Samba Commander (Smbc) 1.2.0

The interactive download and upload utility
Updated for Smbc 1.2.0, 24 February 2005

by Rafal Michniewicz

For my wife Magda and our child.

This file documents the Samba Commander (Smbc) utility for downloading and uploading from network data.

Copyright © 2003 - 2005 Rafal Michniewicz.

1 Overview

Samba Commander is a text mode SMB network commander. In Smbc, you can browse the local network or you can use the search function to find the files. You can also download/upload files and directories or create them both locally and remotely. Smbc has a resume function and supports UTF-8 characters.

2 Invoking

By default, Smbc is very simple to invoke.

```
smbc [options]...
```

Usually Smbc is running without parameters. During first run Smbc creates directory with name ".smbc" in home user directory. In this new directory Smbc finds configuration file with name "smbcrc". If this file is empty or if Smbc cannot open configuration file it runs with default configuration. The example file with all parameters you can find usually at "PREFIX_INSTALATION/share/smbc/sample.smbcrc".

2.1 Options

Some functions of Smbc are available only as parameters.

'-V'
'--version'
      Displays the version of Smbc.

'-h'
'--help'   Prints a help message describing all of Smbc's command-line options.

'-f'
'--flush' Flushs all download/upload lists. All files from "~/.smbc/" with name "dulist*" will be removed. In next run of Smbc the download/upload list will be empty.

'-l'
'--list'   Shows all download/upload lists from "~/.smbc/".

'-s INT'
'--show=INT'
      Displays all items form list with numer INT. You can get all number from list executing smbc -l command.

'-p'
'--sleep' Sleeps Smbc. Smbc doesn't download/upload any files when execuding even if some files wait in queue.

'-m STRING'
'--message=STRING'
      Receives message from Samba. If you want that Smbc receives WinPopup message you must add bellow line to smb.conf

      ```message command = /path_to/smbc -m 'message from %f on %m' -i %s; rm %s```

      Now if you have running Smbc and someone sends you a WinPopup message Smbc immediatelly displays it. If Smbc doesn't run all WinPopup messages wait for executing Smbc.

'-i STRING'
'--file=STRING'
      Sets file with samba message, usage only with -m.

2.2 Content of parameters form ~/.smbc/smbcrc configuration file

'username'
      Username that is used during login to remote host, default "guest".

'password'
> Password that is enter during login to remote host, default none.

'smbclient'
> Path to file "smbclient", neccessery for sending WinPopup message, default none. Only functions concantenate with send and receive a WinPopup messages work as frontend, Samba Team doesn't include this functions in libsmbclient library.

'localdir'
> Starts local directory when running Smbc, default HOME.

'workgroup'
> Starts workgroup, default none.

'host'   Starts host, default none.

'share'   Starts remote host dir, default none.

'typeofsort-left'
'typeofsort-right'
> Type of files and directories sorting in selected panels, default 1.
>
> ```
> typeofsort-left 1 - sort by filenames
> typeofsort-left 2 - sort by extension
> typeofsort-left 3 - sort by size
> typeofsort-left 4 - don't sort
> ```

'revesesort-left'
'revesesort-right'
> Type of reverse sorting, default 0.
>
> ```
> reversesort 1 - on
> reversesort 0 - off
> ```

'group-left'
'group-right'
> Group files and directories, default 1.
>
> ```
> group-left 1 - on
> group-left 0 - off
> ```

'timeout'   Connection time out in seconds, default 3 seconds. This parameter was used when Smbc tries to connect to remote host and waits for response. If you have the Samba in version oldest than 3.0.0 this parameter doesn't work and Smbc may be waiting for very long time.

'autoresume'
> Autoresumes download, doesn't ask if connection is broken, default 0. If connection to remote host or to local file was broken and autoresume was set to 1 Smbc sets retry-delay-time for this file and immediatelly goes to next item in download/upload list.
>
> ```
> autoresume 1 - on
> autoresume 0 - off
> ```

'indextime'
> Time between smbc restarts network files indexing in seconds, default 300 seconds.
>
> ```
> indextime  0 - Smbc disables network files indexing
> indextime  1 - Smbc ony once indexes network files
> indextime  300 - Smbc indexes network files, then delay, 300 second and
>                  restart indexing
> ```

'`char-convert`'
> Converts all chars from UTF-8 to terminal charset, (see Section 3.3 [Characters conversion], page 6) , default enabled.
>
> ```
> char-convert 1 - enable conversion
> char-convert 0 - disable conversion
> ```

'`retry-delay-time`'
> Delay time of retrying download is seconds, default 60 second.

'`askquit`'   Asks if quit from Smbc, default 1.
> ```
> askquit 1 - ask
> askquit 0 - don't ask
> ```

'`retry-read-groups`'
> How many times smbc retries to read groups when samba returns fail or empty result, default retry-read-groups 5.
>
> ```
> retry-read-groups = -1 - retries to success
> retry-read-groups = 0  - doesn't retry
> retry-read-groups > 0  - retries retry-read-groups times
> ```

'`retry-read-hosts`'
> How many times smbc retries to read hosts when samba returns fail or empty result, default retry-read-hosts 5.
>
> ```
> retry-read-hosts = -1 - retries to success
> retry-read-hosts = 0  - doesn't retry
> retry-read-hosts > 0  - retries retry-read-hosts times
> ```

'`retry-read-shares`'
> How many times smbc retries to read shares when samba returns fail or empty result, default retry-read-shares 5.
>
> ```
> retry-read-shares = -1 - retries to success
> retry-read-shares = 0  - doesn't retry
> retry-read-shares > 0  - retries retry-read-shares times
> ```

'`colorK XXXX,YYYY,ZZZZ`'
> Defines three colors, where XXXX,YYYY,ZZZZ are red,green,blue and have value = <0000..1000> ,K has value <0..2>, default 0 colors defined.
>
> ```
> examples:
> color0 0100,0100,0610
> color1 0900,0080,0900
> color2 0010,0500,0500
> ```

'`extcolorK`'
> Defines color for file extension, K has value <0..2>, one definition per line, maximal extension length = 10 chars ,default 0 colors defined.
>
> ```
> examples:
> extcolor0 exe
> extcolor0 bin
> extcolor0 bat
> extcolor0 tar
> extcolor0 gz
> extcolor0 tgz
> extcolor1 mp3
> extcolor1 wav
> ```

```
extcolor1 mod
extcolor2 avi
extcolor2 mpg
extcolor2 mpeg
```

2.3 Content of ~/.smbc/ directory

'`smbcrc`'   Configuration file.

'`smbc.lock`'

        This file is a semaphore to manage a download lists. (see Section 3.1 [Management of a download/upload list of files], page 6).

'`bookmark`'

        This file includes all bookmarks.

'`findfile`'

        The "quick find file function" is used to search files. Access to this file is faster than access to network.

'`findfileprim`'

        If a function of indexing a network is enabled all founded files in network are written to this "findfileprim" file. If all files from network were indexed "findfileprim" file was renamed to "findfile" and now you can use "quick find file function".

'`debug`'   If Smbc during instalation is configured with option "–with-debug" all debug messages are saved to this "debug" file.

3 How the Smbc works

3.1 Management of a download/upload list of files

If you add a fiew files do download/upload list and you quit from Smbc before Smbc finished download/upload all files, then Smbc saves this list to file "~/.smbc/dulistX" where X is a first free number. If you do the same at one time with more that one Smbc in "~/.smbc/" directory will be created more that one "dufileX"; example:

```
dulist0
dulist1
dulist2
```

At some time you again run Smbc. Now Smbc is searching to "~/.smbc/" directory to files "dulistX" find and load a file with the smallest numer. If this instance of Smbc finishes download/upload all files it is searching again "~/.smbc/" directory and again load next found "dulistX" file.

3.2 A quick file found

If you run a first instance of Smbc, Smbc creates a child process. A child process is looking for all files from network and saves it to file "findfileprim" in "~/.smbc" directory. When all files form network were found the child process rename file "findfileprim" to "findfile" and sends message to Smbc process that a process from network searching files was finished. At this time you can use a quick find file function. If you run more than one instance of Smbc only one Smbc indexing files from network process is started. If this instance of Smbc will be closed, next instance of Smbc creates a child process for indexing a network files. The child process after finishing files from network indexing waits "indextime" (see Section 2.2 [Content of parameters form ~/.smbc/smbcrc configuration file], page 2) seconds and starts indexing again.

3.3 Characters conversion

Smbc can convert all characters received from network and from system to characters used by terminal. If a parameter "char-convert" was set to 1, the internal characters in Smbc are UTF-8 and Smbc convert, all character from/to terminal, system and network. If the parameter "char-convert" is set as 0 Smbc disables conversion.

3.4 Retrying download/upload files

Smbc downloades/uploades files and suddenly the connection to remote host broken. In this situation Smbc responds at with way two actions, first if the parameter "autoresume" is set to 0, the Smbc displays menu "message when connection is broken" (see Section 5.4 [Message when connection is broken], page 11) and waits for user decision. At this menu user can decide what Smbc must do cancel, wait, overwrite with immediate retry, retry after fiew seconds or retry after fiew seconds without asking if the connections will be broken again. Second if the parameter "autoresume" is set to 1, the Smbc retries after fiew seconds without asking.

3.5 Sending and receiving WinPopup messages

Smbc can send and receive WinPopup messages, but this function works as frontend. Samba Team doesn't include in libsmbclient library functions to send and receive WinPopup messages. To send messages you must first configure Smbc. You must "smbclient" parameter sets in "~/.smbc/smbcrc"; for example

```
smbclient /usr/bin/smbclient
```

If you want to receive WinPopup messages you must set "message command" parameter in "smb.conf" file; for example

```
message command = /path_to/smbc -m 'message from %f on %m' -i %s; rm %s
```

At this time Samba after receiving a WinPopup message executes Smbc and Smbc saves received message to temporary directory. If you run Smbc at the same time when message is received it is immediatelly displayed; if not, message will be displayed after you run Smbc.

4 Functions in Smbc

4.1 Find file function

Quick find file function finds files in entire network. In slow find file function you can select where do you want to search for files. If some files or directories were selected Smbc searches only in them else Smbc searches in all subdirectories.

5 Menus and keys

5.1 Main menu

`arrow-up`

`p`   move one item up

`arrow-down`

`o`   move one item down

`tab`

`i`   change selected column

`t`   group/ungroup catalogs or files

`end`

`u`   go to the end off the list

`home`

`y`   go to the start off the list

`F5`

`d`   download/upload selected files and directories

`w`   reverse sorting

`enter`

`x`   execute a workgroup, host, share or directory

`insert`

`a`   select or unselect one item

`page up`

`l`   move one screen up

`page down`

`k`   move one screen down

`F8`

`ctrl+d`   delete selected files and directories

`F7`

`c`   create directory

`F3`

`v`   view text file, execute workgroup, host, share or directory

`g`   go to workgroup, host, share in remote host

`e`   change the type of sorting

`s`   edit download/upload list

`m`   send a WinPopup message

`b`   bookmark

`bb`   add item to bookmark

`q`   exit from Smbc

5.2 Download/upload list menu

`q`   exit from this menu

`del`

`d`   set selected item to delete

`u`   set selected item to undelete

`m`   mark/unmark selected item

`space`   pause/resume selected item download

`ctrl+d`   delete all dirs and subdirs of selected item

`ctrl+f`   flush all items

`arrow-right`
`.`   add 1 second to delay time

`arrow-left`
`,`   take off 1 second from delay time

`shift+arrow-right`
`>`   add 60 seconds to delay time

`shift+arrow-left`
`<`   take off 60 seconds from delay time

`;`   add 1 second to delay time for all items

`'`   take off 1 second from delay time for all items

`:`   add 60 seconds to delay time for all items

`"`   take off 60 seconds from delay time for all items

`|`   copy current item delay time to all items

`n`   set try download now to select item

`N`   set try download now to all items

5.3 Bookmark list menu

`q`   exit from this menu

`b`   add item to bookmark and exit

`del`

`d`   set selected item to delete

`u`   set selected item to undelete

`m`   mark/unmark item

`enter`

`x`   go to selected item

5.4 Message when connection is broken

`arrow-up`

.   add 1 second to delay time

`arrow-down`
,   take off 1 second from delay time

`shift+arrow-up`
>   add 60 seconds to delay time

`shift+arrow-down`
<   take off 60 seconds from delay time

5.5 Find file menu

5.5.1 input items

`enter`

`tab`   go to the next item

`ctrl+p`   enable/disable interactive filtering

`ctrl+k`   exit from find file menu

5.5.2 select items

`tab`   go to the next item

`enter`   go to selected file

`q`   quit

6 Contributors

- My wife Magda for inspiration to work and my English correction of.
- Mikhail Kshevetskiy for implementation iconv in Smbc.
- Noel Köthe for raports of bugs.

7 Copying

Samba Commander (Smbc) is licensed under the GNU GPL, which makes it *free software*.

Please note that "free" in "free software" refers to liberty, not price. As some GNU project advocates like to point out, think of "free speech" rather than "free beer". The exact and legally binding distribution terms are spelled out below; in short, you have the right (freedom) to run and change Smbc and distribute it to other people. The important restriction is that you have to grant your recipients the same rights and impose the same restrictions.

This method of licensing software is also known as *open source* because, among other things, it makes sure that all recipients will receive the source code along with the program, and be able to improve it. The GNU project prefers the term "free software" for reasons outlined at http://www.gnu.org/philosophy/free-software-for-freedom.html.

The exact license terms are defined by this paragraph and the GNU General Public License it refers to:

> Samba Commander (Smbc) is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

> Samba Commander (Smbc) 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 General Public License for more details.

> A copy of the GNU General Public License is included as part of this manual; if you did not receive it, write to the Free Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.

In addition to this, this manual is free in the same sense:

> Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with the Invariant Sections being "GNU General Public License" and "GNU Free Documentation License", with no Front-Cover Texts, and with no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

The full texts of the GNU General Public License and of the GNU Free Documentation License are available below.

7.1 GNU General Public License

Version 2, June 1991

Copyright © 1989, 1991 Free Software Foundation, Inc.
675 Mass Ave, Cambridge, MA 02139, USA

Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software—to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program

whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, 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 or use pieces of it in new free programs; and that you know you can do these things.

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

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

1. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

   Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

2. You may copy and distribute verbatim copies of the Program's 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 give any other recipients of the Program a copy of this License along with the Program.

   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.

3. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, 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. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

    b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

    c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

    These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, 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 Program, 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 Program.

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

4. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

    a. 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; or,

    b. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

    c. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

    The source code for a work means the preferred form of the work for making modifications to it. For an executable work, 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 executable. However, as a special exception, the source code 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.

If distribution of executable or 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 counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

5. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program 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.

6. 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 Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

7. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program 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 to this License.

8. 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 Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program 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 Program.

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.

9. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program 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.

10. The Free Software Foundation may publish revised and/or new versions of the 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 Program 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 Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

11. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, 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

12. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "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 PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

13. 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 PROGRAM 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 PROGRAM (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 PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

7.4 GNU Free Documentation License

Version 1.1, March 2000

Copyright (C) 2000 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.

0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other written document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you".

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (For example, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License.

The "Cover Texts" are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License.

A "Transparent" copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, whose contents can be viewed and edited directly and straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file

format whose markup has been designed to thwart or discourage subsequent modification by readers is not Transparent. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML designed for human modification. Opaque formats include PostScript, PDF, proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies of the Document numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a publicly-accessible computer-network location containing a complete Transparent copy of the Document, free of added material, which the general network-using public has access to download anonymously at no charge using public-standard network protocols. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has less than five).
C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
D. Preserve all the copyright notices of the Document.
E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
H. Include an unaltered copy of this License.
I. Preserve the section entitled "History", and its title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
K. In any section entitled "Acknowledgements" or "Dedications", preserve the section's title, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
M. Delete any section entitled "Endorsements". Such a section may not be included in the Modified Version.
N. Do not retitle any existing section as "Endorsements" or to conflict in title with any Invariant Section.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your

option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties–for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

    You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice.

    The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

    In the combination, you must combine any sections entitled "History" in the various original documents, forming one section entitled "History"; likewise combine any sections entitled "Acknowledgements", and any sections entitled "Dedications". You must delete all sections entitled "Endorsements."

6. COLLECTIONS OF DOCUMENTS

    You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

    You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

    A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, does not as a whole count as a Modified Version of the Document, provided no compilation copyright is claimed for the compilation. Such a compilation is called an "aggregate", and this License does not apply to the other self-contained works thus compiled with the Document, on account of their being thus compiled, if they are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one quarter of the entire aggregate, the Document's Cover Texts may be placed on covers that surround only the Document within the aggregate. Otherwise they must appear on covers around the whole aggregate.

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License provided that you also include the original English version of this License. In case of a disagreement between the translation and the original English version of this License, the original English version will prevail.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document 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.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation 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. See http://www.gnu.org/copyleft/.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

ADDENDUM: How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

```
Copyright (C)  year  your name.
Permission is granted to copy, distribute and/or modify this document
under the terms of the GNU Free Documentation License, Version 1.1
or any later version published by the Free Software Foundation;
with the Invariant Sections being list their titles, with the
Front-Cover Texts being list, and with the Back-Cover Texts being list.
A copy of the license is included in the section entitled ``GNU
Free Documentation License''.
```

If you have no Invariant Sections, write "with no Invariant Sections" instead of saying which ones are invariant. If you have no Front-Cover Texts, write "no Front-Cover Texts" instead of "Front-Cover Texts being list"; likewise for Back-Cover Texts.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.

Index

Table of Contents