The IEEEconf class*

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1 Introduction

The IEEEconf class implements the formatting dictated by the IEEE Computer Society Press for conference proceedings. `IEEEconf.cls` replaces `latex8.sty` and is compatible with any BibTeX style, not just `latex8.bst`. The goal was to produce a more faithful implementation of the formatting rules and to do so with cleaner LaTeX 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 LaTeX registers directly.

- IEEEconf selects fonts using the LaTeX 2_ε font commands instead of TeX 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 BibTeX style file.

Note that IEEEconf is intended specifically for preparing manuscripts for IEEE Computer Society Press conference proceedings. Most other IEEE publications—including other IEEE conference proceedings—specify different formatting requirements. Unless you were instructed explicitly to follow IEEE Computer Society Press's conference-proceedings guidelines, you may find the IEEEtran package more appropriate than IEEEconf.

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*This document corresponds to IEEEconf v1.3b, dated 2007/01/15.

Caveats First, as of this writing, IEEEconf has been neither validated nor endorsed by the IEEE Computer Society Press. Second, some of the IEEE Computer Society Press's guidelines are outside of IEEEconf's scope. See Section 3 for details. Third, the IEEE Computer Society Press occasionally changes their guidelines; IEEEconf v1.3b implements the guidelines which were current on 2007/01/15. In fact, the IEEE Computer Society Press Web site provides two sets of guidelines:

- `ftp://pubftp.computer.org/press/outgoing/proceedings/instruct.pdf`. IEEEconf relies on this document for its primary set of guidelines.

- `http://www.computer.org/portal/site/ieeecs/index.jsp?pageID=ieeecs_level1&path=ieeecs/publications/cps&file=cps_forms.xml&xsl=generic.xsl`. This Web page contains almost the same contents as the preceding PDF file except that the "Footnotes" section has nothing to do with footnotes but rather with column formatting. Footnote guidance is taken from the other set of guidelines.

- `ftp://pubftp.computer.org/press/outgoing/proceedings/INSTRUCT.HTM` and `ftp://pubftp.computer.org/press/outgoing/proceedings/instruct.txt`. This document provides guidance on footnote formatting. However, it contradicts the previous documents by specifying that paragraphs be indented by 1 pica while the preceding document says to indent paragraphs by 1/4 inch (1.5 picas). It limits the abstract to 3 inches (7.62 cm) while the previous document dictates a 150-word limit. IEEEconf follows the previous document in the case of any conflict.

  This document contains an additional section about illustrations which says not to use color figures unless instructed to do so and presents a few prehistoric guidelines about penciling in page numbers and how to use rub-on symbols.

2 Usage

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

> `\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 and a 10 pt. Times Roman font. As of version 1.3a, IEEEconf honors the user's default paper size because the IEEE Computer Society Press now allows both U.S. Letter- and A4-sized paper. The paper size can be overridden by the `letterpaper` or `a4paper` class options if a conference dictates a particular paper size.

`\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 affiliation `\email` author's affiliation and e-mail address. For convenience, IEEEconf provides an `affiliation` environment for typesetting affiliations and an `\email` macro for

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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 Llanfairpwllgwyngyllgogerychwyrndrobwllllantysiliogogogoch
  \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}
}
```

There is not currently any special support in IEEEconf for typesetting multiple
affiliations per author.

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

\callout   A *callout* is a piece of text referring to a figure or table. When the
IEEE Computer Society Press re-typesets a document they supposedly want
the "See Figure..." and "See Table..." text to stand out to help the type-
setter ensure that figures and tables are placed as close as possible to their
references. The \callout macro simply typesets its argument in 9-point Hel-
vetica as per the guidelines and is typically used as follows: "For details,
see \callout{Figure~\ref{myfigure}}". My understanding is that \callout
should be used only when a paper will be re-typeset and not when producing
camera-ready copy.

\dobeforekey   The IEEE Computer Society Press guidelines say, "If the last page of your
paper is only partially filled, arrange the columns so that they are evenly bal-
anced if possible, rather than having one long column." This is a fairly tricky
requirement in the general case for LaTeX 2$_\varepsilon$. Because the last page typically con-
tains only references, IEEEconf provides a simple command, \dobeforekey, to
help with that specific case. \dobeforekey takes two arguments: a bibliography
key (i.e., a string passed to the \cite command) and a command to execute be-
fore typesetting the corresponding bibliography entry. When preparing the final
version of your paper, put "\dobeforekey{⟨key⟩}{\newpage}" anywhere before

the `\bibliography` command and use trial-and-error to find the key which best balances the columns on the last page of the paper.

Reference lists The IEEE Computer Society Press provides little guidance about typesetting reference lists. Apparently, the author is granted some flexibility. IEEEconf uses the specified font but leaves the rest of the formatting decisions to the author's chosen bibliography style. As the IEEE Computer Society Press's two sample references both use abbreviated author names, it's probably best to use `\bibliographystyle{abbrv}` when including a BibTeX bibliography.[1] IEEEconf also supports the `\thebibliography` environment for authors who prefer to typeset their reference lists manually.

`\extrareflistcode`   Previous versions of the IEEE Computer Society Press guidelines stated that bibliographic references must be single-spaced and that's how IEEEconf formats the references list. The current guidelines say nothing about inter-reference spacing but their two sample references are in fact separated by a blank line. To provide the author with both alternatives, IEEEconf provides a "hook" macro called `\extrareflistcode` which enables one to alter the line spacing—or any other aspect of reference-list spacing.

As in most LaTeX 2$_\varepsilon$ classes, references are typeset within a LaTeX `list` environment. The `\extrareflistcode` macro specifies extra code to execute as part of the second argument to `\begin{list}` when typesetting the document's References section. `\extrareflistcode` is initially empty but can be redefined by the author with `\renewcommand`. For example, the following code instructs IEEEconf to insert a blank line between entries in the references list:

```
\renewcommand{\extrareflistcode}{\setlength{\itemsep}{\baselineskip}}
```

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."

- "Avoid using bit-mapped fonts if possible. True–Type 1 fonts are preferred."

- "Use footnotes sparingly (or not at all!)". 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."

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[1] `latex8.bst` is in fact identical to `abbrv.bst` except that it injects "`\setlength{\itemsep} {-1ex}\small`" into its generated `thebibliography` environment.

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

- "The abstract is to be. . . up to 150 words in length." IEEEconf currently allows abstracts of any length.

- In the author list, "[m]ultiple authors may be shown in a two- or three-column format". Like article, IEEEconf packs as many authors as possible onto a line.

- "Initially capitalize only the first word of each figure caption and table title . . . Figure captions are to be centered below the figures. Table titles are to be centered above the tables." Consider using the topcapt package to help with this captioning requirement.

- "If the last page of your paper is only partially filled, arrange the columns so that they are evenly balanced if possible, rather than having one long column." Consider using either IEEEconf's \doafterkey macro or the balance package to help with this formatting requirement.

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 $6 \times 9''$ 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 `twocolumn` and `10pt` options.

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

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

"All paragraphs should be indented 1/4 inch (approximately 0.5 cm)."
```
11 \setlength{\parindent}{0.25in}
```

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 6-1/2 inches (16.51 cm) wide by 8-7/8 inches (22.51 cm) high. Do not write or print anything outside the print area. All *text* must be in a two-column format. Columns are to be 3-1/16 inches (7.85 cm) wide, with a 3/8 inch (0.81 cm) space between them. Text must be fully justified.

We set the top margin to 1 inch and let the bottom margin define itself based on the top margin and the text height as per the following instructions:

> The second and following pages should begin 1.0 inch (2.54 cm) from the top edge. On all pages, the bottom margin should be 1-1/8 inches (2.86 cm) from the bottom edge of the page for 8.5 $\times$ 11-inch paper; for A4 paper, approximately 1-5/8 inches (4.13 cm) from the bottom edge of the page.

```
12 \RequirePackage[%
13   noheadfoot,
14   textwidth=6.5in,
15   textheight=8.875in,
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.

\ieee@times@xiv@bold   Set Times 14 pt. bold.

```
22 \newcommand{\ieee@times@xiv@bold}{%
23   \rmfamily\bfseries\upshape\fontsize{14}{16}\selectfont}
```

\ieee@times@xii@bold   Set Times 12 pt. bold.

```
24 \newcommand{\ieee@times@xii@bold}{%
25   \rmfamily\bfseries\upshape\fontsize{12}{14}\selectfont}
```

\ieee@times@xi@bold   Set Times 11 pt. bold.

```
26 \newcommand{\ieee@times@xi@bold}{%
27   \rmfamily\bfseries\upshape\fontsize{11}{13}\selectfont}
```

\ieee@times@x@bold   Set Times 10 pt. bold.

```
28 \newcommand{\ieee@times@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@ix@roman`	Set Helvetica 9 pt. roman.

```
36 \newcommand{\ieee@helv@ix@roman}{%
37   \sffamily\mdseries\upshape\fontsize{9}{11}\selectfont}
```

`\ieee@helv@x@bold`	Set Helvetica 10 pt. bold.

```
38 \newcommand{\ieee@helv@x@bold}{%
39   \sffamily\bfseries\upshape\fontsize{10}{12}\selectfont}
```

4.4   Title formatting

We use the array package to help center the text within tabular "p" columns.

```
40 \RequirePackage{array}
```

`\ieee@author@width`	`\@maketitle` sets this ⟨*dimen*⟩ to the width of the widest author block.

```
41 \newlength{\ieee@author@width}
```

`\and`	Redefine the `\and` macro used in titles to force some blank space above each author block. (Other than the `\rule` line, this version of `\and` is identical to the one in `ltsect.dtx`.)

```
42 \def\and{%
43   \end{tabular}%
44   \hskip 1em \@plus 0.17fil%
45   \rule{0pt}{1.5\baselineskip}%
46   \begin{tabular}[t]{@{}>{\centering}p{\ieee@author@width}@{}}%
47 }
```

`\@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."

```
48 \def\@maketitle{%
49   \newpage
50   \null
51   \vskip 0.375in%
52   \begin{center}%
53     \let\footnote=\thanks
54     {\ieee@times@xiv@bold\@title\par}%
55     \vskip 24pt
56     \ieee@times@xii@roman
```

Set `\ieee@author@width` to the width of the widest author block.

```
57    \settowidth{\ieee@author@width}{%
58      \let\and=\crcr
```

We temporarily let-bind both `\thanks` and `\footnote` to `\@gobble`. If we didn't, IEEEconf would output each footnote twice: once when calculating the width of the author blocks and once when typesetting them. Note that we use `\@gobble` instead of, say, `\footnotemark` because `\@ieee@old@maketitle` (a.k.a. the article class's `\maketitle` macro) places footnote markers within an `\rlap` so they occupy no horizontal space.

```
59      \let\thanks=\@gobble
60      \let\footnote=\@gobble
61      \begin{tabular}[t]{@{}c@{}}%
62        \@author
63      \end{tabular}%
64    }%
```

Typeset all author blocks with columns exactly of width `\ieee@author@width`.

```
65      \begin{tabular}[t]{@{}>{\centering}p{\ieee@author@width}@{}}%
66        \@author
67      \end{tabular}%
68    \end{center}%
```

"Author information should be followed by two 12-point blank lines."

```
69    \vskip 24pt%
70 }
```

affiliation   Affiliations are supposed to be in Times 12 pt. italic type. We define an environment to help out with that.

```
71 \newenvironment{affiliation}{%
72    \ieee@times@xii@italic
73    \begin{tabular}[t]{c}%
74 }{%
75    \end{tabular}%
76 }
```

email   E-mail addresses are supposed to be in Times 12 pt. italic type. We define a macro to help out with that.

```
77 \newcommand*{\email}[1]{%
78    {\ieee@times@xii@italic#1}}
```

4.5 Abstract

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

The abstract is to 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 abstract is to be in 10-point, single-spaced type, and up to 150 words in length. Leave two blank lines after the abstract, then begin the main text.

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

```
 79 \if@titlepage
 80   \renewenvironment{abstract}{%
 81       \titlepage
 82       \null\vfil
 83       \@beginparpenalty\@lowpenalty
 84       \begin{center}%
 85         \bfseries \abstractname
 86         \@endparpenalty\@M
 87       \end{center}}%
 88     {\par\vfil\null\endtitlepage}
 89 \else
 90   \renewenvironment{abstract}{%
 91       \if@twocolumn
 92         \begin{center}%
 93           \ieee@times@xii@bold \abstractname
 94         \end{center}
 95         \itshape
 96       \else
 97         \small
 98         \begin{center}%
 99           {\bfseries \abstractname\vspace{-.5em}\vspace{\z@}}%
100         \end{center}%
101         \quotation
102       \fi}
103       {\if@twocolumn
104         \vspace*{\baselineskip}%
105       \else
106         \endquotation
107       \fi}
108 \fi
```

4.6   Figures and tables

Format figure and table captions as follows:

> Figure and table captions should be 10-point Helvetica (or a similar sans-serif font), boldface. Callouts should be 9-point Helvetica, non-boldface. Initially capitalize only the first word of each figure caption and table title. Figures and tables must be numbered separately. For example: "Figure 1. Database contexts", "Table 1. Input data". Figure captions are to be below the figures. Table titles are to be centered above the tables.

Currently, the author is responsible for putting captions above tables and below figures. The `topcapt` package is useful for ensuring proper spacing when captions are placed above a table.

`\@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.

```
109 \long\def\@makecaption#1#2{%
110   \vskip\abovecaptionskip
```

9

```
111  \sbox\@tempboxa{\ieee@helv@x@bold #1. #2}%
112  \ifdim \wd\@tempboxa >\hsize
113    \ieee@helv@x@bold #1. #2\par
114  \else
115    \global \@minipagefalse
116    \hb@xt@\hsize{\hfil\box\@tempboxa\hfil}%
117  \fi
118  \vskip\belowcaptionskip}
```

\callout When the IEEE Computer Society Press re-typesets a document they supposedly want the "See Figure" and "See Table" callouts to stand out to help the typesetter ensure that figures and tables are placed as close as possible to their callouts. The \callout macro simply typesets its argument in 9-point Helvetica as per the IEEE Computer Society Press guidelines.

```
119  \DeclareRobustCommand{\callout}[1]{%
120    {\ieee@helv@ix@roman#1}%
121  }
```

4.7 Section headers

The titlesec package makes it easy to modify section headers.

```
122  \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.

```
123  \titleformat{\section}{\ieee@times@xii@bold}{\thesection.}{0.5em}%
124    {}\relax
125  \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.

```
126  \titleformat{\subsection}{\ieee@times@xi@bold}{\thesubsection.}%
127    {0.5em}{}\relax
128  \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.

```
129  \titleformat{\subsubsection}[runin]{\ieee@times@x@bold}%
130    {\thesubsubsection.}{0.5em}{}[.]
131  \titlespacing{\subsubsection}{0pt}{10pt}{0.5em}
```

4.8 References

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.

```
132 \renewenvironment{thebibliography}[1]{%
133    \section*{\refname}%
134    \@mkboth{\MakeUppercase\refname}{\MakeUppercase\refname}%
135    \begin{ieee@thebibitemlist}{#1}%
136 }{%
137    \end{ieee@thebibitemlist}%
138 }
```

ieee@thebibitemlist 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. The user can reinstate blank lines by redefining the `\extrareflistcode` hook.

```
139 \newenvironment{ieee@thebibitemlist}[1]
140        {\list{\@biblabel{\@arabic\c@enumiv}}%
141             {\ieee@times@ix@roman
142              \setlength{\itemsep}{0pt}%
143              \setlength{\parsep}{0pt}%
144              \settowidth\labelwidth{\@biblabel{#1}}%
145              \leftmargin\labelwidth
146              \advance\leftmargin\labelsep
147              \@openbib@code
148              \usecounter{enumiv}%
149              \let\p@enumiv\@empty
150              \renewcommand\theenumiv{\@arabic\c@enumiv}%
151              \extrareflistcode}%
152         \sloppy
153         \clubpenalty4000
154         \@clubpenalty \clubpenalty
155         \widowpenalty4000%
156         \sfcode`\.\@m}
157        {\def\@noitemerr
158          {\@latex@warning{Empty `thebibliography' environment}}%
159         \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 `ieee@thebibitemlist` environment.

```
160 \AtBeginDocument{%
161    \@ifpackageloaded{tocbibind}{%
162      \let\thebibitemlist=\ieee@thebibitemlist
163      \let\endthebibitemlist=\endieee@thebibitemlist
164    }%
165    {}%
166 }
```

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`\ieee@pre@bibitem@key` `\ieee@pre@bibitem@cmd`	The commands defined by the user in `\ieee@pre@bibitem@cmd` are executed before IEEEconf typesets a bibliographic entry with key `\ieee@pre@bibitem@key`.

```
167 \newcommand{\ieee@pre@bibitem@key}{IEEEconf}
168 \newcommand{\ieee@pre@bibitem@cmd}{}
```

`\dobeforekey`	Store a command to execute before a given bibliography key.

```
169 \newcommand{\dobeforekey}[2]{%
170   \def\ieee@pre@bibitem@key{#1}%
171   \def\ieee@pre@bibitem@cmd{#2}%
172 }
```

`\ieee@old@bibitem` `\bibitem`	Redefine `\bibitem` to insert `\ieee@pre@bibitem@cmd` before a citation or reference label designated by the user.

```
173 \let\ieee@old@bibitem=\bibitem
174 \renewcommand{\bibitem}[2][]{%
175   \def\ieee@biblabel{#1}%
176   \def\ieee@bibkey{#2}%
177   \ifx\ieee@bibkey\ieee@pre@bibitem@key
178     \ieee@pre@bibitem@cmd
179   \fi
180   \ifx\ieee@biblabel\@empty
181     \def\next{\ieee@old@bibitem{#2}}%
182   \else
183     \def\next{\ieee@old@bibitem[#1]{#2}}%
184   \fi
185   \next
186 }
```

`\extrareflistcode`	Provide a hook for the user to inject arbitrary code into the `list` environment's spacing argument (i.e., the second argument to `\begin{list}`) when producing a reference list.

```
187 \newcommand{\extrareflistcode}{}
```

5   License