

**NAME**

cattobib – convert Z39.50 library catalog server data to BibTeX markup

**SYNOPSIS**

```
cattobib [-?] [-author] [-byxxx] [-CODEN] [-debug] [-editor] [-help] [-initfile alternate-alias-file]
          [-ISBN] [-ISSN] [-ISSN-L] [-keep-files] [-logfile] [-no-USMARC] [-quiet]
          [-server name-or-path] [-test] [-title] [-USMARC] [-version] [-volume]
          search-key-1 search-key-2 search-key-3 ... > BibTeX-file
```

**DESCRIPTION**

**cattobib** converts Z39.50 library-catalog server data to BIB<sub>T</sub>E<sub>X</sub> markup, using one or more search keys provided on the command line. That allows convenient re-use of publication data, and eases the tedious and error-prone task of creating BIB<sub>T</sub>E<sub>X</sub> entries for books and other cataloged publications.

The library catalog server can be specified by a command-line option, with the default server being the world's largest library catalog, the US Library of Congress.

ANSI/NISO Standard Z39.50-1995 and ISO Standard 23950:1998 “Information and documentation — Information retrieval (Z39.50) — Application service definition and protocol specification” define a library catalog protocol that allows client programs to communicate with library catalog servers around the world, and retrieve data in a small number of different formats, notably USMARC (*United States Machine-Readable Cataloging*) and SUTRS (*Simple Unstructured Text Record Syntax*).

**OPTIONS**

Command-line options may be abbreviated to a unique leading prefix, and may begin with either one or two leading hyphens. Uppercase options may also be spelled in lowercase.

**-?** Give a brief help message on *stdout*, and exit immediately with a successful status code.

**-author**

Restrict search-key matching to author fields.

**-byxxx** Pass that sort-order option to **bibsort**(1). The suffix *xxx* is one of *day*, *label*, *number*, *pages*, *seriesvolume*, *volume*, or *year*, or any other suffix supported by future versions of that program.

**-CODEN**

Restrict search-key matching to CODEN (Chemical Abstracts periodical number) fields.

**-debug** Display on *stderr* the commands to be sent to each Z39.50 catalog server immediately before contacting that server. Display the server session as well on *stderr* when possible, and otherwise, log it to a temporary file whose name is reported on *stdout*.

**-editor** Restrict search-key matching to editor fields.

**-help** Give a help message on *stdout* describing the options and known Z39.50 servers, and exit immediately with a successful status code.

**-initfile filename**

Specify the name of an alternate initialization file that is to be used instead of the default personal file, *\$HOME/.cattobibrc*. If the specified file is not readable or does not exist, the option is ignored.

**-ISBN** Restrict search-key matching to ISBN (International Standard Book Number) fields.

Because of its frequency of use, the option may be abbreviated to a single letter, even though it shares a two-character prefix with other options.

**-ISSN** Restrict search-key matching to ISSN (International Standard Serial Number) fields.

**-ISSN-L**

Restrict search-key matching to ISSN-L (linking International Standard Serial Number) fields.

**-keep-files**

Preserve intermediate scratch files in */tmp* (or wherever the environment variable *TMPDIR* points).

They are named *cattobib.bib.nnn* (raw B<sub>I</sub>T<sub>E</sub>X data before several cleanup steps), *cattobib.fifo.nnn* (raw data from Z39.50 server for the last item searched), *cattobib.rc.nnn* (reduced combined initialization file), and *cattobib.label.nnn* (citation-label substitution file), where *nnn* is a random-number suffix. Normally, those files are not of interest and are deleted on exit, unless that option is specified.

**-logfile** *filename*

Log the output on the specified filename, which must be a new file, instead of on *stdout*.

**-no-USMARC**

Suppress output of unrecognized USMARC catalog records, because the unrecognized ones rarely contain additional information that is useful to record in B<sub>I</sub>T<sub>E</sub>X entries.

**-quiet** Suppress search status messages.

**-server** *names-or-paths*

Specify a list of one or Z39.50 catalog servers. The *names-or-paths* value is either a space-separated list of paths to particular Z39.50 servers, usually in the form *hostname:portnumber/databasename*, or abbreviations for such servers, as shown below. A regularly-updated directory of Z39.50 servers can be found on the Web at

<http://www.indexdata.dk/targettest/>

The option can be specified as many times as needed, and all specified servers are accumulated into a master list that is searched on completion of command-line processing.

The special server name *home* means *all* of the aliases in the user-specific file *\$HOME/.cattobib.rc*. Similarly, the special server name *local* means *all* of the aliases in the local system-wide file */usr/local/share/cattobib/cattobib-0.07/cattobib.rc*. Any of the aliases in those files can also be used individually in the **-server** option. See the section **INITIALIZATION FILES** for more about such files.

In this list, vertical bars separate alternatives, and asterisk matches any word with that prefix:

ALL   A*	All Z39.50 servers known to cattobib
NATIONAL   N*	National libraries and union catalogs
alberta   ab	University of Alberta
amherst   umass	University of Massachusetts, Amherst
amicus   ca	National Library of Canada
anu	Australian National University
be   ulb	Université Libre de Bruxelles, Belgium
bibsys	Norwegian Union Catalog
bne   es	National Library of Spain
bnp   pt	National Library of Portugal
boulder   co	University of Colorado, Boulder
british   br	British Library
byu	Brigham Young University
calgary	University of Calgary
caltech	California Institute of Technology
carnegie   cmu	Carnegie Mellon University
chicago	University of Chicago
columbia   cu	Columbia University
congress   lc   loc	US Library of Congress
copac   uk	COPAC (union of 24 research-university catalogs in the UK and Ireland)
cosmos	Danish National Library of Science & Medicine
crl	Center for Research Libraries
dartmouth	Dartmouth College, NH
denmark   dk	Royal Library of Denmark

dsb   dsl	Danish State Library
duke	Duke University
edinburgh   ed	Edinburgh University
emory	Emory University
eu	European University Institute Library
florida   fl	Florida Center for Library Automation
gbv	German Union Catalog
gmu	George Mason University
harvard	Harvard University
hopkins   jhu	The Johns Hopkins University
indiana   iu	Indiana University
indystate   in	Indiana State University Consortium
kings   kcl	King's College (London)
ku-leuven   ku	Katholieke Universiteit Leuven, Belgium
madrid	Universidad Autonoma de Madrid, Spain
marriott   utah   ut	University of Utah Marriott Library
mcgill	McGill University
melbourne	University of Melbourne
melvyl   cal	University of California
michigan   mi	University of Michigan
minn*   mn	University of Minnesota
mit	Massachusetts Institute of Technology
montreal   um	Université de Montréal
nbi   bohr	Niels Bohr Institut
newyork   ny	New York University
nla   au	National Library of Australia
nlm   nih	National Library of Medicine (US)
nlz   nz	National Library of New Zealand
nls   scotland	National Library of Scotland
nlw   cwm   wales	National Library of Wales
northwestern   nw	Northwestern University
norway   no	National Library of Norway
nsw   unsw	University of New South Wales
nus   sg	National University of Singapore
odense   sdu	University of Southern Denmark
oregon   uo	University of Oregon
oxford   ox*	Oxford University
pennstate   psu   pa	Pennsylvania State University
poland   pl	National Library of Poland
princeton	Princeton University
quebec   uq	Université de Québec
rlg	Research Libraries Group
rutgers	Rutgers University
sfu	Simon Fraser University
sudoc   abes   fr	French Union Catalog
sweden   se	National Library of Sweden
stanford   su	Stanford University
stockholm	Stockholm University
tamu	Texas A&M University
texas   tx	University of Texas at Austin
toronto	University of Toronto
trinity   tcd	Trinity College, Dublin
tub   berlin	Technische Universität Berlin, Germany

tud   darmstadt	Technische Universität Darmstadt, Germany
tufts	Tufts University
ub   bern	Universität Bern, Switzerland
ucc   cork	University College Cork, Ireland
ucd   dublin	University College Dublin, Ireland
ucsf	University of California, San Francisco
upenn   penn	University of Pennsylvania
usc	University of Southern California
uta	University of Texas, Arlington
uwo	University of Western Ontario
vanderbilt	Vanderbilt University
victoria   vu	Victoria University, Melbourne, Australia
westpoint   usma	United States Military Academy West Point
witwatersrand   wit	University of Witwatersrand, Johannesburg, South Africa
wustl	Washington University St. Louis
yale	Yale University

A later section provides information about representing accented characters in searches of the catalog of the National Library of Poland.

**-test** Run in test mode: library-catalog data is supplied on *stdin*, instead of being fetched from a Z39.50 catalog server. That option is primarily intended for the installation-time validation test suite, but can be also use for local testing and tuning of the format-conversion software.

**-title** Restrict search-key matching to title fields.

**-USMARC**

Include unrecognized USMARC catalog data in additional fields in the output BIB<sub>T</sub><sub>E</sub>X entries. [Default]

**-version**

Display the version number and revision date on *stdout*, and exit immediately with a successful status code.

The option name may be abbreviated to a single letter.

**-volume**

Search for a series and volume, where the search key consists of a series name and a volume number, separated by one or more nonalphanumeric, nonhyphen, nonspace characters.

**EXAMPLES**

**Search the default Z39.50 server for a book by its ISBN:**

```
% cattobib 1-57586-011-2
%% Searching [z3950.loc.gov:7090/Voyager] for [1575860112]: flags = [@attr 1=7]
@Book{Knuth:1999:DT,
  author =      "Donald Ervin Knuth",
  title =       "Digital typography",
  volume =      "78",
  publisher =    "CSLI Publications",
  address =     "Stanford, Calif.",
  pages =       "xv + 685",
  year =        "1999",
  ISBN =        "1-57586-011-2 (cloth), 1-57586-010-4 (paperback)",
  ISBN-13 =     "978-1-57586-011-4 (cloth), 978-1-57586-010-7 (paperback)",
  LCCN =        "Z249.3 .K59 1999",
  bibdate =     "Wed Jun 22 18:49:36 2005",
  bibsource =   "z3950.loc.gov:7090/Voyager",
  series =      "CSLI lecture notes",
```

```

URL =          "ftp://uiarchive.cso.uiuc.edu/pub/etext/gutenberg/;
               http://www.loc.gov/catdir/description/cam029/98027331.html;
               http://www.loc.gov/catdir/toc/cam022/98027331.html",
acknowledgement = ack-nhfb,
subject =      "Printing; Data processing; Computerized typesetting;
               Computer fonts; TeX (Computer file); METAFONT",
}

```

**Remark:** The ISBN is a *unique* identifier assigned to books published throughout the world since about 1972. It consists of ten decimal digits, the last of which may also be the letter X, divided into four hyphen- (or rarely, space-) separated parts: country or language, publisher, book number within the publisher, and a final check digit that can be used to detect invalid ISBNs.

Country/language groups 0 and 1 are English, 2 is French, 3 is German, 4 is Japanese, 5 is Russian, and so on. The Republic of Srpska (1996 population about 1.4 million people) is 99938.

Large publishers have small numbers (e.g., Collins is 00, McGraw-Hill is 07, and Prentice-Hall is 13), and small publishers have big numbers (e.g., Peachpit Press is 938151 and Personal T<sub>E</sub>X is 9631044).

When a publisher exhausts its range of book numbers, it gets a new publisher number: for example, O'Reilly Media Inc. now has publisher numbers 937175, 56592, 4493, and 596. Each of those steps allows a ten-fold change in the number of possible book numbers.

Because the 10-digit ISBN numbers are rapidly being exhausted, effective 1-Jan-2007, they are no longer issued, and instead are replaced by new 13-digit values based on the *European Article Numbering* (EAN) system. The name for the new system is ISBN-13, and such values are also EAN values.

From version 0.02, **cattobib** output includes both ISBN(-10) and ISBN-13 data, because the latter are now found in many online bookstore and library catalogs, and many publishers now print them both with the back-cover bar code.

ISBN-13 translations of ISBN-10 data are handled automatically by the **biborder**(1) utility, and consist of the prefix 978-, followed by the first nine digits of the ISBN-10 value with the same (optional) hyphenation as before, followed by a hyphen and a new check digit. The latter is computed by a different algorithm, and does not in general match the tenth digit (the check digit) of the ISBN-10 value.

ISBN-13 values can also begin with 979-, but they are still rare, and do not have ISBN-10 equivalents. They are needed when a publisher exhausts its assigned book-number range(s) in the 978- group, and no free ranges are available elsewhere from the assignment authority.

#### Search the default Z39.50 server for a book by its title:

```

% cattobib --title 'Digital Typography Sourcebook'
%% Searching [z3950.loc.gov:7090/Voyager] for [Digital Typography Sourcebook]: flags = []
@Book{Bryan:1996:DTS,
  author =      "Marvin Bryan",
  title =       "The digital typography sourcebook",
  publisher =    "Wiley",
  address =     "New York",
  pages =       "xxiv + 384, 3",
  year =        "1996",
  ISBN =        "0-471-14811-3 (paper/CD-ROM)",
  ISBN-13 =     "978-0-471-14811-1",
  LCCN =        "Z250.7 .B79 1996",
  bibdate =     "Wed Jun 22 18:49:36 2005",
  bibsource =   "z3950.loc.gov:7090/Voyager",
  URL =         "ftp://uiarchive.cso.uiuc.edu/pub/etext/gutenberg/;
               http://www.loc.gov/catdir/bios/wiley047/96013161.html;
               http://www.loc.gov/catdir/description/wiley033/96013161.html;
               http://www.loc.gov/catdir/toc/onix04/96013161.html",
}

```

```

    acknowledgement = ack-nhfb,
    subject =        "Computer fonts",
}

```

### Search the British Library for the same book:

```

% cattobib --server br --title 'Digital Typography Sourcebook'
%% Searching [z3950cat.bl.uk:9909/BLAC] for [Digital Typography Sourcebook]: flags = []
%% IGNORED: Number of hits: 1, setno 1
...
@Book{Bryan:1997:DTS,
  author =        "Marvin Bryan",
  title =         "The digital typography sourcebook",
  publisher =     "Wiley",
  address =       "New York ; Chichester",
  pages =         "xxiv + 384",
  year =          "1997",
  ISBN =          "0-471-14811-3 (paperback)",
  ISBN-13 =       "978-0-471-14811-1",
  bibdate =       "Wed Jun 22 18:49:36 2005",
  acknowledgement = ack-nhfb,
  subject =        "Computer fonts",
}

```

### Search the National Library of Australia for two books by ISBN:

```

% cattobib -q --server au --ISBN 0-06-621285-5 0-19-860702-4
@Book{Winchester:2003:KDW,
  author =        "Simon Winchester",
  title =         "Krakatoa: the day the world exploded, 27 August 1883",
  publisher =     "HarperCollins Publishers",
  address =       "New York",
  pages =         "xvi + 416",
  year =          "2003",
  ISBN =          "0-06-621285-5",
  ISBN-13 =       "978-0-06-621285-2",
  bibdate =       "Wed Jun 22 18:49:36 2005",
  bibsource =     "catalogue.nla.gov.au:7090/Voyager",
  acknowledgement = ack-nhfb,
  remark =        "Includes bibliographical references and index.",
  subject =        "Natural disasters; Indonesia; Krakatoa; Social
                    aspects; Volcanoes; Indonesia; Krakatoa; Krakatoa
                    (Indonesia); Eruption, 1883",
  usmarc-019 =    "019 1 $a 24669279",
  usmarc-043 =    "043 $a a-io---",
  usmarc-250 =    "250 $a 1st U.S. ed.",
  usmarc-984 =    "984 $a ANL $c YY 551.2109598 W759",
}

@Book{Winchester:2003:MES,
  author =        "Simon Winchester",
  title =         "The meaning of everything: the story of the Oxford
                    English Dictionary",
  publisher =     "Oxford University Press",
  address =       "Oxford",
  pages =         "xxv + 260",
  year =          "2003",
}

```

```

ISBN =          "0-19-860702-4 (hbk.), 0-19-860702-4 (hbk.)",
ISBN-13 =       "978-0-19-860702-1 (hbk.), 978-0-19-860702-1 (hbk.)",
bibdate =       "Wed Jun 22 18:49:36 2005",
bibsource =     "catalogue.nla.gov.au:7090/Voyager",
price =         "No price",
acknowledgement = ack-nhfb,
remark =        "Includes ndex.",
subject =       "Oxford English dictionary; Lexicology; History",
usmarc-019 =    "019 1 $a 25073662",
}

```

## SEARCHING THE NATIONAL LIBRARY OF POLAND

The Polish language uses 22 accented letters that are not available in 7-bit ASCII or its 8-bit ISO 8859-1 extension used for most Western European languages. The Z39.50 output from the National Library of Poland uses the ISO 6937-2 character set, which is described in a character map available on the Web at

<ftp://dkuug.dk/i18n/charmaps/117>

**cattobib** handles translation to T<sub>E</sub>X of just the parts of that character set that are needed for the Polish accented letters. Input search strings are, however, not in any standard encoding, but instead require an awkward and idiosyncratic representation of the 22 accented letters:

{834}A	LATIN CAPITAL LETTER A WITH ACUTE
{834}C	LATIN CAPITAL LETTER C WITH ACUTE
{834}E	LATIN CAPITAL LETTER E WITH ACUTE
{834}N	LATIN CAPITAL LETTER N WITH ACUTE
{834}O	LATIN CAPITAL LETTER O WITH ACUTE
{834}S	LATIN CAPITAL LETTER S WITH ACUTE
{834}Z	LATIN CAPITAL LETTER Z WITH ACUTE
{834}a	LATIN SMALL LETTER A WITH ACUTE
{834}c	LATIN SMALL LETTER C WITH ACUTE
{834}e	LATIN SMALL LETTER E WITH ACUTE
{834}n	LATIN SMALL LETTER N WITH ACUTE
{834}o	LATIN SMALL LETTER O WITH ACUTE
{834}s	LATIN SMALL LETTER S WITH ACUTE
{834}z	LATIN SMALL LETTER Z WITH ACUTE
{839}Z	LATIN CAPITAL LETTER Z WITH DOT ABOVE
{839}z	LATIN SMALL LETTER Z WITH DOT ABOVE
{846}A	LATIN CAPITAL LETTER A WITH OGONEK
{846}E	LATIN CAPITAL LETTER E WITH OGONEK
{846}a	LATIN SMALL LETTER A WITH OGONEK
{846}e	LATIN SMALL LETTER E WITH OGONEK
{888}	LATIN CAPITAL LETTER L WITH STROKE
{888}	LATIN SMALL LETTER L WITH STROKE

Notice that the *same* input encoding is used for both lowercase and uppercase l-with-stroke. The prefix {834} represents the acute accent, {839} the dot accent, and {846} the ogonek (a hook accent attached near the lower right corner of the letter). Pictures of all of the Polish accented letters are available on the Web at

<http://www.eki.ee/letter/chardata.cgi?lang=pl+Polish&script=latin>

Thus, to search for the author name represented in T<sub>E</sub>X as `Bie{\`n}`, use the command

```
cattobib --server pl --author "Bie{834}n"
```

For the title represented in T<sub>E</sub>X as `Wi{\k{e}}{\`z}niowie Moskwy`, use the command

```
cattobib --server pl --title "Wi{846}e{834}zniowie Moskwy"
```

It would of course be much easier for users to allow matches of unaccented letters with accented ones, but that feature is not supported by the library catalog Z39.50 server. Instead, **cattobib** provides a convenient alternative: T<sub>E</sub>X markup for the Polish accented letters is silently translated to the form needed for the National Library of Poland. You can then write the sample search commands as:

```
cattobib --server pl --author "Bie{\n}"
cattobib --server pl --title "Wi{\k{e}}{\z}niowie Moskwy"
```

Outer braces surrounding accented letters may be omitted: both `{\k{a}}` and `\k{a}` are recognized, as are `{\z}`, `\z`, `{\z}`, `\z`, and so on.

## INITIALIZATION FILES

**cattobib** supports two initialization files to provide additional short aliases for Z39.50 catalog server names: a user-specific file `$HOME/.cattobibrc` and a system-wide file `@SHRLIBDIR@/cattobib.rc`. The format of such files is simple:

- Optional comments run from sharp to end of line, and are discarded first.
- Long lines may be continued by a backslash at end of line; the backslash and newline are removed, and thus, may be embedded in a name if that is useful.
- Lines of the form `alias name v1 v2 . . . vk` define `name` to be a possibly-empty white-space-separated list of values. Each value is normally a Z39.50 server name, such as `z3950.loc.gov:7090/Voyager`, but may also be a previously-defined alias whose value is to be substituted for that alias.
- All other lines are silently ignored.

Here is a sample file to illustrate the syntax, with short uppercase names in place of long Z39.50 server names:

```
### Test file for initialization file preprocessing

### Start with some basic definitions

alias one      ONE          # comment
alias two      TWO          # comment
alias three    THREE        # comment
alias four     FOUR         # comment
alias five     FIVE         # comment
alias six      SIX          # comment
alias seven    SEVEN        # comment
alias eight    EIGHT        # comment
alias nine     NINE         # comment
alias ten      TEN          # comment

### redefine an alias name
alias  three    UNO \
              DOS \
              TRES          # comment

alias v3        three

### undefine an alias name
alias three          # comment

alias v4_5          three FOUR FIVE    # comment

alias nine_ten      NINE TEN          # comment

### show line continuation: backslash-newline disappears,
### and thus, may appear in the middle of a name
alias v6_10          six \
```



```

              seven \
              eight \
              nine_\
ten                                     # comment

alias v_even    two four six eight ten
alias v_odd     one three five seven nine

```

**cattobib** reduces that file by discarding comments, joining wrapped lines, and expanding aliases to produce a temporary file that looks like this:

```

alias one      ONE
alias two      TWO
alias three    THREE
alias four     FOUR
alias five     FIVE
alias six      SIX
alias seven    SEVEN
alias eight    EIGHT
alias nine     NINE
alias ten      TEN
alias three    UNO DOS TRES
alias v3       UNO DOS TRES
alias three
alias v4_5     FOUR FIVE
alias nine_ten NINE TEN
alias v6_10    SIX SEVEN EIGHT NINE TEN
alias v_even   TWO FOUR SIX EIGHT TEN
alias v_odd    ONE FIVE SEVEN NINE

```

There are no restrictions on what characters may occur in the whitespace-separated words, except that sharp cannot survive the reduction, because it always starts a comment that is removed. No special marker, such as the Unix shell's dollar sign, is needed to request expansion; the number of alias names is likely to be small enough that no conflicts are likely.

Here is a fragment of an initialization file that shows the convenience of aliases of aliases, and alias expansion:

```

# Z39.50 catalogs of the eight members of the Ivy League
alias brown    # no known Z39.50 server
alias columbia clio-db.cc.columbia.edu:7090/Voyager
alias dartmouth catalog-lib.dartmouth.edu:210/innopac
alias harvard  z3950s://navigator.fas.harvard.edu/boston
alias mit      library.mit.edu:9909/mit01
alias princeton catalog.princeton.edu:7090/voyager
alias upenn    libdb.lib.upenn.edu:7090/voyager
alias yale     prodorbis.library.yale.edu:7090/voyager

# alternate short abbreviations:
alias dar      dartmouth
alias pen      upenn
alias pri      princeton
alias har      harvard
alias col      columbia

```

```
# all of the Ivy League Z39.50 university catalogs
alias ivy      brown columbia dartmouth harvard mit princeton upenn yale

# large universities in Utah
alias byu      catalog.lib.byu.edu:2200
alias usu      ht02aggies.ser321.usu.edu:20003/OPAC
alias utah     hip.library.utah.edu:210/horizon

alias ut-all   byu utah usu
```

Each word in the value list is looked up *just once* in the table of already-defined aliases. The substituted value is *not* scanned for further aliases, so there is no possibility of an infinite loop during alias substitution.

## BUGS

No matter which server is selected, library-catalog data tends to be rife with errors like these:

- completely wrong author lists;
- duplicated records, sometimes with minor variations;
- faulty title capitalization;
- incomplete, inaccurate, or missing page numbers;
- incorrect author order;
- mangled and missing accents;
- off-by-one copyright years;
- truncated author lists and titles;
- ...

The best advice to the user is to search three or more catalogs for the same data, and then merge the results, using a majority vote to resolve discrepancies.

When multiple catalogs provide the same data, it may indicate that the data are likely to be reliable. However, the user is warned that libraries around the world share cataloging data, so there may not be as much data independence as might appear from geographically-distant catalogs.

While the conversion of USMARC and SUTRS markup to BIB<sub>T</sub><sub>E</sub>X works reasonably well, there are many catalog record types that are not converted. When they are known not to be useful in BIB<sub>T</sub><sub>E</sub>X entries, they are silently discarded. Otherwise, **cattobib** preserves them as additional key/value pairs, such as the *usmarc-nnn* keys in the BIB<sub>T</sub><sub>E</sub>X output in the **EXAMPLES** section, or else complains about them in diagnostic messages.

**cattobib** produces only BIB<sub>T</sub><sub>E</sub>X @Book{...} entries, even for conference proceedings, for which a @Proceedings{...} entry is required. Library catalog information often does not distinguish between those document types, so the user must convert such entries.

A certain amount of manual cleanup of the BIB<sub>T</sub><sub>E</sub>X output is almost always necessary.

## ENVIRONMENT VARIABLES

**TESTSHRLIBDIR** Directory where format-conversion software is stored. That variable is primarily intended for the installation-time validation test suite, but can also be used for testing alternate versions of the software.

**TMPDIR** Directory where temporary files are stored (default: */tmp*).

## SEE ALSO

**bibclean(1)**, **bibjoin(1)**, **biblabel(1)**, **biborder(1)**, **bibsort(1)**, **bibtex(1)**, **citesub(1)**, **yaz-client(1)**.

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