."
- "Capitalize the first letter of nouns, pronouns, verbs, adjectives, and adverbs; do not capitalize articles, coordinate conjunctions, or prepositions (unless the title begins with such a word)."
- "Avoid the use of academic degrees and society affiliations."
- "All fonts must be Type 1 or 3 Postscript fonts from the Latin 1 Fontset. Our PostScript printers will not recognize any other fonts. Do not use TrueType, bitmapped, or Ryumin fonts."
- "Basic PDF distiller settings must be changed to:
 - Optimized,
 - Acrobat 4.0 compatibility,
 - All graphics at least 300 dpi resolution,
 - All fonts are embedded and subset,
 - Postscript settings do not override distiller settings,
 - Page size is 612.0×792.0 points ($8.5'' \times 11''$)"
- "Before submitting your work, print your formatted text on 8.5×11 -inch white printer paper. Ensure that all symbols are accurate and that figures and tables are sequentially cited in the text and appear in the correct order in the paper."
- "All graphics should be high resolution"
- "Avoid using footnotes; incorporate this material parenthetically in the text." The guidelines do specify how to format footnotes if you're desperate and IEEEconf honors the those requirements.
- "Where appropriate, include the name(s) of editors of referenced books."

Furthermore, there are also some requirements the IEEEconf does not currently implement:

- "The abstract... may be up to 3 in. (7.62 cm) long." IEEEconf currently allows abstracts of any length.
- In an abstract, "[m]ultiple authors may be shown in a two- or three-column format". However, like article, IEEEconf packs as many authors as possible onto a line.

- In the context of figures and tables, “[c]allouts should be 9-point Helvetica, non-boldface.” I don’t know what this means so I ignored it.
- “Place figure captions below the figures; center table titles above the tables.” You’re on your own for that.
- “If the last page of your paper is only partially filled, arrange the columns so that they are evenly balanced; avoid one long column at the end.” You may be able to use an explicit `\clearpage` at the right place or use the `multicol` package for the last page.
- All graphics should be “centered in one column or across a two-column width.” This would actually be easy to implement but I believe that most people already use `\centering` in their `figure` environments so it seemed unnecessary to do this in `IEEEconf`.

Some of the above shortcomings may be fixed in a future release of `IEEEconf` if I figure out a good way to do so.

Also note that currently, only $8\frac{1}{2} \times 11$ ” proceedings are supported, not 6×9 ” proceedings.

4 Implementation

This section contains the complete source code to `IEEEconf`. If you’re not a \LaTeX hacker you probably won’t find it particularly interesting or useful. However, if you’re comfortable reading \TeX and \LaTeX code, you can see exactly what `IEEEconf` is doing and how.

4.1 Initialization

For simplicity, we’ll derive everything from the standard `article` class but force the `letterpaper`, `twocolumn` and `10pt` options.

```

1 \PassOptionsToClass{letterpaper,twocolumn,10pt}{article}
2 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{article}}
3 \ProcessOptions\relax
4 \LoadClass{article}

\IEEEold@maketitle The guidelines say not to paginate.
\maketitle          5 \let\IEEEold@maketitle=\maketitle
6 \renewcommand{\maketitle}{%
7   \IEEEold@maketitle
8   \thispagestyle{empty}%
9 }
10 \pagestyle{empty}

```

“All paragraphs should be indented 1 pica”, say the guidelines.

```

11 \setlength{\parindent}{1pc}

```

4.2 Page layout

Define the page layout as per the following instructions:

All printed material, including text, illustrations, and charts, must be kept within a print area of 6-7/8 inches (17.5 cm) wide by 8-7/8 inches (22.54 cm) high. Text must not extend outside the print area. All text must be in a two-column format, beginning with the abstract. Columns are to be 3-1/4 inches (8.25 cm) wide, with a 5/16 inch (0.8 cm) space between them. Text must be fully justified.

Actually, the numbers don't quite add up. $3\frac{1}{4}'' + \frac{5}{16}'' + 3\frac{1}{4}'' = 6\frac{13}{16}''$, not $6\frac{7}{8}''$. (Also, $8.25\text{ cm} + 0.8\text{ cm} + 8.25\text{ cm} = 17.3\text{ cm}$, not 17.5 cm .) We assume the text widths and column widths are correct and that the inter-column spacings are derived from those. In addition, although the guidelines call for an $\frac{87}{8}''$ text height, the layout diagram on the IEEE Web site seems to indicate a slightly shorter text height, $\frac{813}{16}''$, so we use that instead.

```
12 \RequirePackage[%
13   noheadfoot,
14   textwidth=6.875in,
15   textheight=8.8125in,
16   tmargin=1in
17 ]{geometry}
18 \setlength{\columnsep}{0.375in}
```

4.3 Font selection

The guidelines specify Times (or similar) as the default font and Helvetica as the sans-serif font. While we're at it, we specify Courier as the fixed-width font.

```
19 \RequirePackage{mathptmx}
20 \RequirePackage{helvet}
21 \RequirePackage{courier}
```

Next, we define commands to set the fonts we'll need later in this file.

```
\ieeetimes@xiv@bold Set Times 14 pt. bold.
22 \newcommand{\ieeetimes@xiv@bold}{%
23   \rmfamily\bfseries\upshape\fontsize{14}{16}\selectfont}

\ieeetimes@xii@bold Set Times 12 pt. bold.
24 \newcommand{\ieeetimes@xii@bold}{%
25   \rmfamily\bfseries\upshape\fontsize{12}{14}\selectfont}

\ieeetimes@xi@bold Set Times 11 pt. bold.
26 \newcommand{\ieeetimes@xi@bold}{%
27   \rmfamily\bfseries\upshape\fontsize{11}{13}\selectfont}

\ieeetimes@x@bold Set Times 10 pt. bold.
28 \newcommand{\ieeetimes@x@bold}{%
29   \rmfamily\bfseries\upshape\fontsize{10}{12}\selectfont}
```

```

\IEEE@times@xii@roman Set Times 12 pt. roman.
30 \newcommand{\IEEE@times@xii@roman}{%
31 \rmfamily\mdseries\upshape\fontsize{12}{14}\selectfont}

\IEEE@times@xii@italic Set Times 12 pt. italic.
32 \newcommand{\IEEE@times@xii@italic}{%
33 \rmfamily\mdseries\itshape\fontsize{12}{14}\selectfont}

\IEEE@times@ix@roman Set Times 9 pt. roman.
34 \newcommand{\IEEE@times@ix@roman}{%
35 \rmfamily\mdseries\upshape\fontsize{9}{11}\selectfont}

\IEEE@helv@x@roman Set Helvetica 10 pt. roman.
36 \newcommand{\IEEE@helv@x@roman}{%
37 \sffamily\mdseries\upshape\fontsize{10}{12}\selectfont}

```

4.4 Title formatting

```

\@maketitle The guidelines say that the “title (on the first page) should begin 1-3/8 inches
(3.49 cm) from the top edge of the page, centered, and in Times 14-point, boldface
type... Leave two blank lines after the title.”
38 \def\@maketitle{%
39 \newpage
40 \null
41 \vskip 0.375in%
42 \begin{center}%
43 \let\footnote=\thanks
44 {\IEEE@times@xiv@bold \@title}%
45 \vskip 2\baselineskip
46 \IEEE@times@xii@roman
47 \begin{tabular}[t]{c}%
48 \@author
49 \end{tabular}%
50 \end{center}%
51 \vskip 10pt%
52 }

affiliation Affiliations are supposed to be in Times 12 pt. italic type. We define an environ-
ment to help out with that.
53 \newenvironment{affiliation}{%
54 \IEEE@times@xii@italic
55 \begin{tabular}[t]{c}%
56 }{%
57 \end{tabular}%
58 }

email E-mail addresses are supposed to be in Times 12 pt. italic type. We define a macro
to help out with that.
59 \newcommand*{\email}[1]{%
60 {\IEEE@times@xii@italic#1}}

```

4.5 Abstract

`abstract` The guidelines have a lot to say about formatting abstracts:

The abstract must be in fully-justified, italicized text, at the top of the left-hand column as it is here, below the author information. Use the word “Abstract” as the title, in 12-point Times, boldface type, centered relative to the column, initially capitalized. The text is to be in 10-point, single-spaced type, and may be up to 3 in. (7.62 cm) long. Leave two blank lines after the abstract, then begin the main text.

Most of the following code was taken verbatim from `classes.dtx`.

```
61 \if@titlepage
62   \renewenvironment{abstract}{%
63     \titlepage
64     \null\vfil
65     \@beginparpenalty\@lowpenalty
66     \begin{center}%
67       \bfseries \abstractname
68       \@endparpenalty\@M
69     \end{center}}%
70   {\par\vfil\null\endtitlepage}
71 \else
72   \renewenvironment{abstract}{%
73     \if@twocolumn
74       \begin{center}%
75         \IEEE@times@xii@bold \abstractname
76       \end{center}
77     \itshape
78   \else
79     \small
80     \begin{center}%
81       {\bfseries \abstractname\vspace{-.5em}\vspace{\z@}}%
82     \end{center}%
83     \quotation
84   \fi}
85   {\if@twocolumn
86     \vspace*{\baselineskip}%
87   \else
88     \endquotation
89   \fi}
90 \fi
```

4.6 Figures and tables

`\@makecaption` Modify `\@makecaption` to typeset everything in 10 pt. Helvetica and to put a period instead of a colon after the figure number. See the definition of `\@makecaption` in `classes.dtx` for additional commentary.

```
91 \long\def\@makecaption#1#2{%
```

```

92 \vskip\abovecaptionskip
93 \sbox\@tempboxa{\IEEE@helv@x@roman #1. #2}%
94 \ifdim \wd\@tempboxa >\hszize
95   \IEEE@helv@x@roman #1. #2\par
96 \else
97   \global \@minipagefalse
98   \hb@xt@\hszize{\hfil\box\@tempboxa\hfil}%
99 \fi
100 \vskip\belowcaptionskip}

```

The `titlesec` package makes it easy to modify section headers.

```
101 \RequirePackage{titlesec}
```

Format sections as follows:

For example, “1. Introduction”, should be Times 12-point boldface, initially capitalized, flush left, with one blank line before, and one blank line after. Use a period (“.”) after the Arabic heading number, not a colon.

```

102 \titleformat{\section}{%
103   \IEEE@times@xii@bold}{\thesection.}{0.5em}{}{}
104 \titlespacing{\section}{0pt}{12pt}{12pt}

```

Format subsections as follows:

As in this heading, they should be Times 11-point boldface, initially capitalized, flush left, with one blank line before, and one after.

```

105 \titleformat{\subsection}{%
106   \IEEE@times@xi@bold}{\thesubsection.}{0.5em}{}{}
107 \titlespacing{\subsection}{0pt}{11pt}{11pt}

```

Format subsubsections as follows:

Third-order headings, as in this paragraph, are discouraged. However, if you must use them, use 10-point Times, boldface, initially capitalized, flush left, preceded by one blank line, followed by a period and your text on the same line.

```

108 \titleformat{\subsubsection}{%
109   \IEEE@times@x@bold}{\thesubsubsection.}{0.5em}{}{}
110 \titlespacing{\subsubsection}{0pt}{10pt}{10pt}

```

4.7 Bibliography

`thebibliography` In order to make `IEEEconf` play nicely with the `tocbibind` package we need to separate the code that outputs the word “References” (or whatever `\refname` is defined as) from the code that typesets the bibliography in a list. Hence, our `thebibliography` definition is rather short.


```

111 \renewenvironment{thebibliography}[1]{%
112   \section*{\refname}%
113   \@mkboth{\MakeUppercase\refname}{\MakeUppercase\refname}%
114   \begin{ieeethebibitemlist}{#1}%
115 }{%
116   \end{ieeethebibitemlist}%
117 }

```

`ieeethebibitemlist` The IEEE guidelines provide very little guidance when it comes to formatting a bibliography. All they insist upon is that it be typeset in 9 pt. Times and use square brackets. The following is almost identical to the definition of `thebibliography` in `classes.dtx` but sets the appropriate font size and—as a courtesy to authors struggling to meet page-length requirements—eliminates blank lines between entries.

```

118 \newenvironment{ieeethebibitemlist}[1]
119   {\list{\@biblabel{\@arabic\c@enumiv}}%
120     {\ieeetimes@ix@roman
121       \setlength{\itemsep}{0pt}%
122       \setlength{\parsep}{0pt}%
123       \settowidth\labelwidth{\@biblabel{#1}}%
124       \leftmargin\labelwidth
125       \advance\leftmargin\labelsep
126       \@openbib@code
127       \usecounter{enumiv}%
128       \let\p@enumiv\@empty
129       \renewcommand\theenumiv{\@arabic\c@enumiv}}%
130   \sloppy
131   \clubpenalty4000
132   \@clubpenalty \clubpenalty
133   \widowpenalty4000%
134   \sfcode'\.\@m}
135   {\def\@noitemerr
136     {\@latex@warning{Empty 'thebibliography' environment}}%
137   \endlist}

```

At the beginning of the document, after the author has finished loading packages, we check to see if the `tocbibind` package was loaded. If it was, we replace its `thebibitemlist` environment with our `ieeethebibitemlist` environment.

```

138 \AtBeginDocument{%
139   \ifpackageloaded{tocbibind}{%
140     \let\thebibitemlist=ieeethebibitemlist
141     \let\endthebibitemlist=endieeethebibitemlist
142   }%
143   {}%
144 }

```

5 License

Copyright © 2004 by Scott Pakin

This file may be distributed and/or modified under the conditions of the L^AT_EX Project Public License, either version 1.2 of this license or (at your option) any later version. The latest version of this license is in:

<http://www.latex-project.org/lppl.txt>

and version 1.2 or later is part of all distributions of L^AT_EX version 1999/12/01 or later.

Index

Numbers written in *italics* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

Symbols	E	<code>\ieeetimesxi@bold</code>
<code>\@author</code> 48	<code>\email</code> 59, <u>59</u>	. . . . . <u>26</u> , 106
<code>\@biblabel</code> . . . 119, 123	<code>\endieeethebibitemlist</code>	<code>\ieeetimesxii@bold</code>
<code>\@ifpackageloaded</code> . 139	. . . . . 141	. . . . . <u>24</u> , 75, 103
<code>\@latex@warning</code> . . . 136	<code>\endthebibitemlist</code> . 141	<code>\ieeetimesxii@italic</code>
<code>\@makecaption</code> <u>91</u>	environments:	. . . . . <u>32</u> , 54, 60
<code>\@maketitle</code> <u>38</u>	abstract <u>61</u>	<code>\ieeetimesxii@roman</code>
<code>\@title</code> 44	affiliation <u>53</u>	. . . . . <u>30</u> , 46
	<code>ieeethebibitemlist</code>	<code>\ieeetimesxiv@bold</code>
	. . . . . <u>118</u>	. . . . . <u>22</u> , 44
A	<code>thebibliography</code> <u>111</u>	<code>\if@titlepage</code> 61
<code>\abovecaptionskip</code> . 92		<code>\if@twocolumn</code> . . . 73, 85
abstract (environ-	F	<code>\itemsep</code> 121
ment) <u>61</u>	<code>\fontsize</code> 23, 25, 27,	<code>\itshape</code> 33, 77
<code>\abstractname</code> 67, 75, 81	29, 31, 33, 35, 37	
affiliation (environ-	<code>\footnote</code> 43	L
ment) <u>53</u>		<code>\labelsep</code> 125
<code>\AtBeginDocument</code> . . 138		<code>\labelwidth</code> . . . 123, 124
	I	<code>\leftmargin</code> . . . 124, 125
B	<code>\ieeehelv@x@roman</code> .	<code>\LoadClass</code> 4
<code>\baselineskip</code> . . . 45, 86	. . . . . <u>36</u> , 93, 95	
<code>\belowcaptionskip</code> . 100	<code>\ieeegold@maketitle</code> . <u>5</u>	M
<code>\bfseries</code> 23,	<code>\ieeethebibitemlist</code>	<code>\maketitle</code> <u>5</u>
25, 27, 29, 67, 81	. . . . . 140	<code>\MakeUppercase</code> . . . 113
C	<code>ieeethebibitemlist</code>	<code>\mdseries</code> 31, 33, 35, 37
<code>\columnsep</code> 18	(environment) <u>118</u>	
<code>\CurrentOption</code> 2	<code>\ieeetimes@ix@roman</code>	P
	. . . . . <u>34</u> , 120	<code>\pagestyle</code> 10
D	<code>\ieeetimes@x@bold</code> .	<code>\parindent</code> 11
<code>\DeclareOption</code> 2	. . . . . <u>28</u> , 109	

<code>\parsep</code>	122			
<code>\PassOptionsToClass</code>				
.	1, 2			
<code>\ProcessOptions</code>	3			
R				
<code>\refname</code>	112, 113			
<code>\renewcommand</code> . . .	6, 129			
<code>\renewenvironment</code> .				
.	62, 72, 111			
<code>\RequirePackage</code> . . .				
. . .	12, 19–21, 101			
<code>\rmfamily</code> . . .	23, 25,			
27, 29, 31, 33, 35				
S				
<code>\section</code> . .	102, 104, 112			
<code>\selectfont</code> 23, 25, 27,				
29, 31, 33, 35, 37				
<code>\sffamily</code>	37			
<code>\subsection</code> . . .	105, 107			
<code>\subsubsection</code>	108, 110			
T				
<code>\thanks</code>	43			
<code>\thebibitemlist</code> . . .	140			
<code>thebibliography</code> (envi-				
ronment) . . .	<u>111</u>			
<code>\theenumiv</code>	129			
<code>\thesection</code>	103			
U				
<code>\upshape</code>	23, 25,			
27, 29, 31, 35, 37				
W				
<code>\widowpenalty</code>	133			
<code>\thesubsection</code>	106			
<code>\thesubsubsection</code> . .	109			
<code>\thispagestyle</code>	8			
<code>\titleformat</code>				
.	102, 105, 108			
<code>\titlepage</code>	63			
<code>\titlespacing</code>				
.	104, 107, 110			