



# Open Source Used In ETHAN UK HQ001 3.47

## **Cisco Systems, Inc.**

[www.cisco.com](http://www.cisco.com)

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

Text Part Number: 78EE117C99-119831768

**This document contains licenses and notices for open source software used in this product. With respect to the free/open source software listed in this document, if you have any questions or wish to receive a copy of any source code to which you may be entitled under the applicable free/open source license(s) (such as the GNU Lesser/General Public License), please contact us at [external-opensource-requests@cisco.com](mailto:external-opensource-requests@cisco.com).**

**In your requests please include the following reference number 78EE117C99-119831768**

## Contents

### **1.1 ASN1C 0.9.23**

1.1.1 Available under license

### **1.2 base64.c 1.3**

1.2.1 Available under license

### **1.3 Boost C++ library 1.50**

1.3.1 Available under license

### **1.4 cJSON r40**

1.4.1 Available under license

### **1.5 curl 7.26.0**

1.5.1 Available under license

### **1.6 dhcp 4.1-ESV-R8**

1.6.1 Available under license

### **1.7 dumpasn1 1**

1.7.1 Available under license

### **1.8 expat 2.1.0**

1.8.1 Available under license

### **1.9 ffmpeg 0.11.1**

1.9.1 Available under license

### **1.10 ffmpeg\_v2 0.11.1**

1.10.1 Available under license

### **1.11 FreeBSD kernel 8.2 :FreeBSD 8.2**

1.11.1 Available under license

### **1.12 FREETYPE2 2.4.4**

1.12.1 Available under license

### **1.13 jpeg 8c**

1.13.1 Notifications

- 1.13.2 Available under license
- 1.14 KazLib 1.20**
  - 1.14.1 Available under license
- 1.15 libpng 1.5.2**
  - 1.15.1 Available under license
- 1.16 libstrophe 1.1.8**
  - 1.16.1 Available under license
- 1.17 libusb 1.0.8**
  - 1.17.1 Available under license
- 1.18 lighttpd 1.4.28**
  - 1.18.1 Available under license
- 1.19 lighttpd 1.4.28**
  - 1.19.1 Available under license
- 1.20 lua 5.1.5 5.1.5**
  - 1.20.1 Available under license
- 1.21 openkit-ios na**
  - 1.21.1 Available under license
- 1.22 openssl 1.0.1q :1**
  - 1.22.1 Notifications
  - 1.22.2 Available under license
- 1.23 prosody 0.9.6**
  - 1.23.1 Available under license
- 1.24 pugixml 1.0**
  - 1.24.1 Available under license
- 1.25 rfc3550 - A Transport Protocol for Real-Time Applications 1.0**
  - 1.25.1 Available under license
- 1.26 SHA-1 2.1.**
  - 1.26.1 Available under license
- 1.27 SLRE 1.0**
  - 1.27.1 Available under license
- 1.28 sqlite 3.7.9**
  - 1.28.1 Available under license
- 1.29 upnp (libupnp) 1.6.6**
  - 1.29.1 Available under license
- 1.30 wintsock 3**
  - 1.30.1 Available under license
- 1.31 winx -win32sdk 1.2 :1.2**
- 1.32 XFree86 4.4.0**
  - 1.32.1 Available under license

### 1.33 xorg-x11-server 1.1.1

1.33.1 Available under license

### 1.34 Zlib 1.2.5.3

1.34.1 Available under license

## 1.1 ASN1C 0.9.23

### 1.1.1 Available under license :

```
/*-
 * Copyright (c) 2003, 2004, 2005, 2006, 2007 Lev Walkin <vlm@lionet.info>
 * All rights reserved.
 *
 * Redistribution and use in source and binary forms, with or without
 * modification, are permitted provided that the following conditions
 * are met:
 * 1. Redistributions of source code must retain the above copyright
 * notice, this list of conditions and the following disclaimer.
 * 2. Redistributions in binary form must reproduce the above copyright
 * notice, this list of conditions and the following disclaimer in the
 * documentation and/or other materials provided with the distribution.
 *
 * THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND
 * ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
 * IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
 * ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE
 * FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
 * DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
 * OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
 * HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
 * LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
 * OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
 * SUCH DAMAGE.
 *
 * $Id$
 */
```

## 1.2 base64.c 1.3

### 1.2.1 Available under license :

```
/* $NetBSD: base64.c,v 1.3 1997/07/13 19:57:30 christos Exp $ */

/*
 * Copyright (c) 1996 by Internet Software Consortium.
 *
 * Permission to use, copy, modify, and distribute this software for any
```

\* purpose with or without fee is hereby granted, provided that the above  
\* copyright notice and this permission notice appear in all copies.  
\*  
\* THE SOFTWARE IS PROVIDED "AS IS" AND INTERNET SOFTWARE CONSORTIUM DISCLAIMS  
\* ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES  
\* OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL INTERNET SOFTWARE  
\* CONSORTIUM BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL  
\* DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR  
\* PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS  
\* ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS  
\* SOFTWARE.  
\*/  
  
/\*  
\* Portions Copyright (c) 1995 by International Business Machines, Inc.  
\*  
\* International Business Machines, Inc. (hereinafter called IBM) grants  
\* permission under its copyrights to use, copy, modify, and distribute this  
\* Software with or without fee, provided that the above copyright notice and  
\* all paragraphs of this notice appear in all copies, and that the name of IBM  
\* not be used in connection with the marketing of any product incorporating  
\* the Software or modifications thereof, without specific, written prior  
\* permission.  
\*  
\* To the extent it has a right to do so, IBM grants an immunity from suit  
\* under its patents, if any, for the use, sale or manufacture of products to  
\* the extent that such products are used for performing Domain Name System  
\* dynamic updates in TCP/IP networks by means of the Software. No immunity is  
\* granted for any product per se or for any other function of any product.  
\*  
\* THE SOFTWARE IS PROVIDED "AS IS", AND IBM DISCLAIMS ALL WARRANTIES,  
\* INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A  
\* PARTICULAR PURPOSE. IN NO EVENT SHALL IBM BE LIABLE FOR ANY SPECIAL,  
\* DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER ARISING  
\* OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE, EVEN  
\* IF IBM IS APPRISED OF THE POSSIBILITY OF SUCH DAMAGES.  
\*/

## 1.3 Boost C++ library 1.50

### 1.3.1 Available under license :

Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization obtaining a copy of the software and accompanying documentation covered by this license (the "Software") to use, reproduce, display, distribute, execute, and transmit the Software, and to prepare derivative works of the

Software, and to permit third-parties to whom the Software is furnished to do so, all subject to the following:

The copyright notices in the Software and this entire statement, including the above license grant, this restriction and the following disclaimer, must be included in all copies of the Software, in whole or in part, and all derivative works of the Software, unless such copies or derivative works are solely in the form of machine-executable object code generated by a source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE LIABLE FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Software License, Version 1.0

Copyright 2002-2003, Trustees of Indiana University.

Copyright 2000-2001, University of Notre Dame.

All rights reserved.

Indiana University has the exclusive rights to license this product under the following license.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- \* All redistributions of source code must retain the above copyright notice, the list of authors in the original source code, this list of conditions and the disclaimer listed in this license;
- \* All redistributions in binary form must reproduce the above copyright notice, this list of conditions and the disclaimer listed in this license in the documentation and/or other materials provided with the distribution;
- \* Any documentation included with all redistributions must include the following acknowledgement:

"This product includes software developed at the University of Notre Dame and the Pervasive Technology Labs at Indiana University. For technical information contact Andrew Lumsdaine at the Pervasive Technology Labs at Indiana University. For administrative and license questions contact the Advanced Research and Technology Institute at 351 West 10th Street. Indianapolis, Indiana 46202, phone 317-278-4100, fax 317-274-5902."

Alternatively, this acknowledgement may appear in the software itself, and

wherever such third-party acknowledgments normally appear.

\* The name Indiana University, the University of Notre Dame or "Caramel" shall not be used to endorse or promote products derived from this software without prior written permission from Indiana University. For written permission, please contact Indiana University Advanced Research & Technology Institute.

\* Products derived from this software may not be called "Caramel", nor may Indiana University, the University of Notre Dame or "Caramel" appear in their name, without prior written permission of Indiana University Advanced Research & Technology Institute.

Indiana University provides no reassurances that the source code provided does not infringe the patent or any other intellectual property rights of any other entity. Indiana University disclaims any liability to any recipient for claims brought by any other entity based on infringement of intellectual property rights or otherwise.

LICENSEE UNDERSTANDS THAT SOFTWARE IS PROVIDED "AS IS" FOR WHICH NO WARRANTIES AS TO CAPABILITIES OR ACCURACY ARE MADE. INDIANA UNIVERSITY GIVES NO WARRANTIES AND MAKES NO REPRESENTATION THAT SOFTWARE IS FREE OF INFRINGEMENT OF THIRD PARTY PATENT, COPYRIGHT, OR OTHER PROPRIETARY RIGHTS. INDIANA UNIVERSITY MAKES NO WARRANTIES THAT SOFTWARE IS FREE FROM "BUGS", "VIRUSES", "TROJAN HORSES", "TRAP DOORS", "WORMS", OR OTHER HARMFUL CODE. LICENSEE ASSUMES THE ENTIRE RISK AS TO THE PERFORMANCE OF SOFTWARE AND/OR ASSOCIATED MATERIALS, AND TO THE PERFORMANCE AND VALIDITY OF INFORMATION GENERATED USING SOFTWARE.

This package was debianized by Vladimir Prus <ghost@cs.msu.su> on Wed, 17 July 2002, 19:27:00 +0400.

Copyright:

```
/+\n+\ Copyright 1993-2002 Christopher Seiwald and Perforce Software, Inc.\n\+/\
```

This is Release 2.4 of Jam/MR, a make-like program.

License is hereby granted to use this software and distribute it freely, as long as this copyright notice is retained and modifications are clearly marked.

ALL WARRANTIES ARE HEREBY DISCLAIMED.

Some portions are also:

Copyright 2001-2006 David Abrahams.

Copyright 2002-2006 Rene Rivera.

Copyright 2003-2006 Vladimir Prus.

Distributed under the Boost Software License, Version 1.0.

(See accompanying file LICENSE\_1\_0.txt or [http://www.boost.org/LICENSE\\_1\\_0.txt](http://www.boost.org/LICENSE_1_0.txt))

## 1.4 cJSON r40

### 1.4.1 Available under license :

/\*

Copyright (c) 2009 Dave Gamble

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

\*/

## 1.5 curl 7.26.0

### 1.5.1 Available under license :

COPYRIGHT AND PERMISSION NOTICE

Copyright (c) 1996 - 2012, Daniel Stenberg, <daniel@haxx.se>.

All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN



NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

```
  _ _ _ _ _  
  _||| _||  
 / _||| | ||  
 |(_||| _<|_  
 \_|||/| \_|||
```

## README

Curl is a command line tool for transferring data specified with URL syntax. Find out how to use curl by reading the curl.1 man page or the MANUAL document. Find out how to install Curl by reading the INSTALL document.

libcurl is the library curl is using to do its job. It is readily available to be used by your software. Read the libcurl.3 man page to learn how!

You find answers to the most frequent questions we get in the FAQ document.

Study the COPYING file for distribution terms and similar. If you distribute curl binaries or other binaries that involve libcurl, you might enjoy the LICENSE-MIXING document.

## CONTACT

If you have problems, questions, ideas or suggestions, please contact us by posting to a suitable mailing list. See <http://curl.haxx.se/mail/>

All contributors to the project are listed in the THANKS document.

## WEB SITE

Visit the curl web site for the latest news and downloads:

<http://curl.haxx.se/>

## GIT

To download the very latest source off the GIT server do this:

```
git clone git://github.com/bagder/curl.git
```

(you'll get a directory named curl created, filled with the source code)

## NOTICE

Curl contains pieces of source code that is Copyright (c) 1998, 1999 Kungliga Tekniska Högskolan. This notice is included here to comply with the distribution terms.

# 1.6 dhcp 4.1-ESV-R8

## 1.6.1 Available under license :

```
# Copyright (c) 2004-2013 by Internet Systems Consortium, Inc. ("ISC")
# Copyright (c) 1995-2003 by Internet Software Consortium
#
# Permission to use, copy, modify, and distribute this software for any
# purpose with or without fee is hereby granted, provided that the above
# copyright notice and this permission notice appear in all copies.
#
# THE SOFTWARE IS PROVIDED "AS IS" AND ISC DISCLAIMS ALL WARRANTIES
# WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF
# MERCHANTABILITY AND FITNESS.  IN NO EVENT SHALL ISC BE LIABLE FOR
# ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES
# WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN
# ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT
# OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.
#
# Internet Systems Consortium, Inc.
# 950 Charter Street
# Redwood City, CA 94063
# <info@isc.org>
# https://www.isc.org/
```

# 1.7 dumpasn1 1

## 1.7.1 Available under license :

```
/* ASN.1 data display code, copyright Peter Gutmann
<pgut001@cs.auckland.ac.nz>, based on ASN.1 dump program by David Kemp,
with contributions from various people including Matthew Hamrick, Bruno
Couillard, Hallvard Furuseth, Geoff Thorpe, David Boyce, John Hughes,
'Life is hard, and then you die', Hans-Olof Hermansson, Tor Rustad,
Kjetil Barvik, James Sweeny, Chris Ridd, David Lemley, John Tobey, James
Manger and several other people whose names I've misplaced.
```

Available from <http://www.cs.auckland.ac.nz/~pgut001/dumpasn1.c>. Last

updated 12 January 2013 (version 20130113, if you prefer it that way).  
To build under Windows, use 'cl /MD dumpasn1.c'. To build on OS390 or z/OS, use '/bin/c89 -D OS390 -o dumpasn1 dumpasn1.c'.

This code grew slowly over time without much design or planning, and with extra features being tacked on as required. It's not representative of my normal coding style. cryptlib, <http://www.cs.auckland.ac.nz/~pgut001/cryptlib/>, does a much better job of checking ASN.1 than this does, since dumpasn1 is a display program written to accept the widest possible range of input and not a compliance checker. In other words it will bend over backwards to accept even invalid data, since a common use for it is to try and locate encoding problems that lead to invalid encoded data. While it will warn about some types of common errors, the fact that dumpasn1 will display an ASN.1 data item doesn't mean that the item is valid.

dumpasn1 requires a config file dumpasn1.cfg to be present in the same location as the program itself or in a standard directory where binaries live (it will run without it but will display a warning message, you can configure the path either by hardcoding it in or using an environment variable as explained further down). The config file is available from <http://www.cs.auckland.ac.nz/~pgut001/dumpasn1.cfg>.

This code assumes that the input data is binary, having come from a MIME-aware mailer or been piped through a decoding utility if the original format used base64 encoding. If you need to decode it, it's recommended that you use a utility like udevview, which will strip virtually any kind of encoding (MIME, PEM, PGP, whatever) to recover the binary original.

You can use this code in whatever way you want, as long as you don't try to claim you wrote it.

Editing notes: Tabs to 4, phasers to malky (and in case anyone wants to complain about that, see "Program Indentation and Comprehensibility", Richard Miara, Joyce Musselman, Juan Navarro, and Ben Shneiderman, Communications of the ACM, Vol.26, No.11 (November 1983), p.861) \*/

## 1.8 expat 2.1.0

### 1.8.1 Available under license :

Copyright (c) 1998, 1999, 2000 Thai Open Source Software Center Ltd  
and Clark Cooper

Copyright (c) 2001, 2002, 2003, 2004, 2005, 2006 Expat maintainers.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including

without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

## 1.9 ffmpeg 0.11.1

### 1.9.1 Available under license :

GNU GENERAL PUBLIC LICENSE  
Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.,  
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 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 Lesser 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.

## GNU GENERAL PUBLIC LICENSE

### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. 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.

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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

11. 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.

12. 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

### How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

This program 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.

This program 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.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA.

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author  
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
```

This is free software, and you are welcome to redistribute it under certain conditions; type 'show c' for details.

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than 'show w' and 'show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program 'Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

GNU GENERAL PUBLIC LICENSE  
Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <<http://fsf.org/>>  
Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. 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 them 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 prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. 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.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

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

## TERMS AND CONDITIONS

### 0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

#### 1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

## 2. Basic Permissions.

All rights granted under this License are granted for the term of copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered by this License only if the output, given its content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do

not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed; section 10 makes it unnecessary.

### 3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

### 4. Conveying Verbatim Copies.

You may convey 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; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

### 5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

- a) The work must carry prominent notices stating that you modified it, and giving a relevant date.
- b) The work must carry prominent notices stating that it is

released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to "keep intact all notices".

c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.

d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an "aggregate" if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation's users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

#### 6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this



conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must

suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

## 7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you

add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

- a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or
- b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or
- c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or
- d) Limiting the use for publicity purposes of names of licensors or authors of the material; or
- e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or
- f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on those licensors and authors.

All other non-permissive additional terms are considered "further restrictions" within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above requirements apply either way.

## 8. Termination.

You may not propagate or modify a covered work except as expressly

provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

#### 9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.

#### 10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An "entity transaction" is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever

licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

## 11. Patents.

A "contributor" is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's "contributor version".

A contributor's "essential patent claims" are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, "control" includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a "patent license" is any express agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To "grant" such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner

consistent with the requirements of this License, to extend the patent license to downstream recipients. "Knowingly relying" means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is "discriminatory" if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

#### 12. No Surrender of Others' Freedom.

If 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 convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

#### 13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

#### 14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU 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 that a certain numbered version of the GNU General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

#### 15. Disclaimer of Warranty.

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.

#### 16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS 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.

#### 17. Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively state the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

This program 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 3 of the License, or (at your option) any later version.

This program 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.

You should have received a copy of the GNU General Public License along with this program. If not, see <http://www.gnu.org/licenses/>.



Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

```
<program> Copyright (C) <year> <name of author>  
This program comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.  
This is free software, and you are welcome to redistribute it  
under certain conditions; type 'show c' for details.
```

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an "about box".

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

The GNU General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. But first, please read <http://www.gnu.org/philosophy/why-not-lgpl.html>.

#### GNU LESSER GENERAL PUBLIC LICENSE

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.  
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA  
Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

#### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether

this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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

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

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

## GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or

other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License").

Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, 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 library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete 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 distribute a copy of this License along with the Library.

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.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, 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) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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

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

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the

ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you 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.

If distribution of 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 satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the

Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy

from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be 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.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library 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.

9. 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 Library or its derivative works. These actions are



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

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

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

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.

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

13. The Free Software Foundation may publish revised and/or new versions of the Lesser 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 Library 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 Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, 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

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

16. 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 LIBRARY 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 LIBRARY (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 LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH

DAMAGES.

## END OF TERMS AND CONDITIONS

### How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library 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 Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

## GNU LESSER GENERAL PUBLIC LICENSE

Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <<http://fsf.org/>>  
Everyone is permitted to copy and distribute verbatim copies  
of this license document, but changing it is not allowed.

This version of the GNU Lesser General Public License incorporates  
the terms and conditions of version 3 of the GNU General Public  
License, supplemented by the additional permissions listed below.

### 0. Additional Definitions.

As used herein, "this License" refers to version 3 of the GNU Lesser  
General Public License, and the "GNU GPL" refers to version 3 of the GNU  
General Public License.

"The Library" refers to a covered work governed by this License,  
other than an Application or a Combined Work as defined below.

An "Application" is any work that makes use of an interface provided  
by the Library, but which is not otherwise based on the Library.  
Defining a subclass of a class defined by the Library is deemed a mode  
of using an interface provided by the Library.

A "Combined Work" is a work produced by combining or linking an  
Application with the Library. The particular version of the Library  
with which the Combined Work was made is also called the "Linked  
Version".

The "Minimal Corresponding Source" for a Combined Work means the  
Corresponding Source for the Combined Work, excluding any source code  
for portions of the Combined Work that, considered in isolation, are  
based on the Application, and not on the Linked Version.

The "Corresponding Application Code" for a Combined Work means the  
object code and/or source code for the Application, including any data  
and utility programs needed for reproducing the Combined Work from the  
Application, but excluding the System Libraries of the Combined Work.

### 1. Exception to Section 3 of the GNU GPL.

You may convey a covered work under sections 3 and 4 of this License  
without being bound by section 3 of the GNU GPL.

### 2. Conveying Modified Versions.

If you modify a copy of the Library, and, in your modifications, a facility refers to a function or data to be supplied by an Application that uses the facility (other than as an argument passed when the facility is invoked), then you may convey a copy of the modified version:

- a) under this License, provided that you make a good faith effort to ensure that, in the event an Application does not supply the function or data, the facility still operates, and performs whatever part of its purpose remains meaningful, or
- b) under the GNU GPL, with none of the additional permissions of this License applicable to that copy.

### 3. Object Code Incorporating Material from Library Header Files.

The object code form of an Application may incorporate material from a header file that is part of the Library. You may convey such object code under terms of your choice, provided that, if the incorporated material is not limited to numerical parameters, data structure layouts and accessors, or small macros, inline functions and templates (ten or fewer lines in length), you do both of the following:

- a) Give prominent notice with each copy of the object code that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the object code with a copy of the GNU GPL and this license document.

### 4. Combined Works.

You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and reverse engineering for debugging such modifications, if you also do each of the following:

- a) Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the Combined Work with a copy of the GNU GPL and this license document.
- c) For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the

copies of the GNU GPL and this license document.

d) Do one of the following:

0) Convey the Minimal Corresponding Source under the terms of this License, and the Corresponding Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with a modified version of the Linked Version to produce a modified Combined Work, in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.

1) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (a) uses at run time a copy of the Library already present on the user's computer system, and (b) will operate properly with a modified version of the Library that is interface-compatible with the Linked Version.

e) Provide Installation Information, but only if you would otherwise be required to provide such information under section 6 of the GNU GPL, and only to the extent that such information is necessary to install and execute a modified version of the Combined Work produced by recombining or relinking the Application with a modified version of the Linked Version. (If you use option 4d0, the Installation Information must accompany the Minimal Corresponding Source and Corresponding Application Code. If you use option 4d1, you must provide the Installation Information in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.)

## 5. Combined Libraries.

You may place library facilities that are a work based on the Library side by side in a single library together with other library facilities that are not Applications and are not covered by this License, and convey such a combined library under terms of your choice, if you do both of the following:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, conveyed under the terms of this License.

b) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

## 6. Revised Versions of the GNU Lesser General Public License.

The Free Software Foundation may publish revised and/or new versions of the GNU Lesser 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 Library as you received it specifies that a certain numbered version of the GNU Lesser General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation.

If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy's public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.

FFmpeg:

-----

Most files in FFmpeg are under the GNU Lesser General Public License version 2.1 or later (LGPL v2.1+). Read the file COPYING.LGPLv2.1 for details. Some other files have MIT/X11/BSD-style licenses. In combination the LGPL v2.1+ applies to FFmpeg.

Some optional parts of FFmpeg are licensed under the GNU General Public License version 2 or later (GPL v2+). See the file COPYING.GPLv2 for details. None of these parts are used by default, you have to explicitly pass `--enable-gpl` to configure to activate them. In this case, FFmpeg's license changes to GPL v2+.

Specifically, the GPL parts of FFmpeg are

- libpostproc
- optional x86 optimizations in the files  
libavcodec/x86/idct\_mmx.c
- the X11 grabber in libavdevice/x11grab.c

There are a handful of files under other licensing terms, namely:

\* The files libavcodec/jfdctfst.c, libavcodec/jfdctint\_template.c and libavcodec/jrevdct.c are taken from libjpeg, see the top of the files for licensing details. Specifically note that you must credit the IJG in the documentation accompanying your program if you only distribute executables.

You must also indicate any changes including additions and deletions to

those three files in the documentation.

Should you, for whatever reason, prefer to use version 3 of the (L)GPL, then the configure parameter `--enable-version3` will activate this licensing option for you. Read the file `COPYING.LGPLv3` or, if you have enabled GPL parts, `COPYING.GPLv3` to learn the exact legal terms that apply in this case.

external libraries:

-----

Some external libraries, e.g. `libx264`, are under GPL and can be used in conjunction with FFmpeg. They require `--enable-gpl` to be passed to configure as well.

The OpenCORE external libraries are under the Apache License 2.0. That license is incompatible with the LGPL v2.1 and the GPL v2, but not with version 3 of those licenses. So to combine the OpenCORE libraries with FFmpeg, the license version needs to be upgraded by passing `--enable-version3` to configure.

The nonfree external libraries `libfaac` and `libaacplus` can be hooked up in FFmpeg. You need to pass `--enable-nonfree` to configure to enable it. Employ this option with care as FFmpeg then becomes nonfree and unredistributable.

## 1.10 ffmpeg\_v2 0.11.1

### 1.10.1 Available under license :

GNU GENERAL PUBLIC LICENSE  
Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.,  
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 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 Lesser 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.

## GNU GENERAL PUBLIC LICENSE

### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. 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.

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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

11. 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.

12. 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

#### How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This program 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.
```

```
This program 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.
```

```
You should have received a copy of the GNU General Public License along  
with this program; if not, write to the Free Software Foundation, Inc.,  
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type 'show c' for details.
```

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than 'show w' and 'show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
'Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

FFmpeg:

-----

Most files in FFMpeg are under the GNU Lesser General Public License version 2.1 or later (LGPL v2.1+). Read the file COPYING.LGPLv2.1 for details. Some other files have MIT/X11/BSD-style licenses. In combination the LGPL v2.1+ applies to FFMpeg.

Some optional parts of FFMpeg are licensed under the GNU General Public License version 2 or later (GPL v2+). See the file COPYING.GPLv2 for details. None of these parts are used by default, you have to explicitly pass `--enable-gpl` to configure to activate them. In this case, FFMpeg's license changes to GPL v2+.

Specifically, the GPL parts of FFMpeg are

- libpostproc
- optional x86 optimizations in the files

libavcodec/x86/idct\_mmx.c  
- the X11 grabber in libavdevice/x11grab.c

There are a handful of files under other licensing terms, namely:

\* The files libavcodec/jfdctfst.c, libavcodec/jfdctint\_template.c and libavcodec/jrevdct.c are taken from libjpeg, see the top of the files for licensing details. Specifically note that you must credit the IJG in the documentation accompanying your program if you only distribute executables. You must also indicate any changes including additions and deletions to those three files in the documentation.

Should you, for whatever reason, prefer to use version 3 of the (L)GPL, then the configure parameter --enable-version3 will activate this licensing option for you. Read the file COPYING.LGPLv3 or, if you have enabled GPL parts, COPYING.GPLv3 to learn the exact legal terms that apply in this case.

external libraries:

-----

Some external libraries, e.g. libx264, are under GPL and can be used in conjunction with FFmpeg. They require --enable-gpl to be passed to configure as well.

The OpenCORE external libraries are under the Apache License 2.0. That license is incompatible with the LGPL v2.1 and the GPL v2, but not with version 3 of those licenses. So to combine the OpenCORE libraries with FFmpeg, the license version needs to be upgraded by passing --enable-version3 to configure.

The nonfree external libraries libfaac and libaacplus can be hooked up in FFmpeg. You need to pass --enable-nonfree to configure to enable it. Employ this option with care as FFmpeg then becomes nonfree and unredistributable.

## 1.11 FreeBSD kernel 8.2 :FreeBSD 8.2

### 1.11.1 Available under license :

- \* Copyright (c) 2009-2010, The FreeBSD Foundation
- \* All rights reserved.
- \*
- \* Portions of this software were developed at the Centre for Advanced
- \* Internet Architectures, Swinburne University of Technology, Melbourne,
- \* Australia by Lawrence Stewart under sponsorship from the FreeBSD Foundation.
- \*
- \* Redistribution and use in source and binary forms, with or without
- \* modification, are permitted provided that the following conditions
- \* are met:



- \* 1. Redistributions of source code must retain the above copyright
- \* notice unmodified, this list of conditions, and the following
- \* disclaimer.
- \* 2. Redistributions in binary form must reproduce the above copyright
- \* notice, this list of conditions and the following disclaimer in the
- \* documentation and/or other materials provided with the distribution.
- \*
- \* THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR
- \* IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
- \* OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
- \* IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
- \* INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
- \* NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
- \* DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
- \* THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
- \* (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
- \* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

## 1.12 FREETYPE2 2.4.4

### 1.12.1 Available under license :

The FreeType Project LICENSE

-----

2006-Jan-27

Copyright 1996-2002, 2006 by  
David Turner, Robert Wilhelm, and Werner Lemberg

Introduction

=====

The FreeType Project is distributed in several archive packages; some of them may contain, in addition to the FreeType font engine, various tools and contributions which rely on, or relate to, the FreeType Project.

This license applies to all files found in such packages, and which do not fall under their own explicit license. The license affects thus the FreeType font engine, the test programs, documentation and makefiles, at the very least.

This license was inspired by the BSD, Artistic, and IJG (Independent JPEG Group) licenses, which all encourage inclusion and use of free software in commercial and freeware products

alike. As a consequence, its main points are that:

- o We don't promise that this software works. However, we will be interested in any kind of bug reports. ('as is' distribution)
- o You can use this software for whatever you want, in parts or full form, without having to pay us. ('royalty-free' usage)
- o You may not pretend that you wrote this software. If you use it, or only parts of it, in a program, you must acknowledge somewhere in your documentation that you have used the FreeType code. ('credits')

We specifically permit and encourage the inclusion of this software, with or without modifications, in commercial products. We disclaim all warranties covering The FreeType Project and assume no liability related to The FreeType Project.

Finally, many people asked us for a preferred form for a credit/disclaimer to use in compliance with this license. We thus encourage you to use the following text:

""

Portions of this software are copyright © <year> The FreeType Project (www.freetype.org). All rights reserved.

""

Please replace <year> with the value from the FreeType version you actually use.

## Legal Terms

=====

### 0. Definitions

-----

Throughout this license, the terms 'package', 'FreeType Project', and 'FreeType archive' refer to the set of files originally distributed by the authors (David Turner, Robert Wilhelm, and Werner Lemberg) as the 'FreeType Project', be they named as alpha, beta or final release.

'You' refers to the licensee, or person using the project, where 'using' is a generic term including compiling the project's source code as well as linking it to form a 'program' or 'executable'.

This program is referred to as 'a program using the FreeType

engine'.

This license applies to all files distributed in the original FreeType Project, including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The FreeType Project is copyright (C) 1996-2000 by David Turner, Robert Wilhelm, and Werner Lemberg. All rights reserved except as specified below.

#### 1. No Warranty

-----

THE FREETYPE PROJECT IS PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OR THE INABILITY TO USE, OF THE FREETYPE PROJECT.

#### 2. Redistribution

-----

This license grants a worldwide, royalty-free, perpetual and irrevocable right and license to use, execute, perform, compile, display, copy, create derivative works of, distribute and sublicense the FreeType Project (in both source and object code forms) and derivative works thereof for any purpose; and to authorize others to exercise some or all of the rights granted herein, subject to the following conditions:

- o Redistribution of source code must retain this license file ('FTL.TXT') unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright notices of the unaltered, original files must be preserved in all copies of source files.
  
- o Redistribution in binary form must provide a disclaimer that states that the software is based in part of the work of the FreeType Team, in the distribution documentation. We also encourage you to put an URL to the FreeType web page in your documentation, though this isn't mandatory.

These conditions apply to any software derived from or based on

the FreeType Project, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

### 3. Advertising

-----

Neither the FreeType authors and contributors nor you shall use the name of the other for commercial, advertising, or promotional purposes without specific prior written permission.

We suggest, but do not require, that you use one or more of the following phrases to refer to this software in your documentation or advertising materials: 'FreeType Project', 'FreeType Engine', 'FreeType library', or 'FreeType Distribution'.

As you have not signed this license, you are not required to accept it. However, as the FreeType Project is copyrighted material, only this license, or another one contracted with the authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the FreeType Project, you indicate that you understand and accept all the terms of this license.

### 4. Contacts

-----

There are two mailing lists related to FreeType:

o [freetype@nongnu.org](mailto:freetype@nongnu.org)

Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution.

If you are looking for support, start in this list if you haven't found anything to help you in the documentation.

o [freetype-devel@nongnu.org](mailto:freetype-devel@nongnu.org)

Discusses bugs, as well as engine internals, design issues, specific licenses, porting, etc.

Our home page can be found at

<http://www.freetype.org>

--- end of FTL.TXT ---

The FreeType 2 font engine is copyrighted work and cannot be used legally without a software license. In order to make this project usable to a vast majority of developers, we distribute it under two mutually exclusive open-source licenses.

This means that \*you\* must choose \*one\* of the two licenses described below, then obey all its terms and conditions when using FreeType 2 in any of your projects or products.

- The FreeType License, found in the file 'FTL.TXT', which is similar to the original BSD license \*with\* an advertising clause that forces you to explicitly cite the FreeType project in your product's documentation. All details are in the license file. This license is suited to products which don't use the GNU General Public License.
- The GNU General Public License version 2, found in 'GPL.TXT' (any later version can be used also), for programs which already use the GPL. Note that the FTL is incompatible with the GPL due to its advertisement clause.

The contributed BDF and PCF drivers come with a license similar to that of the X Window System. It is compatible to the above two licenses (see file src/bdf/README and src/pcf/README).

The gzip module uses the zlib license (see src/gzip/zlib.h) which too is compatible to the above two licenses.

--- end of LICENSE.TXT ---

GNU GENERAL PUBLIC LICENSE  
Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.  
51 Franklin St, Fifth Floor, Boston, MA 02110-1301 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.

## GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. 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.

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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

11. 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.

12. 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

### How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This program 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.

This program 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.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type 'show c' for details.
```

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than 'show w' and 'show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
'Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

FreeType font driver for BDF fonts

```
Francesco Zappa Nardelli
<francesco.zappa.nardelli@ens.fr>
```

Introduction  
\*\*\*\*\*

BDF (Bitmap Distribution Format) is a bitmap font format defined by Adobe, which is intended to be easily understood by both humans and computers. This code implements a BDF driver for the FreeType library, following the Adobe Specification V 2.2. The specification of the BDF font format is

available from Adobe's web site:

[http://partners.adobe.com/asn/developer/PDFS/TN/5005.BDF\\_Spec.pdf](http://partners.adobe.com/asn/developer/PDFS/TN/5005.BDF_Spec.pdf)

Many good bitmap fonts in bdf format come with XFree86 ([www.XFree86.org](http://www.XFree86.org)). They do not define vertical metrics, because the X Consortium BDF specification has removed them.

## Encodings

\*\*\*\*\*

The variety of encodings that accompanies bdf fonts appears to encompass the small set defined in freetype.h. On the other hand, two properties that specify encoding and registry are usually defined in bdf fonts.

I decided to make these two properties directly accessible, leaving to the client application the work of interpreting them. For instance:

```
#include FT_INTERNAL_BDF_TYPES_H

FT_Face      face;
BDF_Public_Face bdfiface;

FT_New_Face( library, ..., &face );

bdfiface = (BDF_Public_Face)face;

if ( ( bdfiface->charset_registry == "ISO10646" ) &&
      ( bdfiface->charset_encoding == "1" ) )
    [..]
```

Thus the driver always exports 'ft\_encoding\_none' as face->charmap.encoding. FT\_Get\_Char\_Index's behavior is unmodified, that is, it converts the ULong value given as argument into the corresponding glyph number.

If the two properties are not available, Adobe Standard Encoding should be assumed.

## Anti-Aliased Bitmaps

\*\*\*\*\*

The driver supports an extension to the BDF format as used in Mark Leisher's xmbdfed bitmap font editor. Microsoft's SBIT tool expects bitmap fonts in

that format for adding anti-aliased them to TrueType fonts. It introduces a fourth field to the 'SIZE' keyword which gives the bpp value (bits per pixel) of the glyph data in the font. Possible values are 1 (the default), 2 (four gray levels), 4 (16 gray levels), and 8 (256 gray levels). The driver returns either a bitmap with 1 bit per pixel or a pixmap with 8bits per pixel (using 4, 16, and 256 gray levels, respectively).

#### Known problems

\*\*\*\*\*

- A font is entirely loaded into memory. Obviously, this is not the Right Thing(TM). If you have big fonts I suggest you convert them into PCF format (using the bdf2pcf utility): the PCF font drive of FreeType can perform incremental glyph loading.

When I have some time, I will implement on-demand glyph parsing.

- Except for encodings properties, client applications have no visibility of the PCF\_Face object. This means that applications cannot directly access font tables and must trust FreeType.

- Currently, glyph names are ignored.

I plan to give full visibility of the BDF\_Face object in an upcoming revision of the driver, thus implementing also glyph names.

- As I have never seen a BDF font that defines vertical metrics, vertical metrics are (parsed and) discarded. If you own a BDF font that defines vertical metrics, please let me know (I will implement them in 5-10 minutes).

#### License

\*\*\*\*\*

Copyright (C) 2001-2002 by Francesco Zappa Nardelli

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

\*\*\* Portions of the driver (that is, bdflib.c and bdf.h):

Copyright 2000 Computing Research Labs, New Mexico State University  
Copyright 2001-2002 Francesco Zappa Nardelli

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE COMPUTING RESEARCH LAB OR NEW MEXICO STATE UNIVERSITY BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

#### Credits

\*\*\*\*\*

This driver is based on excellent Mark Leisher's bdf library. If you find something good in this driver you should probably thank him, not me.

FreeType font driver for PCF fonts

Francesco Zappa Nardelli  
<francesco.zappa.nardelli@ens.fr>

#### Introduction

\*\*\*\*\*

PCF (Portable Compiled Format) is a binary bitmap font format, largely used in X world. This code implements a PCF driver for the FreeType library. Glyph images are loaded into memory only on demand, thus leading to a small memory footprint.

Information on the PCF font format can only be worked out from 'pcfread.c', and 'pcfwrite.c', to be found, for instance, in the XFree86 ([www.xfree86.org](http://www.xfree86.org)) source tree (xc/lib/font/bitmap/).

Many good bitmap fonts in bdf format come with XFree86: they can be compiled into the pcf format using the 'bdf2pcf' utility.

#### Supported hardware

\*\*\*\*\*

The driver has been tested on linux/x86 and sunos5.5/sparc. In both cases the compiler was gcc. When back in Paris, I will test it also on linux/alpha.

#### Encodings

\*\*\*\*\*

The variety of encodings that accompanies pcf fonts appears to encompass the small set defined in freetype.h. On the other hand, each pcf font defines two properties that specify encoding and registry.

I decided to make these two properties directly accessible, leaving to the client application the work of interpreting them. For instance:

```
#include "pcftypes.h" /* include/freetype/internal/pcftypes.h */
```

```
FT_Face face;
```

```
PCF_Public_Face pcfface;
```

```
FT_New_Face( library,...., &face );
```

```
pcfface = (PCF_Public_Face)face;
```

```
if ((pcfface->charset_registry == "ISO10646") &&  
    (pcfface->charset_encoding == "1")) [..]
```

Thus the driver always export 'ft\_encoding\_none' as face->charmap.encoding. FT\_Get\_Char\_Index() behavior is unmodified, that is, it converts the ULong value given as argument into the corresponding glyph number.



## Known problems

\*\*\*\*\*

- dealing explicitly with encodings breaks the uniformity of freetype2 api.

- except for encodings properties, client applications have no visibility of the PCF\_Face object. This means that applications cannot directly access font tables and are obliged to trust FreeType.

- currently, glyph names and ink\_metrics are ignored.

I plan to give full visibility of the PCF\_Face object in the next release of the driver, thus implementing also glyph names and ink\_metrics.

- height is defined as (ascent - descent). Is this correct?

- if unable to read size information from the font, PCF\_Init\_Face sets available\_size->width and available\_size->height to 12.

- too many english grammar errors in the readme file :-)

## License

\*\*\*\*\*

Copyright (C) 2000 by Francesco Zappa Nardelli

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE

Credits

\*\*\*\*\*

Keith Packard wrote the pcf driver found in XFree86. His work is at the same time the specification and the sample implementation of the PCF format. Undoubtedly, this driver is inspired from his work.

/\* zlib.h -- interface of the 'zlib' general purpose compression library  
version 1.1.4, March 11th, 2002

Copyright (C) 1995-2002 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Jean-loup Gailly      Mark Adler  
jloup@gzip.org      madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files ftp://ds.internic.net/rfc/rfc1950.txt (zlib format), rfc1951.txt (deflate format) and rfc1952.txt (gzip format).

\*/

## 1.13 jpeg 8c

### 1.13.1 Notifications :

This software is based in part on the work of the Independent JPEG Group.

### 1.13.2 Available under license :

USING THE IJG JPEG LIBRARY

Copyright (C) 1994-2010, Thomas G. Lane, Guido Vollbeding.

This file is part of the Independent JPEG Group's software.  
For conditions of distribution and use, see the accompanying README file.

This file describes how to use the IJG JPEG library within an application program. Read it if you want to write a program that uses the library.

The file `example.c` provides heavily commented skeleton code for calling the JPEG library. Also see `jpeglib.h` (the include file to be used by application programs) for full details about data structures and function parameter lists. The library source code, of course, is the ultimate reference.

Note that there have been \*major\* changes from the application interface presented by IJG version 4 and earlier versions. The old design had several inherent limitations, and it had accumulated a lot of cruft as we added features while trying to minimize application-interface changes. We have sacrificed backward compatibility in the version 5 rewrite, but we think the improvements justify this.

## TABLE OF CONTENTS

-----

### Overview:

- Functions provided by the library

- Outline of typical usage

### Basic library usage:

- Data formats

- Compression details

- Decompression details

- Mechanics of usage: include files, linking, etc

### Advanced features:

- Compression parameter selection

- Decompression parameter selection

- Special color spaces

- Error handling

- Compressed data handling (source and destination managers)

- I/O suspension

- Progressive JPEG support

- Buffered-image mode

- Abbreviated datastreams and multiple images

- Special markers

- Raw (downsampled) image data

- Really raw data: DCT coefficients

- Progress monitoring

- Memory management

- Memory usage

- Library compile-time options

You should read at least the overview and basic usage sections before trying to program with the library. The sections on advanced features can be read if and when you need them.

## OVERVIEW

=====

### Functions provided by the library

-----

The IJG JPEG library provides C code to read and write JPEG-compressed image files. The surrounding application program receives or supplies image data a scanline at a time, using a straightforward uncompressed image format. All details of color conversion and other preprocessing/postprocessing can be handled by the library.

The library includes a substantial amount of code that is not covered by the JPEG standard but is necessary for typical applications of JPEG. These functions preprocess the image before JPEG compression or postprocess it after decompression. They include colorspace conversion, downsampling/upsampling, and color quantization. The application indirectly selects use of this code by specifying the format in which it wishes to supply or receive image data. For example, if colormapped output is requested, then the decompression library automatically invokes color quantization.

A wide range of quality vs. speed tradeoffs are possible in JPEG processing, and even more so in decompression postprocessing. The decompression library provides multiple implementations that cover most of the useful tradeoffs, ranging from very-high-quality down to fast-preview operation. On the compression side we have generally not provided low-quality choices, since compression is normally less time-critical. It should be understood that the low-quality modes may not meet the JPEG standard's accuracy requirements; nonetheless, they are useful for viewers.

A word about functions *\*not\** provided by the library. We handle a subset of the ISO JPEG standard; most baseline, extended-sequential, and progressive JPEG processes are supported. (Our subset includes all features now in common use.) Unsupported ISO options include:

- \* Hierarchical storage
- \* Lossless JPEG
- \* DNL marker
- \* Nonintegral subsampling ratios

We support both 8- and 12-bit data precision, but this is a compile-time choice rather than a run-time choice; hence it is difficult to use both

precisions in a single application.

By itself, the library handles only interchange JPEG datastreams --- in particular the widely used JFIF file format. The library can be used by surrounding code to process interchange or abbreviated JPEG datastreams that are embedded in more complex file formats. (For example, this library is used by the free LIBTIFF library to support JPEG compression in TIFF.)

#### Outline of typical usage

-----

The rough outline of a JPEG compression operation is:

```
Allocate and initialize a JPEG compression object
Specify the destination for the compressed data (eg, a file)
Set parameters for compression, including image size & colorspace
jpeg_start_compress(...);
while (scan lines remain to be written)
    jpeg_write_scanlines(...);
jpeg_finish_compress(...);
Release the JPEG compression object
```

A JPEG compression object holds parameters and working state for the JPEG library. We make creation/destruction of the object separate from starting or finishing compression of an image; the same object can be re-used for a series of image compression operations. This makes it easy to re-use the same parameter settings for a sequence of images. Re-use of a JPEG object also has important implications for processing abbreviated JPEG datastreams, as discussed later.

The image data to be compressed is supplied to `jpeg_write_scanlines()` from in-memory buffers. If the application is doing file-to-file compression, reading image data from the source file is the application's responsibility. The library emits compressed data by calling a "data destination manager", which typically will write the data into a file; but the application can provide its own destination manager to do something else.

Similarly, the rough outline of a JPEG decompression operation is:

```
Allocate and initialize a JPEG decompression object
Specify the source of the compressed data (eg, a file)
Call jpeg_read_header() to obtain image info
Set parameters for decompression
jpeg_start_decompress(...);
while (scan lines remain to be read)
    jpeg_read_scanlines(...);
jpeg_finish_decompress(...);
```

Release the JPEG decompression object

This is comparable to the compression outline except that reading the datastream header is a separate step. This is helpful because information about the image's size, colorspace, etc is available when the application selects decompression parameters. For example, the application can choose an output scaling ratio that will fit the image into the available screen size.

The decompression library obtains compressed data by calling a data source manager, which typically will read the data from a file; but other behaviors can be obtained with a custom source manager. Decompressed data is delivered into in-memory buffers passed to `jpeg_read_scanlines()`.

It is possible to abort an incomplete compression or decompression operation by calling `jpeg_abort()`; or, if you do not need to retain the JPEG object, simply release it by calling `jpeg_destroy()`.

JPEG compression and decompression objects are two separate struct types. However, they share some common fields, and certain routines such as `jpeg_destroy()` can work on either type of object.

The JPEG library has no static variables: all state is in the compression or decompression object. Therefore it is possible to process multiple compression and decompression operations concurrently, using multiple JPEG objects.

Both compression and decompression can be done in an incremental memory-to-memory fashion, if suitable source/destination managers are used. See the section on "I/O suspension" for more details.

## BASIC LIBRARY USAGE

=====

Data formats

-----

Before diving into procedural details, it is helpful to understand the image data format that the JPEG library expects or returns.

The standard input image format is a rectangular array of pixels, with each pixel having the same number of "component" or "sample" values (color channels). You must specify how many components there are and the colorspace interpretation of the components. Most applications will use RGB data (three components per pixel) or grayscale data (one component per pixel).

**PLEASE NOTE THAT RGB DATA IS THREE SAMPLES PER PIXEL, GRAYSCALE ONLY ONE.**

A remarkable number of people manage to miss this, only to find that their programs don't work with grayscale JPEG files.

There is no provision for colormapped input. JPEG files are always full-color or full grayscale (or sometimes another colorspace such as CMYK). You can feed in a colormapped image by expanding it to full-color format. However JPEG often doesn't work very well with source data that has been colormapped, because of dithering noise. This is discussed in more detail in the JPEG FAQ and the other references mentioned in the README file.

Pixels are stored by scanlines, with each scanline running from left to right. The component values for each pixel are adjacent in the row; for example, R,G,B,R,G,B,R,G,B,... for 24-bit RGB color. Each scanline is an array of data type JSAMPLE --- which is typically "unsigned char", unless you've changed jmorecfg.h. (You can also change the RGB pixel layout, say to B,G,R order, by modifying jmorecfg.h. But see the restrictions listed in that file before doing so.)

A 2-D array of pixels is formed by making a list of pointers to the starts of scanlines; so the scanlines need not be physically adjacent in memory. Even if you process just one scanline at a time, you must make a one-element pointer array to conform to this structure. Pointers to JSAMPLE rows are of type JSAMPROW, and the pointer to the pointer array is of type JSAMPARRAY.

The library accepts or supplies one or more complete scanlines per call. It is not possible to process part of a row at a time. Scanlines are always processed top-to-bottom. You can process an entire image in one call if you have it all in memory, but usually it's simplest to process one scanline at a time.

For best results, source data values should have the precision specified by BITS\_IN\_JSAMPLE (normally 8 bits). For instance, if you choose to compress data that's only 6 bits/channel, you should left-justify each value in a byte before passing it to the compressor. If you need to compress data that has more than 8 bits/channel, compile with BITS\_IN\_JSAMPLE = 12. (See "Library compile-time options", later.)

The data format returned by the decompressor is the same in all details, except that colormapped output is supported. (Again, a JPEG file is never colormapped. But you can ask the decompressor to perform on-the-fly color quantization to deliver colormapped output.) If you request colormapped output then the returned data array contains a single JSAMPLE per pixel; its value is an index into a color map. The color map is represented as a 2-D JSAMPARRAY in which each row holds the values of one color component, that is, colormap[i][j] is the value of the i'th color component for pixel value (map index) j. Note that since the colormap indexes are stored in JSAMPLEs, the maximum number of colors is limited by the size of JSAMPLE (ie, at most 256 colors for an 8-bit JPEG library).

## Compression details

-----

Here we revisit the JPEG compression outline given in the overview.

### 1. Allocate and initialize a JPEG compression object.

A JPEG compression object is a "struct jpeg\_compress\_struct". (It also has a bunch of subsidiary structures which are allocated via malloc(), but the application doesn't control those directly.) This struct can be just a local variable in the calling routine, if a single routine is going to execute the whole JPEG compression sequence. Otherwise it can be static or allocated from malloc().

You will also need a structure representing a JPEG error handler. The part of this that the library cares about is a "struct jpeg\_error\_mgr". If you are providing your own error handler, you'll typically want to embed the jpeg\_error\_mgr struct in a larger structure; this is discussed later under "Error handling". For now we'll assume you are just using the default error handler. The default error handler will print JPEG error/warning messages on stderr, and it will call exit() if a fatal error occurs.

You must initialize the error handler structure, store a pointer to it into the JPEG object's "err" field, and then call jpeg\_create\_compress() to initialize the rest of the JPEG object.

Typical code for this step, if you are using the default error handler, is

```
struct jpeg_compress_struct cinfo;
struct jpeg_error_mgr jerr;
...
cinfo.err = jpeg_std_error(&jerr);
jpeg_create_compress(&cinfo);
```

jpeg\_create\_compress allocates a small amount of memory, so it could fail if you are out of memory. In that case it will exit via the error handler; that's why the error handler must be initialized first.

### 2. Specify the destination for the compressed data (eg, a file).

As previously mentioned, the JPEG library delivers compressed data to a "data destination" module. The library includes one data destination module which knows how to write to a stdio stream. You can use your own destination module if you want to do something else, as discussed later.

If you use the standard destination module, you must open the target stdio



stream beforehand. Typical code for this step looks like:

```
FILE * outfile;
...
if ((outfile = fopen(filename, "wb")) == NULL) {
    fprintf(stderr, "can't open %s\n", filename);
    exit(1);
}
jpeg_stdio_dest(&cinfo, outfile);
```

where the last line invokes the standard destination module.

**WARNING:** it is critical that the binary compressed data be delivered to the output file unchanged. On non-Unix systems the stdio library may perform newline translation or otherwise corrupt binary data. To suppress this behavior, you may need to use a "b" option to fopen (as shown above), or use setmode() or another routine to put the stdio stream in binary mode. See cjpeg.c and djpeg.c for code that has been found to work on many systems.

You can select the data destination after setting other parameters (step 3), if that's more convenient. You may not change the destination between calling jpeg\_start\_compress() and jpeg\_finish\_compress().

### 3. Set parameters for compression, including image size & colorspace.

You must supply information about the source image by setting the following fields in the JPEG object (cinfo structure):

```
image_width  Width of image, in pixels
image_height Height of image, in pixels
input_components Number of color channels (samples per pixel)
in_color_space Color space of source image
```

The image dimensions are, hopefully, obvious. JPEG supports image dimensions of 1 to 64K pixels in either direction. The input color space is typically RGB or grayscale, and input\_components is 3 or 1 accordingly. (See "Special color spaces", later, for more info.) The in\_color\_space field must be assigned one of the J\_COLOR\_SPACE enum constants, typically JCS\_RGB or JCS\_GRAYSCALE.

JPEG has a large number of compression parameters that determine how the image is encoded. Most applications don't need or want to know about all these parameters. You can set all the parameters to reasonable defaults by calling jpeg\_set\_defaults(); then, if there are particular values you want to change, you can do so after that. The "Compression parameter selection" section tells about all the parameters.

You must set `in_color_space` correctly before calling `jpeg_set_defaults()`, because the defaults depend on the source image colorspace. However the other three source image parameters need not be valid until you call `jpeg_start_compress()`. There's no harm in calling `jpeg_set_defaults()` more than once, if that happens to be convenient.

Typical code for a 24-bit RGB source image is

```
cinfo.image_width = Width; /* image width and height, in pixels */
cinfo.image_height = Height;
cinfo.input_components = 3; /* # of color components per pixel */
cinfo.in_color_space = JCS_RGB; /* colorspace of input image */

jpeg_set_defaults(&cinfo);
/* Make optional parameter settings here */
```

4. `jpeg_start_compress(...)`;

After you have established the data destination and set all the necessary source image info and other parameters, call `jpeg_start_compress()` to begin a compression cycle. This will initialize internal state, allocate working storage, and emit the first few bytes of the JPEG datastream header.

Typical code:

```
jpeg_start_compress(&cinfo, TRUE);
```

The "TRUE" parameter ensures that a complete JPEG interchange datastream will be written. This is appropriate in most cases. If you think you might want to use an abbreviated datastream, read the section on abbreviated datastreams, below.

Once you have called `jpeg_start_compress()`, you may not alter any JPEG parameters or other fields of the JPEG object until you have completed the compression cycle.

5. `while (scan lines remain to be written)`

```
jpeg_write_scanlines(...);
```

Now write all the required image data by calling `jpeg_write_scanlines()` one or more times. You can pass one or more scanlines in each call, up to the total image height. In most applications it is convenient to pass just one or a few scanlines at a time. The expected format for the passed data is discussed under "Data formats", above.

Image data should be written in top-to-bottom scanline order. The JPEG spec

contains some weasel wording about how top and bottom are application-defined terms (a curious interpretation of the English language...) but if you want your files to be compatible with everyone else's, you WILL use top-to-bottom order. If the source data must be read in bottom-to-top order, you can use the JPEG library's virtual array mechanism to invert the data efficiently. Examples of this can be found in the sample application cjpeg.

The library maintains a count of the number of scanlines written so far in the `next_scanline` field of the JPEG object. Usually you can just use this variable as the loop counter, so that the loop test looks like `"while (cinfo.next_scanline < cinfo.image_height)"`.

Code for this step depends heavily on the way that you store the source data. `example.c` shows the following code for the case of a full-size 2-D source array containing 3-byte RGB pixels:

```
JSAMPROW row_pointer[1]; /* pointer to a single row */
int row_stride; /* physical row width in buffer */

row_stride = image_width * 3; /* JSAMPLEs per row in image_buffer */

while (cinfo.next_scanline < cinfo.image_height) {
    row_pointer[0] = & image_buffer[cinfo.next_scanline * row_stride];
    jpeg_write_scanlines(&cinfo, row_pointer, 1);
}
```

`jpeg_write_scanlines()` returns the number of scanlines actually written. This will normally be equal to the number passed in, so you can usually ignore the return value. It is different in just two cases:

- \* If you try to write more scanlines than the declared image height, the additional scanlines are ignored.
- \* If you use a suspending data destination manager, output buffer overrun will cause the compressor to return before accepting all the passed lines. This feature is discussed under "I/O suspension", below. The normal `stdio` destination manager will NOT cause this to happen.

In any case, the return value is the same as the change in the value of `next_scanline`.

## 6. `jpeg_finish_compress(...)`;

After all the image data has been written, call `jpeg_finish_compress()` to complete the compression cycle. This step is ESSENTIAL to ensure that the last bufferload of data is written to the data destination.

`jpeg_finish_compress()` also releases working memory associated with the JPEG object.

Typical code:

```
jpeg_finish_compress(&cinfo);
```

If using the stdio destination manager, don't forget to close the output stdio stream (if necessary) afterwards.

If you have requested a multi-pass operating mode, such as Huffman code optimization, `jpeg_finish_compress()` will perform the additional passes using data buffered by the first pass. In this case `jpeg_finish_compress()` may take quite a while to complete. With the default compression parameters, this will not happen.

It is an error to call `jpeg_finish_compress()` before writing the necessary total number of scanlines. If you wish to abort compression, call `jpeg_abort()` as discussed below.

After completing a compression cycle, you may dispose of the JPEG object as discussed next, or you may use it to compress another image. In that case return to step 2, 3, or 4 as appropriate. If you do not change the destination manager, the new datastream will be written to the same target. If you do not change any JPEG parameters, the new datastream will be written with the same parameters as before. Note that you can change the input image dimensions freely between cycles, but if you change the input colorspace, you should call `jpeg_set_defaults()` to adjust for the new colorspace; and then you'll need to repeat all of step 3.

#### 7. Release the JPEG compression object.

When you are done with a JPEG compression object, destroy it by calling `jpeg_destroy_compress()`. This will free all subsidiary memory (regardless of the previous state of the object). Or you can call `jpeg_destroy()`, which works for either compression or decompression objects --- this may be more convenient if you are sharing code between compression and decompression cases. (Actually, these routines are equivalent except for the declared type of the passed pointer. To avoid gripes from ANSI C compilers, `jpeg_destroy()` should be passed a `j_common_ptr`.)

If you allocated the `jpeg_compress_struct` structure from `malloc()`, freeing it is your responsibility --- `jpeg_destroy()` won't. Ditto for the error handler structure.

Typical code:

```
jpeg_destroy_compress(&cinfo);
```

#### 8. Aborting.

If you decide to abort a compression cycle before finishing, you can clean up in either of two ways:

\* If you don't need the JPEG object any more, just call `jpeg_destroy_compress()` or `jpeg_destroy()` to release memory. This is legitimate at any point after calling `jpeg_create_compress()` --- in fact, it's safe even if `jpeg_create_compress()` fails.

\* If you want to re-use the JPEG object, call `jpeg_abort_compress()`, or call `jpeg_abort()` which works on both compression and decompression objects. This will return the object to an idle state, releasing any working memory. `jpeg_abort()` is allowed at any time after successful object creation.

Note that cleaning up the data destination, if required, is your responsibility; neither of these routines will call `term_destination()`. (See "Compressed data handling", below, for more about that.)

`jpeg_destroy()` and `jpeg_abort()` are the only safe calls to make on a JPEG object that has reported an error by calling `error_exit` (see "Error handling" for more info). The internal state of such an object is likely to be out of whack. Either of these two routines will return the object to a known state.

## Decompression details

-----

Here we revisit the JPEG decompression outline given in the overview.

### 1. Allocate and initialize a JPEG decompression object.

This is just like initialization for compression, as discussed above, except that the object is a "struct `jpeg_decompress_struct`" and you call `jpeg_create_decompress()`. Error handling is exactly the same.

Typical code:

```
struct jpeg_decompress_struct cinfo;
struct jpeg_error_mgr jerr;
...
cinfo.err = jpeg_std_error(&jerr);
jpeg_create_decompress(&cinfo);
```

(Both here and in the IJG code, we usually use variable name "cinfo" for both compression and decompression objects.)

### 2. Specify the source of the compressed data (eg, a file).

As previously mentioned, the JPEG library reads compressed data from a "data source" module. The library includes one data source module which knows how to read from a stdio stream. You can use your own source module if you want to do something else, as discussed later.

If you use the standard source module, you must open the source stdio stream beforehand. Typical code for this step looks like:

```
FILE * infile;
...
if ((infile = fopen(filename, "rb")) == NULL) {
    fprintf(stderr, "can't open %s\n", filename);
    exit(1);
}
jpeg_stdio_src(&cinfo, infile);
```

where the last line invokes the standard source module.

**WARNING:** it is critical that the binary compressed data be read unchanged. On non-Unix systems the stdio library may perform newline translation or otherwise corrupt binary data. To suppress this behavior, you may need to use a "b" option to fopen (as shown above), or use setmode() or another routine to put the stdio stream in binary mode. See cjpeg.c and djpeg.c for code that has been found to work on many systems.

You may not change the data source between calling jpeg\_read\_header() and jpeg\_finish\_decompress(). If you wish to read a series of JPEG images from a single source file, you should repeat the jpeg\_read\_header() to jpeg\_finish\_decompress() sequence without reinitializing either the JPEG object or the data source module; this prevents buffered input data from being discarded.

3. Call jpeg\_read\_header() to obtain image info.

Typical code for this step is just

```
jpeg_read_header(&cinfo, TRUE);
```

This will read the source datastream header markers, up to the beginning of the compressed data proper. On return, the image dimensions and other info have been stored in the JPEG object. The application may wish to consult this information before selecting decompression parameters.

More complex code is necessary if

\* A suspending data source is used --- in that case jpeg\_read\_header() may return before it has read all the header data. See "I/O suspension",

below. The normal stdio source manager will NOT cause this to happen.

\* Abbreviated JPEG files are to be processed --- see the section on abbreviated datastreams. Standard applications that deal only in interchange JPEG files need not be concerned with this case either.

It is permissible to stop at this point if you just wanted to find out the image dimensions and other header info for a JPEG file. In that case, call `jpeg_destroy()` when you are done with the JPEG object, or call `jpeg_abort()` to return it to an idle state before selecting a new data source and reading another header.

#### 4. Set parameters for decompression.

`jpeg_read_header()` sets appropriate default decompression parameters based on the properties of the image (in particular, its colorspace). However, you may well want to alter these defaults before beginning the decompression. For example, the default is to produce full color output from a color file. If you want colormapped output you must ask for it. Other options allow the returned image to be scaled and allow various speed/quality tradeoffs to be selected. "Decompression parameter selection", below, gives details.

If the defaults are appropriate, nothing need be done at this step.

Note that all default values are set by each call to `jpeg_read_header()`. If you reuse a decompression object, you cannot expect your parameter settings to be preserved across cycles, as you can for compression. You must set desired parameter values each time.

#### 5. `jpeg_start_decompress(...)`;

Once the parameter values are satisfactory, call `jpeg_start_decompress()` to begin decompression. This will initialize internal state, allocate working memory, and prepare for returning data.

Typical code is just

```
jpeg_start_decompress(&cinfo);
```

If you have requested a multi-pass operating mode, such as 2-pass color quantization, `jpeg_start_decompress()` will do everything needed before data output can begin. In this case `jpeg_start_decompress()` may take quite a while to complete. With a single-scan (non progressive) JPEG file and default decompression parameters, this will not happen; `jpeg_start_decompress()` will return quickly.

After this call, the final output image dimensions, including any requested

scaling, are available in the JPEG object; so is the selected colormap, if colormapped output has been requested. Useful fields include

output\_width image width and height, as scaled  
output\_height  
out\_color\_components # of color components in out\_color\_space  
output\_components # of color components returned per pixel  
colormap the selected colormap, if any  
actual\_number\_of\_colors number of entries in colormap

output\_components is 1 (a colormap index) when quantizing colors; otherwise it equals out\_color\_components. It is the number of JSAMPLE values that will be emitted per pixel in the output arrays.

Typically you will need to allocate data buffers to hold the incoming image. You will need output\_width \* output\_components JSAMPLEs per scanline in your output buffer, and a total of output\_height scanlines will be returned.

Note: if you are using the JPEG library's internal memory manager to allocate data buffers (as djpeg does), then the manager's protocol requires that you request large buffers \*before\* calling jpeg\_start\_decompress(). This is a little tricky since the output\_XXX fields are not normally valid then. You can make them valid by calling jpeg\_calc\_output\_dimensions() after setting the relevant parameters (scaling, output color space, and quantization flag).

```
6. while (scan lines remain to be read)
    jpeg_read_scanlines(...);
```

Now you can read the decompressed image data by calling jpeg\_read\_scanlines() one or more times. At each call, you pass in the maximum number of scanlines to be read (ie, the height of your working buffer); jpeg\_read\_scanlines() will return up to that many lines. The return value is the number of lines actually read. The format of the returned data is discussed under "Data formats", above. Don't forget that grayscale and color JPEGs will return different data formats!

Image data is returned in top-to-bottom scanline order. If you must write out the image in bottom-to-top order, you can use the JPEG library's virtual array mechanism to invert the data efficiently. Examples of this can be found in the sample application djpeg.

The library maintains a count of the number of scanlines returned so far in the output\_scanline field of the JPEG object. Usually you can just use this variable as the loop counter, so that the loop test looks like "while (cinfo.output\_scanline < cinfo.output\_height)". (Note that the test should NOT be against image\_height, unless you never use scaling. The image\_height field is the height of the original unscaled image.)



The return value always equals the change in the value of `output_scanline`.

If you don't use a suspending data source, it is safe to assume that `jpeg_read_scanlines()` reads at least one scanline per call, until the bottom of the image has been reached.

If you use a buffer larger than one scanline, it is NOT safe to assume that `jpeg_read_scanlines()` fills it. (The current implementation returns only a few scanlines per call, no matter how large a buffer you pass.) So you must always provide a loop that calls `jpeg_read_scanlines()` repeatedly until the whole image has been read.

#### 7. `jpeg_finish_decompress(...)`;

After all the image data has been read, call `jpeg_finish_decompress()` to complete the decompression cycle. This causes working memory associated with the JPEG object to be released.

Typical code:

```
jpeg_finish_decompress(&cinfo);
```

If using the stdio source manager, don't forget to close the source stdio stream if necessary.

It is an error to call `jpeg_finish_decompress()` before reading the correct total number of scanlines. If you wish to abort decompression, call `jpeg_abort()` as discussed below.

After completing a decompression cycle, you may dispose of the JPEG object as discussed next, or you may use it to decompress another image. In that case return to step 2 or 3 as appropriate. If you do not change the source manager, the next image will be read from the same source.

#### 8. Release the JPEG decompression object.

When you are done with a JPEG decompression object, destroy it by calling `jpeg_destroy_decompress()` or `jpeg_destroy()`. The previous discussion of destroying compression objects applies here too.

Typical code:

```
jpeg_destroy_decompress(&cinfo);
```

#### 9. Aborting.

You can abort a decompression cycle by calling `jpeg_destroy_decompress()` or `jpeg_destroy()` if you don't need the JPEG object any more, or `jpeg_abort_decompress()` or `jpeg_abort()` if you want to reuse the object. The previous discussion of aborting compression cycles applies here too.

Mechanics of usage: include files, linking, etc

-----

Applications using the JPEG library should include the header file `jpeglib.h` to obtain declarations of data types and routines. Before including `jpeglib.h`, include system headers that define at least the typedefs `FILE` and `size_t`. On ANSI-conforming systems, including `<stdio.h>` is sufficient; on older Unix systems, you may need `<sys/types.h>` to define `size_t`.

If the application needs to refer to individual JPEG library error codes, also include `jerror.h` to define those symbols.

`jpeglib.h` indirectly includes the files `jconfig.h` and `jmorecfg.h`. If you are installing the JPEG header files in a system directory, you will want to install all four files: `jpeglib.h`, `jerror.h`, `jconfig.h`, `jmorecfg.h`.

The most convenient way to include the JPEG code into your executable program is to prepare a library file ("`libjpeg.a`", or a corresponding name on non-Unix machines) and reference it at your link step. If you use only half of the library (only compression or only decompression), only that much code will be included from the library, unless your linker is hopelessly brain-damaged. The supplied makefiles build `libjpeg.a` automatically (see `install.txt`).

While you can build the JPEG library as a shared library if the whim strikes you, we don't really recommend it. The trouble with shared libraries is that at some point you'll probably try to substitute a new version of the library without recompiling the calling applications. That generally doesn't work because the parameter struct declarations usually change with each new version. In other words, the library's API is *\*not\** guaranteed binary compatible across versions; we only try to ensure source-code compatibility. (In hindsight, it might have been smarter to hide the parameter structs from applications and introduce a ton of access functions instead. Too late now, however.)

On some systems your application may need to set up a signal handler to ensure that temporary files are deleted if the program is interrupted. This is most critical if you are on MS-DOS and use the `jmemdos.c` memory manager back end; it will try to grab extended memory for temp files, and that space will NOT be freed automatically. See `cjpeg.c` or `djpeg.c` for an example signal handler.

It may be worth pointing out that the core JPEG library does not actually

require the stdio library: only the default source/destination managers and error handler need it. You can use the library in a stdio-less environment if you replace those modules and use `jmemnobs.c` (or another memory manager of your own devising). More info about the minimum system library requirements may be found in `jinclude.h`.

## ADVANCED FEATURES

=====

### Compression parameter selection

-----

This section describes all the optional parameters you can set for JPEG compression, as well as the "helper" routines provided to assist in this task. Proper setting of some parameters requires detailed understanding of the JPEG standard; if you don't know what a parameter is for, it's best not to mess with it! See REFERENCES in the README file for pointers to more info about JPEG.

It's a good idea to call `jpeg_set_defaults()` first, even if you plan to set all the parameters; that way your code is more likely to work with future JPEG libraries that have additional parameters. For the same reason, we recommend you use a helper routine where one is provided, in preference to twiddling `cinfo` fields directly.

The helper routines are:

`jpeg_set_defaults(j_compress_ptr cinfo)`

This routine sets all JPEG parameters to reasonable defaults, using only the input image's color space (field `in_color_space`, which must already be set in `cinfo`). Many applications will only need to use this routine and perhaps `jpeg_set_quality()`.

`jpeg_set_colorspace(j_compress_ptr cinfo, J_COLOR_SPACE colorspace)`

Sets the JPEG file's colorspace (field `jpeg_color_space`) as specified, and sets other color-space-dependent parameters appropriately. See "Special color spaces", below, before using this. A large number of parameters, including all per-component parameters, are set by this routine; if you want to twiddle individual parameters you should call `jpeg_set_colorspace()` before rather than after.

`jpeg_default_colorspace(j_compress_ptr cinfo)`

Selects an appropriate JPEG colorspace based on `cinfo->in_color_space`, and calls `jpeg_set_colorspace()`. This is actually a subroutine of `jpeg_set_defaults()`. It's broken out in case you want to change just the colorspace-dependent JPEG parameters.

`jpeg_set_quality(j_compress_ptr cinfo, int quality, boolean force_baseline)`

Constructs JPEG quantization tables appropriate for the indicated quality setting. The quality value is expressed on the 0..100 scale recommended by IJG (cjpeg's "-quality" switch uses this routine). Note that the exact mapping from quality values to tables may change in future IJG releases as more is learned about DCT quantization. If the `force_baseline` parameter is TRUE, then the quantization table entries are constrained to the range 1..255 for full JPEG baseline compatibility. In the current implementation, this only makes a difference for quality settings below 25, and it effectively prevents very small/low quality files from being generated. The IJG decoder is capable of reading the non-baseline files generated at low quality settings when `force_baseline` is FALSE, but other decoders may not be.

`jpeg_set_linear_quality(j_compress_ptr cinfo, int scale_factor, boolean force_baseline)`

Same as `jpeg_set_quality()` except that the generated tables are the sample tables given in the JPEC spec section K.1, multiplied by the specified scale factor (which is expressed as a percentage; thus `scale_factor = 100` reproduces the spec's tables). Note that larger scale factors give lower quality. This entry point is useful for conforming to the Adobe PostScript DCT conventions, but we do not recommend linear scaling as a user-visible quality scale otherwise. `force_baseline` again constrains the computed table entries to 1..255.

`int jpeg_quality_scaling(int quality)`

Converts a value on the IJG-recommended quality scale to a linear scaling percentage. Note that this routine may change or go away in future releases --- IJG may choose to adopt a scaling method that can't be expressed as a simple scalar multiplier, in which case the premise of this routine collapses. Caveat user.

`jpeg_default_qtables(j_compress_ptr cinfo, boolean force_baseline)`

Set default quantization tables with linear `q_scale_factor[]` values (see below).

`jpeg_add_quant_table(j_compress_ptr cinfo, int which_tbl, const unsigned int *basic_table, int scale_factor, boolean force_baseline)`

Allows an arbitrary quantization table to be created. `which_tbl` indicates which table slot to fill. `basic_table` points to an array of 64 unsigned ints given in normal array order. These values are multiplied by `scale_factor/100` and then clamped to the range 1..65535 (or to 1..255 if `force_baseline` is TRUE).

CAUTION: prior to library version 6a, `jpeg_add_quant_table` expected the basic table to be given in JPEG zigzag order. If you need to write code that works with either older or newer versions of this routine, you must check the library version number. Something like

"#if JPEG\_LIB\_VERSION >= 61" is the right test.

`jpeg_simple_progression (j_compress_ptr cinfo)`

Generates a default scan script for writing a progressive-JPEG file.

This is the recommended method of creating a progressive file, unless you want to make a custom scan sequence. You must ensure that the JPEG color space is set correctly before calling this routine.

Compression parameters (cinfo fields) include:

`int block_size`

Set DCT block size. All N from 1 to 16 are possible.

Default is 8 (baseline format).

Larger values produce higher compression, smaller values produce higher quality.

An exact DCT stage is possible with 1 or 2.

With the default quality of 75 and default Luminance qtable the DCT+Quantization stage is lossless for value 1.

Note that values other than 8 require a SmartScale capable decoder, introduced with IJG JPEG 8. Setting the `block_size` parameter for compression works with version 8c and later.

`J_DCT_METHOD dct_method`

Selects the algorithm used for the DCT step. Choices are:

`JDCT_ISLOW`: slow but accurate integer algorithm

`JDCT_IFAST`: faster, less accurate integer method

`JDCT_FLOAT`: floating-point method

`JDCT_DEFAULT`: default method (normally `JDCT_ISLOW`)

`JDCT_FASTEST`: fastest method (normally `JDCT_IFAST`)

The `FLOAT` method is very slightly more accurate than the `ISLOW` method, but may give different results on different machines due to varying roundoff behavior. The integer methods should give the same results on all machines. On machines with sufficiently fast FP hardware, the floating-point method may also be the fastest. The `IFAST` method is considerably less accurate than the other two; its use is not recommended if high quality is a concern. `JDCT_DEFAULT` and `JDCT_FASTEST` are macros configurable by each installation.

`unsigned int scale_num, scale_denom`

Scale the image by the fraction `scale_num/scale_denom`. Default is 1/1, or no scaling. Currently, the supported scaling ratios are M/N with all N from 1 to 16, where M is the destination DCT size, which is 8 by default (see `block_size` parameter above).

(The library design allows for arbitrary scaling ratios but this is not likely to be implemented any time soon.)

`J_COLOR_SPACE jpeg_color_space`

int num\_components

The JPEG color space and corresponding number of components; see "Special color spaces", below, for more info. We recommend using `jpeg_set_color_space()` if you want to change these.

boolean optimize\_coding

TRUE causes the compressor to compute optimal Huffman coding tables for the image. This requires an extra pass over the data and therefore costs a good deal of space and time. The default is FALSE, which tells the compressor to use the supplied or default Huffman tables. In most cases optimal tables save only a few percent of file size compared to the default tables. Note that when this is TRUE, you need not supply Huffman tables at all, and any you do supply will be overwritten.

unsigned int restart\_interval

int restart\_in\_rows

To emit restart markers in the JPEG file, set one of these nonzero. Set `restart_interval` to specify the exact interval in MCU blocks. Set `restart_in_rows` to specify the interval in MCU rows. (If `restart_in_rows` is not 0, then `restart_interval` is set after the image width in MCUs is computed.) Defaults are zero (no restarts). One restart marker per MCU row is often a good choice. NOTE: the overhead of restart markers is higher in grayscale JPEG files than in color files, and MUCH higher in progressive JPEGs. If you use restarts, you may want to use larger intervals in those cases.

const jpeg\_scan\_info \* scan\_info

int num\_scans

By default, `scan_info` is NULL; this causes the compressor to write a single-scan sequential JPEG file. If not NULL, `scan_info` points to an array of scan definition records of length `num_scans`. The compressor will then write a JPEG file having one scan for each scan definition record. This is used to generate noninterleaved or progressive JPEG files. The library checks that the scan array defines a valid JPEG scan sequence. (`jpeg_simple_progression` creates a suitable scan definition array for progressive JPEG.) This is discussed further under "Progressive JPEG support".

boolean do\_fancy\_downsampling

If TRUE, use direct DCT scaling with DCT size > 8 for downsampling of chroma components.

If FALSE, use only DCT size <= 8 and simple separate downsampling. Default is TRUE.

For better image stability in multiple generation compression cycles it is preferable that this value matches the corresponding `do_fancy_upsampling` value in decompression.

int smoothing\_factor

If non-zero, the input image is smoothed; the value should be 1 for minimal smoothing to 100 for maximum smoothing. Consult `jcsample.c` for details of the smoothing algorithm. The default is zero.

boolean write\_JFIF\_header

If TRUE, a JFIF APP0 marker is emitted. `jpeg_set_defaults()` and `jpeg_set_colorspace()` set this TRUE if a JFIF-legal JPEG color space (ie, YCbCr or grayscale) is selected, otherwise FALSE.

UINT8 JFIF\_major\_version

UINT8 JFIF\_minor\_version

The version number to be written into the JFIF marker.

`jpeg_set_defaults()` initializes the version to 1.01 (major=minor=1).

You should set it to 1.02 (major=1, minor=2) if you plan to write any JFIF 1.02 extension markers.

UINT8 density\_unit

UINT16 X\_density

UINT16 Y\_density

The resolution information to be written into the JFIF marker;

not used otherwise. `density_unit` may be 0 for unknown,

1 for dots/inch, or 2 for dots/cm. The default values are 0,1,1

indicating square pixels of unknown size.

boolean write\_Adobe\_marker

If TRUE, an Adobe APP14 marker is emitted. `jpeg_set_defaults()` and `jpeg_set_colorspace()` set this TRUE if JPEG color space RGB, CMYK, or YCCK is selected, otherwise FALSE. It is generally a bad idea to set both `write_JFIF_header` and `write_Adobe_marker`. In fact, you probably shouldn't change the default settings at all --- the default behavior ensures that the JPEG file's color space can be recognized by the decoder.

JQUANT\_TBL \* quant\_tbl\_ptrs[NUM\_QUANT\_TBLS]

Pointers to coefficient quantization tables, one per table slot,

or NULL if no table is defined for a slot. Usually these should

be set via one of the above helper routines; `jpeg_add_quant_table()`

is general enough to define any quantization table. The other

routines will set up table slot 0 for luminance quality and table

slot 1 for chrominance.

int q\_scale\_factor[NUM\_QUANT\_TBLS]

Linear quantization scaling factors (percentage, initialized 100)

for use with `jpeg_default_qtables()`.

See `rdswitch.c` and `cjpeg.c` for an example of usage.

Note that the `q_scale_factor[]` fields are the "linear" scales, so you

have to convert from user-defined ratings via `jpeg_quality_scaling()`. Here is an example code which corresponds to `cjpeg -quality 90,70`:

```
jpeg_set_defaults(cinfo);

/* Set luminance quality 90. */
cinfo->q_scale_factor[0] = jpeg_quality_scaling(90);
/* Set chrominance quality 70. */
cinfo->q_scale_factor[1] = jpeg_quality_scaling(70);

jpeg_default_qtables(cinfo, force_baseline);
```

CAUTION: You must also set 1x1 subsampling for efficient separate color quality selection, since the default value used by library is 2x2:

```
cinfo->comp_info[0].v_samp_factor = 1;
cinfo->comp_info[0].h_samp_factor = 1;
```

JHUFF\_TBL \* dc\_huff\_tbl\_ptrs[NUM\_HUFF\_TBLS]  
JHUFF\_TBL \* ac\_huff\_tbl\_ptrs[NUM\_HUFF\_TBLS]  
Pointers to Huffman coding tables, one per table slot, or NULL if no table is defined for a slot. Slots 0 and 1 are filled with the JPEG sample tables by `jpeg_set_defaults()`. If you need to allocate more table structures, `jpeg_alloc_huff_table()` may be used. Note that optimal Huffman tables can be computed for an image by setting `optimize_coding`, as discussed above; there's seldom any need to mess with providing your own Huffman tables.

The actual dimensions of the JPEG image that will be written to the file are given by the following fields. These are computed from the input image dimensions and the compression parameters by `jpeg_start_compress()`. You can also call `jpeg_calc_jpeg_dimensions()` to obtain the values that will result from the current parameter settings. This can be useful if you are trying to pick a scaling ratio that will get close to a desired target size.

JDIMENSION jpeg\_width Actual dimensions of output image.  
JDIMENSION jpeg\_height

Per-component parameters are stored in the struct `cinfo.comp_info[i]` for component number `i`. Note that components here refer to components of the JPEG color space, \*not\* the source image color space. A suitably large `comp_info[]` array is allocated by `jpeg_set_defaults()`; if you choose not to use that routine, it's up to you to allocate the array.

int component\_id



The one-byte identifier code to be recorded in the JPEG file for this component. For the standard color spaces, we recommend you leave the default values alone.

int h\_samp\_factor

int v\_samp\_factor

Horizontal and vertical sampling factors for the component; must be 1..4 according to the JPEG standard. Note that larger sampling factors indicate a higher-resolution component; many people find this behavior quite unintuitive. The default values are 2,2 for luminance components and 1,1 for chrominance components, except for grayscale where 1,1 is used.

int quant\_tbl\_no

Quantization table number for component. The default value is 0 for luminance components and 1 for chrominance components.

int dc\_tbl\_no

int ac\_tbl\_no

DC and AC entropy coding table numbers. The default values are 0 for luminance components and 1 for chrominance components.

int component\_index

Must equal the component's index in comp\_info[]. (Beginning in release v6, the compressor library will fill this in automatically; you don't have to.)

#### Decompression parameter selection

-----

Decompression parameter selection is somewhat simpler than compression parameter selection, since all of the JPEG internal parameters are recorded in the source file and need not be supplied by the application. (Unless you are working with abbreviated files, in which case see "Abbreviated datastreams", below.) Decompression parameters control the postprocessing done on the image to deliver it in a format suitable for the application's use. Many of the parameters control speed/quality tradeoffs, in which faster decompression may be obtained at the price of a poorer-quality image. The defaults select the highest quality (slowest) processing.

The following fields in the JPEG object are set by jpeg\_read\_header() and may be useful to the application in choosing decompression parameters:

JDIMENSION image\_width Width and height of image

JDIMENSION image\_height

int num\_components Number of color components

J\_COLOR\_SPACE jpeg\_color\_space Colorspace of image  
boolean saw\_JFIF\_marker TRUE if a JFIF APP0 marker was seen  
UINT8 JFIF\_major\_version Version information from JFIF marker  
UINT8 JFIF\_minor\_version  
UINT8 density\_unit Resolution data from JFIF marker  
UINT16 X\_density  
UINT16 Y\_density  
boolean saw\_Adobe\_marker TRUE if an Adobe APP14 marker was seen  
UINT8 Adobe\_transform Color transform code from Adobe marker

The JPEG color space, unfortunately, is something of a guess since the JPEG standard proper does not provide a way to record it. In practice most files adhere to the JFIF or Adobe conventions, and the decoder will recognize these correctly. See "Special color spaces", below, for more info.

The decompression parameters that determine the basic properties of the returned image are:

J\_COLOR\_SPACE out\_color\_space  
Output color space. jpeg\_read\_header() sets an appropriate default based on jpeg\_color\_space; typically it will be RGB or grayscale. The application can change this field to request output in a different colorspace. For example, set it to JCS\_GRAYSCALE to get grayscale output from a color file. (This is useful for previewing: grayscale output is faster than full color since the color components need not be processed.) Note that not all possible color space transforms are currently implemented; you may need to extend jdcolor.c if you want an unusual conversion.

unsigned int scale\_num, scale\_denom  
Scale the image by the fraction scale\_num/scale\_denom. Currently, the supported scaling ratios are M/N with all M from 1 to 16, where N is the source DCT size, which is 8 for baseline JPEG. (The library design allows for arbitrary scaling ratios but this is not likely to be implemented any time soon.) The values are initialized by jpeg\_read\_header() with the source DCT size. For baseline JPEG this is 8/8. If you change only the scale\_num value while leaving the other unchanged, then this specifies the DCT scaled size to be applied on the given input. For baseline JPEG this is equivalent to M/8 scaling, since the source DCT size for baseline JPEG is 8. Smaller scaling ratios permit significantly faster decoding since fewer pixels need be processed and a simpler IDCT method can be used.

boolean quantize\_colors  
If set TRUE, colormapped output will be delivered. Default is FALSE, meaning that full-color output will be delivered.

The next three parameters are relevant only if `quantize_colors` is `TRUE`.

`int desired_number_of_colors`

Maximum number of colors to use in generating a library-supplied color map (the actual number of colors is returned in a different field).

Default 256. Ignored when the application supplies its own color map.

`boolean two_pass_quantize`

If `TRUE`, an extra pass over the image is made to select a custom color map for the image. This usually looks a lot better than the one-size-fits-all colormap that is used otherwise. Default is `TRUE`. Ignored when the application supplies its own color map.

`J_DITHER_MODE dither_mode`

Selects color dithering method. Supported values are:

`JDITHER_NONE` no dithering: fast, very low quality

`JDITHER_ORDERED` ordered dither: moderate speed and quality

`JDITHER_FS` Floyd-Steinberg dither: slow, high quality

Default is `JDITHER_FS`. (At present, ordered dither is implemented only in the single-pass, standard-colormap case. If you ask for ordered dither when `two_pass_quantize` is `TRUE` or when you supply an external color map, you'll get F-S dithering.)

When `quantize_colors` is `TRUE`, the target color map is described by the next two fields. `colormap` is set to `NULL` by `jpeg_read_header()`. The application can supply a color map by setting `colormap` non-`NULL` and setting `actual_number_of_colors` to the map size. Otherwise, `jpeg_start_decompress()` selects a suitable color map and sets these two fields itself.

[Implementation restriction: at present, an externally supplied colormap is only accepted for 3-component output color spaces.]

`JSAMPARRAY colormap`

The color map, represented as a 2-D pixel array of `out_color_components` rows and `actual_number_of_colors` columns. Ignored if not quantizing.

CAUTION: if the JPEG library creates its own colormap, the storage pointed to by this field is released by `jpeg_finish_decompress()`.

Copy the colormap somewhere else first, if you want to save it.

`int actual_number_of_colors`

The number of colors in the color map.

Additional decompression parameters that the application may set include:

`J_DCT_METHOD dct_method`

Selects the algorithm used for the DCT step. Choices are the same as described above for compression.

`boolean do_fancy_upsampling`

If TRUE, use direct DCT scaling with DCT size > 8 for upsampling of chroma components.

If FALSE, use only DCT size <= 8 and simple separate upsampling. Default is TRUE.

For better image stability in multiple generation compression cycles it is preferable that this value matches the corresponding `do_fancy_downsampling` value in compression.

boolean `do_block_smoothing`

If TRUE, interblock smoothing is applied in early stages of decoding progressive JPEG files; if FALSE, not. Default is TRUE. Early progression stages look "fuzzy" with smoothing, "blocky" without. In any case, block smoothing ceases to be applied after the first few AC coefficients are known to full accuracy, so it is relevant only when using buffered-image mode for progressive images.

boolean `enable_1pass_quant`

boolean `enable_external_quant`

boolean `enable_2pass_quant`

These are significant only in buffered-image mode, which is described in its own section below.

The output image dimensions are given by the following fields. These are computed from the source image dimensions and the decompression parameters by `jpeg_start_decompress()`. You can also call `jpeg_calc_output_dimensions()` to obtain the values that will result from the current parameter settings. This can be useful if you are trying to pick a scaling ratio that will get close to a desired target size. It's also important if you are using the JPEG library's memory manager to allocate output buffer space, because you are supposed to request such buffers \*before\* `jpeg_start_decompress()`.

JDIMENSION `output_width` Actual dimensions of output image.

JDIMENSION `output_height`

int `out_color_components` Number of color components in `out_color_space`.

int `output_components` Number of color components returned.

int `rec_outbuf_height` Recommended height of scanline buffer.

When quantizing colors, `output_components` is 1, indicating a single color map index per pixel. Otherwise it equals `out_color_components`. The output arrays are required to be `output_width * output_components` JSAMPLEs wide.

`rec_outbuf_height` is the recommended minimum height (in scanlines) of the buffer passed to `jpeg_read_scanlines()`. If the buffer is smaller, the library will still work, but time will be wasted due to unnecessary data copying. In high-quality modes, `rec_outbuf_height` is always 1, but some faster, lower-quality modes set it to larger values (typically 2 to 4).

If you are going to ask for a high-speed processing mode, you may as well

go to the trouble of honoring `rec_outbuf_height` so as to avoid data copying. (An output buffer larger than `rec_outbuf_height` lines is OK, but won't provide any material speed improvement over that height.)

## Special color spaces

-----

The JPEG standard itself is "color blind" and doesn't specify any particular color space. It is customary to convert color data to a luminance/chrominance color space before compressing, since this permits greater compression. The existing de-facto JPEG file format standards specify YCbCr or grayscale data (JFIF), or grayscale, RGB, YCbCr, CMYK, or YCCK (Adobe). For special applications such as multispectral images, other color spaces can be used, but it must be understood that such files will be unportable.

The JPEG library can handle the most common colorspace conversions (namely RGB  $\Leftrightarrow$  YCbCr and CMYK  $\Leftrightarrow$  YCCK). It can also deal with data of an unknown color space, passing it through without conversion. If you deal extensively with an unusual color space, you can easily extend the library to understand additional color spaces and perform appropriate conversions.

For compression, the source data's color space is specified by field `in_color_space`. This is transformed to the JPEG file's color space given by `jpeg_color_space`. `jpeg_set_defaults()` chooses a reasonable JPEG color space depending on `in_color_space`, but you can override this by calling `jpeg_set_colorspace()`. Of course you must select a supported transformation. `jpegcolor.c` currently supports the following transformations:

RGB  $\Rightarrow$  YCbCr

RGB  $\Rightarrow$  GRAYSCALE

YCbCr  $\Rightarrow$  GRAYSCALE

CMYK  $\Rightarrow$  YCCK

plus the null transforms: GRAYSCALE  $\Rightarrow$  GRAYSCALE, RGB  $\Rightarrow$  RGB, YCbCr  $\Rightarrow$  YCbCr, CMYK  $\Rightarrow$  CMYK, YCCK  $\Rightarrow$  YCCK, and UNKNOWN  $\Rightarrow$  UNKNOWN.

The de-facto file format standards (JFIF and Adobe) specify APPn markers that indicate the color space of the JPEG file. It is important to ensure that these are written correctly, or omitted if the JPEG file's color space is not one of the ones supported by the de-facto standards. `jpeg_set_colorspace()` will set the compression parameters to include or omit the APPn markers properly, so long as it is told the truth about the JPEG color space.

For example, if you are writing some random 3-component color space without conversion, don't try to fake out the library by setting `in_color_space` and `jpeg_color_space` to `JCS_YCbCr`; use `JCS_UNKNOWN`. You may want to write an APPn marker of your own devising to identify the colorspace --- see "Special markers", below.

When told that the color space is UNKNOWN, the library will default to using

luminance-quality compression parameters for all color components. You may well want to change these parameters. See the source code for `jpeg_set_colorspace()`, in `jcparam.c`, for details.

For decompression, the JPEG file's color space is given in `jpeg_color_space`, and this is transformed to the output color space `out_color_space`. `jpeg_read_header`'s setting of `jpeg_color_space` can be relied on if the file conforms to JFIF or Adobe conventions, but otherwise it is no better than a guess. If you know the JPEG file's color space for certain, you can override `jpeg_read_header`'s guess by setting `jpeg_color_space`. `jpeg_read_header` also selects a default output color space based on (its guess of) `jpeg_color_space`; set `out_color_space` to override this. Again, you must select a supported transformation. `jdcolor.c` currently supports

YCbCr => GRAYSCALE

YCbCr => RGB

GRAYSCALE => RGB

YCK => CMYK

as well as the null transforms. (Since GRAYSCALE=>RGB is provided, an application can force grayscale JPEGs to look like color JPEGs if it only wants to handle one case.)

The two-pass color quantizer, `jquant2.c`, is specialized to handle RGB data (it weights distances appropriately for RGB colors). You'll need to modify the code if you want to use it for non-RGB output color spaces. Note that `jquant2.c` is used to map to an application-supplied colormap as well as for the normal two-pass colormap selection process.

CAUTION: it appears that Adobe Photoshop writes inverted data in CMYK JPEG files: 0 represents 100% ink coverage, rather than 0% ink as you'd expect. This is arguably a bug in Photoshop, but if you need to work with Photoshop CMYK files, you will have to deal with it in your application. We cannot "fix" this in the library by inverting the data during the CMYK<=>YCK transform, because that would break other applications, notably Ghostscript. Photoshop versions prior to 3.0 write EPS files containing JPEG-encoded CMYK data in the same inverted-YCK representation used in bare JPEG files, but the surrounding PostScript code performs an inversion using the PS image operator. I am told that Photoshop 3.0 will write uninverted YCK in EPS/JPEG files, and will omit the PS-level inversion. (But the data polarity used in bare JPEG files will not change in 3.0.) In either case, the JPEG library must not invert the data itself, or else Ghostscript would read these EPS files incorrectly.

#### Error handling

-----

When the default error handler is used, any error detected inside the JPEG routines will cause a message to be printed on `stderr`, followed by `exit()`.

You can supply your own error handling routines to override this behavior and to control the treatment of nonfatal warnings and trace/debug messages. The file `example.c` illustrates the most common case, which is to have the application regain control after an error rather than exiting.

The JPEG library never writes any message directly; it always goes through the error handling routines. Three classes of messages are recognized:

- \* Fatal errors: the library cannot continue.
- \* Warnings: the library can continue, but the data is corrupt, and a damaged output image is likely to result.
- \* Trace/informational messages. These come with a trace level indicating the importance of the message; you can control the verbosity of the program by adjusting the maximum trace level that will be displayed.

You may, if you wish, simply replace the entire JPEG error handling module (`jerror.c`) with your own code. However, you can avoid code duplication by only replacing some of the routines depending on the behavior you need. This is accomplished by calling `jpeg_std_error()` as usual, but then overriding some of the method pointers in the `jpeg_error_mgr` struct, as illustrated by `example.c`.

All of the error handling routines will receive a pointer to the JPEG object (a `j_common_ptr` which points to either a `jpeg_compress_struct` or a `jpeg_decompress_struct`; if you need to tell which, test the `is_decompressor` field). This struct includes a pointer to the error manager struct in its "err" field. Frequently, custom error handler routines will need to access additional data which is not known to the JPEG library or the standard error handler. The most convenient way to do this is to embed either the JPEG object or the `jpeg_error_mgr` struct in a larger structure that contains additional fields; then casting the passed pointer provides access to the additional fields. Again, see `example.c` for one way to do it. (Beginning with IJG version 6b, there is also a void pointer "client\_data" in each JPEG object, which the application can also use to find related data. The library does not touch `client_data` at all.)

The individual methods that you might wish to override are:

`error_exit (j_common_ptr cinfo)`

Receives control for a fatal error. Information sufficient to generate the error message has been stored in `cinfo->err`; call `output_message` to display it. Control must NOT return to the caller; generally this routine will `exit()` or `longjmp()` somewhere.

Typically you would override this routine to get rid of the `exit()` default behavior. Note that if you continue processing, you should clean up the JPEG object with `jpeg_abort()` or `jpeg_destroy()`.

`output_message (j_common_ptr cinfo)`

Actual output of any JPEG message. Override this to send messages

somewhere other than stderr. Note that this method does not know how to generate a message, only where to send it.

`format_message (j_common_ptr cinfo, char * buffer)`

Constructs a readable error message string based on the error info stored in `cinfo->err`. This method is called by `output_message`. Few applications should need to override this method. One possible reason for doing so is to implement dynamic switching of error message language.

`emit_message (j_common_ptr cinfo, int msg_level)`

Decide whether or not to emit a warning or trace message; if so, calls `output_message`. The main reason for overriding this method would be to abort on warnings. `msg_level` is -1 for warnings, 0 and up for trace messages.

Only `error_exit()` and `emit_message()` are called from the rest of the JPEG library; the other two are internal to the error handler.

The actual message texts are stored in an array of strings which is pointed to by the field `err->jpeg_message_table`. The messages are numbered from 0 to `err->last_jpeg_message`, and it is these code numbers that are used in the JPEG library code. You could replace the message texts (for instance, with messages in French or German) by changing the message table pointer. See `jerror.h` for the default texts. CAUTION: this table will almost certainly change or grow from one library version to the next.

It may be useful for an application to add its own message texts that are handled by the same mechanism. The error handler supports a second "add-on" message table for this purpose. To define an addon table, set the pointer `err->addon_message_table` and the message numbers `err->first_addon_message` and `err->last_addon_message`. If you number the addon messages beginning at 1000 or so, you won't have to worry about conflicts with the library's built-in messages. See the sample applications `cjpeg/djpeg` for an example of using addon messages (the addon messages are defined in `cderror.h`).

Actual invocation of the error handler is done via macros defined in `jerror.h`:

`ERREXITn(...)` for fatal errors

`WARNMSn(...)` for corrupt-data warnings

`TRACEMSn(...)` for trace and informational messages.

These macros store the message code and any additional parameters into the error handler struct, then invoke the `error_exit()` or `emit_message()` method. The variants of each macro are for varying numbers of additional parameters. The additional parameters are inserted into the generated message using standard `printf()` format codes.

See `jerror.h` and `jerror.c` for further details.



## Compressed data handling (source and destination managers)

-----

The JPEG compression library sends its compressed data to a "destination manager" module. The default destination manager just writes the data to a memory buffer or to a stdio stream, but you can provide your own manager to do something else. Similarly, the decompression library calls a "source manager" to obtain the compressed data; you can provide your own source manager if you want the data to come from somewhere other than a memory buffer or a stdio stream.

In both cases, compressed data is processed a bufferload at a time: the destination or source manager provides a work buffer, and the library invokes the manager only when the buffer is filled or emptied. (You could define a one-character buffer to force the manager to be invoked for each byte, but that would be rather inefficient.) The buffer's size and location are controlled by the manager, not by the library. For example, the memory source manager just makes the buffer pointer and length point to the original data in memory. In this case the buffer-reload procedure will be invoked only if the decompressor ran off the end of the datastream, which would indicate an erroneous datastream.

The work buffer is defined as an array of datatype JOCTET, which is generally "char" or "unsigned char". On a machine where char is not exactly 8 bits wide, you must define JOCTET as a wider data type and then modify the data source and destination modules to transcribe the work arrays into 8-bit units on external storage.

A data destination manager struct contains a pointer and count defining the next byte to write in the work buffer and the remaining free space:

```
JOCTET * next_output_byte; /* => next byte to write in buffer */
size_t free_in_buffer;    /* # of byte spaces remaining in buffer */
```

The library increments the pointer and decrements the count until the buffer is filled. The manager's empty\_output\_buffer method must reset the pointer and count. The manager is expected to remember the buffer's starting address and total size in private fields not visible to the library.

A data destination manager provides three methods:

```
init_destination (j_compress_ptr cinfo)
Initialize destination. This is called by jpeg_start_compress()
before any data is actually written. It must initialize
next_output_byte and free_in_buffer. free_in_buffer must be
initialized to a positive value.
```

empty\_output\_buffer (j\_compress\_ptr cinfo)

This is called whenever the buffer has filled (free\_in\_buffer reaches zero). In typical applications, it should write out the \*entire\* buffer (use the saved start address and buffer length; ignore the current state of next\_output\_byte and free\_in\_buffer). Then reset the pointer & count to the start of the buffer, and return TRUE indicating that the buffer has been dumped. free\_in\_buffer must be set to a positive value when TRUE is returned. A FALSE return should only be used when I/O suspension is desired (this operating mode is discussed in the next section).

term\_destination (j\_compress\_ptr cinfo)

Terminate destination --- called by jpeg\_finish\_compress() after all data has been written. In most applications, this must flush any data remaining in the buffer. Use either next\_output\_byte or free\_in\_buffer to determine how much data is in the buffer.

term\_destination() is NOT called by jpeg\_abort() or jpeg\_destroy(). If you want the destination manager to be cleaned up during an abort, you must do it yourself.

You will also need code to create a jpeg\_destination\_mgr struct, fill in its method pointers, and insert a pointer to the struct into the "dest" field of the JPEG compression object. This can be done in-line in your setup code if you like, but it's probably cleaner to provide a separate routine similar to the jpeg\_stdio\_dest() or jpeg\_mem\_dest() routines of the supplied destination managers.

Decompression source managers follow a parallel design, but with some additional frammishes. The source manager struct contains a pointer and count defining the next byte to read from the work buffer and the number of bytes remaining:

```
const JOCTET * next_input_byte; /* => next byte to read from buffer */
size_t bytes_in_buffer;      /* # of bytes remaining in buffer */
```

The library increments the pointer and decrements the count until the buffer is emptied. The manager's fill\_input\_buffer method must reset the pointer and count. In most applications, the manager must remember the buffer's starting address and total size in private fields not visible to the library.

A data source manager provides five methods:

init\_source (j\_decompress\_ptr cinfo)

Initialize source. This is called by jpeg\_read\_header() before any data is actually read. Unlike init\_destination(), it may leave bytes\_in\_buffer set to 0 (in which case a fill\_input\_buffer() call will occur immediately).

`fill_input_buffer(j_decompress_ptr cinfo)`

This is called whenever `bytes_in_buffer` has reached zero and more data is wanted. In typical applications, it should read fresh data into the buffer (ignoring the current state of `next_input_byte` and `bytes_in_buffer`), reset the pointer & count to the start of the buffer, and return `TRUE` indicating that the buffer has been reloaded. It is not necessary to fill the buffer entirely, only to obtain at least one more byte. `bytes_in_buffer` **MUST** be set to a positive value if `TRUE` is returned. A `FALSE` return should only be used when I/O suspension is desired (this mode is discussed in the next section).

`skip_input_data(j_decompress_ptr cinfo, long num_bytes)`

Skip `num_bytes` worth of data. The buffer pointer and count should be advanced over `num_bytes` input bytes, refilling the buffer as needed. This is used to skip over a potentially large amount of uninteresting data (such as an APPn marker). In some applications it may be possible to optimize away the reading of the skipped data, but it's not clear that being smart is worth much trouble; large skips are uncommon. `bytes_in_buffer` may be zero on return. A zero or negative skip count should be treated as a no-op.

`resync_to_restart(j_decompress_ptr cinfo, int desired)`

This routine is called only when the decompressor has failed to find a restart (RSTn) marker where one is expected. Its mission is to find a suitable point for resuming decompression. For most applications, we recommend that you just use the default resync procedure, `jpeg_resync_to_restart()`. However, if you are able to back up in the input data stream, or if you have a-priori knowledge about the likely location of restart markers, you may be able to do better. Read the `read_restart_marker()` and `jpeg_resync_to_restart()` routines in `jdmarker.c` if you think you'd like to implement your own resync procedure.

`term_source(j_decompress_ptr cinfo)`

Terminate source --- called by `jpeg_finish_decompress()` after all data has been read. Often a no-op.

For both `fill_input_buffer()` and `skip_input_data()`, there is no such thing as an EOF return. If the end of the file has been reached, the routine has a choice of exiting via `ERREXIT()` or inserting fake data into the buffer. In most cases, generating a warning message and inserting a fake EOI marker is the best course of action --- this will allow the decompressor to output however much of the image is there. In pathological cases, the decompressor may swallow the EOI and again demand data ... just keep feeding it fake EOIs. `jdatsrc.c` illustrates the recommended error recovery behavior.

`term_source()` is **NOT** called by `jpeg_abort()` or `jpeg_destroy()`. If you want

the source manager to be cleaned up during an abort, you must do it yourself.

You will also need code to create a `jpeg_source_mgr` struct, fill in its method pointers, and insert a pointer to the struct into the "src" field of the JPEG decompression object. This can be done in-line in your setup code if you like, but it's probably cleaner to provide a separate routine similar to the `jpeg_stdio_src()` or `jpeg_mem_src()` routines of the supplied source managers.

For more information, consult the memory and stdio source and destination managers in `jdatasrc.c` and `jdatadst.c`.

## I/O suspension

-----

Some applications need to use the JPEG library as an incremental memory-to-memory filter: when the compressed data buffer is filled or emptied, they want control to return to the outer loop, rather than expecting that the buffer can be emptied or reloaded within the data source/destination manager subroutine. The library supports this need by providing an "I/O suspension" mode, which we describe in this section.

The I/O suspension mode is not a panacea: nothing is guaranteed about the maximum amount of time spent in any one call to the library, so it will not eliminate response-time problems in single-threaded applications. If you need guaranteed response time, we suggest you "bite the bullet" and implement a real multi-tasking capability.

To use I/O suspension, cooperation is needed between the calling application and the data source or destination manager; you will always need a custom source/destination manager. (Please read the previous section if you haven't already.) The basic idea is that the `empty_output_buffer()` or `fill_input_buffer()` routine is a no-op, merely returning `FALSE` to indicate that it has done nothing. Upon seeing this, the JPEG library suspends operation and returns to its caller. The surrounding application is responsible for emptying or refilling the work buffer before calling the JPEG library again.

### Compression suspension:

For compression suspension, use an `empty_output_buffer()` routine that returns `FALSE`; typically it will not do anything else. This will cause the compressor to return to the caller of `jpeg_write_scanlines()`, with the return value indicating that not all the supplied scanlines have been accepted. The application must make more room in the output buffer, adjust the output buffer pointer/count appropriately, and then call `jpeg_write_scanlines()` again, pointing to the first unconsumed scanline.

When forced to suspend, the compressor will backtrack to a convenient stopping point (usually the start of the current MCU); it will regenerate some output data when restarted. Therefore, although `empty_output_buffer()` is only called when the buffer is filled, you should NOT write out the entire buffer after a suspension. Write only the data up to the current position of `next_output_byte/free_in_buffer`. The data beyond that point will be regenerated after resumption.

Because of the backtracking behavior, a good-size output buffer is essential for efficiency; you don't want the compressor to suspend often. (In fact, an overly small buffer could lead to infinite looping, if a single MCU required more data than would fit in the buffer.) We recommend a buffer of at least several Kbytes. You may want to insert explicit code to ensure that you don't call `jpeg_write_scanlines()` unless there is a reasonable amount of space in the output buffer; in other words, flush the buffer before trying to compress more data.

The compressor does not allow suspension while it is trying to write JPEG markers at the beginning and end of the file. This means that:

- \* At the beginning of a compression operation, there must be enough free space in the output buffer to hold the header markers (typically 600 or so bytes). The recommended buffer size is bigger than this anyway, so this is not a problem as long as you start with an empty buffer. However, this restriction might catch you if you insert large special markers, such as a JFIF thumbnail image, without flushing the buffer afterwards.
- \* When you call `jpeg_finish_compress()`, there must be enough space in the output buffer to emit any buffered data and the final EOI marker. In the current implementation, half a dozen bytes should suffice for this, but for safety's sake we recommend ensuring that at least 100 bytes are free before calling `jpeg_finish_compress()`.

A more significant restriction is that `jpeg_finish_compress()` cannot suspend. This means you cannot use suspension with multi-pass operating modes, namely Huffman code optimization and multiple-scan output. Those modes write the whole file during `jpeg_finish_compress()`, which will certainly result in buffer overrun. (Note that this restriction applies only to compression, not decompression. The decompressor supports input suspension in all of its operating modes.)

Decompression suspension:

For decompression suspension, use a `fill_input_buffer()` routine that simply returns FALSE (except perhaps during error recovery, as discussed below). This will cause the decompressor to return to its caller with an indication that suspension has occurred. This can happen at four places:

- \* `jpeg_read_header()`: will return `JPEG_SUSPENDED`.
- \* `jpeg_start_decompress()`: will return FALSE, rather than its usual TRUE.
- \* `jpeg_read_scanlines()`: will return the number of scanlines already

completed (possibly 0).

\* `jpeg_finish_decompress()`: will return FALSE, rather than its usual TRUE. The surrounding application must recognize these cases, load more data into the input buffer, and repeat the call. In the case of `jpeg_read_scanlines()`, increment the passed pointers past any scanlines successfully read.

Just as with compression, the decompressor will typically backtrack to a convenient restart point before suspending. When `fill_input_buffer()` is called, `next_input_byte/bytes_in_buffer` point to the current restart point, which is where the decompressor will backtrack to if FALSE is returned. The data beyond that position must NOT be discarded if you suspend; it needs to be re-read upon resumption. In most implementations, you'll need to shift this data down to the start of your work buffer and then load more data after it. Again, this behavior means that a several-Kbyte work buffer is essential for decent performance; furthermore, you should load a reasonable amount of new data before resuming decompression. (If you loaded, say, only one new byte each time around, you could waste a LOT of cycles.)

The `skip_input_data()` source manager routine requires special care in a suspension scenario. This routine is NOT granted the ability to suspend the decompressor; it can decrement `bytes_in_buffer` to zero, but no more. If the requested skip distance exceeds the amount of data currently in the input buffer, then `skip_input_data()` must set `bytes_in_buffer` to zero and record the additional skip distance somewhere else. The decompressor will immediately call `fill_input_buffer()`, which should return FALSE, which will cause a suspension return. The surrounding application must then arrange to discard the recorded number of bytes before it resumes loading the input buffer. (Yes, this design is rather baroque, but it avoids complexity in the far more common case where a non-suspending source manager is used.)

If the input data has been exhausted, we recommend that you emit a warning and insert dummy EOI markers just as a non-suspending data source manager would do. This can be handled either in the surrounding application logic or within `fill_input_buffer()`; the latter is probably more efficient. If `fill_input_buffer()` knows that no more data is available, it can set the pointer/count to point to a dummy EOI marker and then return TRUE just as though it had read more data in a non-suspending situation.

The decompressor does not attempt to suspend within standard JPEG markers; instead it will backtrack to the start of the marker and reprocess the whole marker next time. Hence the input buffer must be large enough to hold the longest standard marker in the file. Standard JPEG markers should normally not exceed a few hundred bytes each (DHT tables are typically the longest). We recommend at least a 2K buffer for performance reasons, which is much larger than any correct marker is likely to be. For robustness against damaged marker length counts, you may wish to insert a test in your application for the case that the input buffer is completely full and yet the decoder has suspended without consuming any data --- otherwise, if this

situation did occur, it would lead to an endless loop. (The library can't provide this test since it has no idea whether "the buffer is full", or even whether there is a fixed-size input buffer.)

The input buffer would need to be 64K to allow for arbitrary COM or APPn markers, but these are handled specially: they are either saved into allocated memory, or skipped over by calling `skip_input_data()`. In the former case, suspension is handled correctly, and in the latter case, the problem of buffer overrun is placed on `skip_input_data`'s shoulders, as explained above. Note that if you provide your own marker handling routine for large markers, you should consider how to deal with buffer overflow.

Multiple-buffer management:

In some applications it is desirable to store the compressed data in a linked list of buffer areas, so as to avoid data copying. This can be handled by having `empty_output_buffer()` or `fill_input_buffer()` set the pointer and count to reference the next available buffer; FALSE is returned only if no more buffers are available. Although seemingly straightforward, there is a pitfall in this approach: the backtrack that occurs when FALSE is returned could back up into an earlier buffer. For example, when `fill_input_buffer()` is called, the current pointer & count indicate the backtrack restart point. Since `fill_input_buffer()` will set the pointer and count to refer to a new buffer, the restart position must be saved somewhere else. Suppose a second call to `fill_input_buffer()` occurs in the same library call, and no additional input data is available, so `fill_input_buffer` must return FALSE. If the JPEG library has not moved the pointer/count forward in the current buffer, then \*the correct restart point is the saved position in the prior buffer\*. Prior buffers may be discarded only after the library establishes a restart point within a later buffer. Similar remarks apply for output into a chain of buffers.

The library will never attempt to backtrack over a `skip_input_data()` call, so any skipped data can be permanently discarded. You still have to deal with the case of skipping not-yet-received data, however.

It's much simpler to use only a single buffer; when `fill_input_buffer()` is called, move any unconsumed data (beyond the current pointer/count) down to the beginning of this buffer and then load new data into the remaining buffer space. This approach requires a little more data copying but is far easier to get right.

Progressive JPEG support

-----

Progressive JPEG rearranges the stored data into a series of scans of increasing quality. In situations where a JPEG file is transmitted across a

slow communications link, a decoder can generate a low-quality image very quickly from the first scan, then gradually improve the displayed quality as more scans are received. The final image after all scans are complete is identical to that of a regular (sequential) JPEG file of the same quality setting. Progressive JPEG files are often slightly smaller than equivalent sequential JPEG files, but the possibility of incremental display is the main reason for using progressive JPEG.

The IJG encoder library generates progressive JPEG files when given a suitable "scan script" defining how to divide the data into scans. Creation of progressive JPEG files is otherwise transparent to the encoder. Progressive JPEG files can also be read transparently by the decoder library. If the decoding application simply uses the library as defined above, it will receive a final decoded image without any indication that the file was progressive. Of course, this approach does not allow incremental display. To perform incremental display, an application needs to use the decoder library's "buffered-image" mode, in which it receives a decoded image multiple times.

Each displayed scan requires about as much work to decode as a full JPEG image of the same size, so the decoder must be fairly fast in relation to the data transmission rate in order to make incremental display useful. However, it is possible to skip displaying the image and simply add the incoming bits to the decoder's coefficient buffer. This is fast because only Huffman decoding need be done, not IDCT, upsampling, colorspace conversion, etc. The IJG decoder library allows the application to switch dynamically between displaying the image and simply absorbing the incoming bits. A properly coded application can automatically adapt the number of display passes to suit the time available as the image is received. Also, a final higher-quality display cycle can be performed from the buffered data after the end of the file is reached.

Progressive compression:

To create a progressive JPEG file (or a multiple-scan sequential JPEG file), set the `scan_info` `cinfo` field to point to an array of scan descriptors, and perform compression as usual. Instead of constructing your own scan list, you can call the `jpeg_simple_progression()` helper routine to create a recommended progression sequence; this method should be used by all applications that don't want to get involved in the nitty-gritty of progressive scan sequence design. (If you want to provide user control of scan sequences, you may wish to borrow the scan script reading code found in `rdswitch.c`, so that you can read scan script files just like `cjpeg's`.) When `scan_info` is not `NULL`, the compression library will store DCT'd data into a buffer array as `jpeg_write_scanlines()` is called, and will emit all the requested scans during `jpeg_finish_compress()`. This implies that multiple-scan output cannot be created with a suspending data destination manager, since `jpeg_finish_compress()` does not support suspension. We



should also note that the compressor currently forces Huffman optimization mode when creating a progressive JPEG file, because the default Huffman tables are unsuitable for progressive files.

Progressive decompression:

When buffered-image mode is not used, the decoder library will read all of a multi-scan file during `jpeg_start_decompress()`, so that it can provide a final decoded image. (Here "multi-scan" means either progressive or multi-scan sequential.) This makes multi-scan files transparent to the decoding application. However, existing applications that used suspending input with version 5 of the IJG library will need to be modified to check for a suspension return from `jpeg_start_decompress()`.

To perform incremental display, an application must use the library's buffered-image mode. This is described in the next section.

Buffered-image mode

-----

In buffered-image mode, the library stores the partially decoded image in a coefficient buffer, from which it can be read out as many times as desired. This mode is typically used for incremental display of progressive JPEG files, but it can be used with any JPEG file. Each scan of a progressive JPEG file adds more data (more detail) to the buffered image. The application can display in lockstep with the source file (one display pass per input scan), or it can allow input processing to outrun display processing. By making input and display processing run independently, it is possible for the application to adapt progressive display to a wide range of data transmission rates.

The basic control flow for buffered-image decoding is

```
jpeg_create_decompress()
set data source
jpeg_read_header()
set overall decompression parameters
cinfo.buffered_image = TRUE; /* select buffered-image mode */
jpeg_start_decompress()
for (each output pass) {
    adjust output decompression parameters if required
    jpeg_start_output() /* start a new output pass */
    for (all scanlines in image) {
        jpeg_read_scanlines()
        display scanlines
    }
    jpeg_finish_output() /* terminate output pass */
}
```

```
}  
jpeg_finish_decompress()  
jpeg_destroy_decompress()
```

This differs from ordinary unbuffered decoding in that there is an additional level of looping. The application can choose how many output passes to make and how to display each pass.

The simplest approach to displaying progressive images is to do one display pass for each scan appearing in the input file. In this case the outer loop condition is typically

```
while (! jpeg_input_complete(&cinfo))
```

and the start-output call should read

```
jpeg_start_output(&cinfo, cinfo.input_scan_number);
```

The second parameter to `jpeg_start_output()` indicates which scan of the input file is to be displayed; the scans are numbered starting at 1 for this purpose. (You can use a loop counter starting at 1 if you like, but using the library's input scan counter is easier.) The library automatically reads data as necessary to complete each requested scan, and `jpeg_finish_output()` advances to the next scan or end-of-image marker (hence `input_scan_number` will be incremented by the time control arrives back at `jpeg_start_output()`). With this technique, data is read from the input file only as needed, and input and output processing run in lockstep.

After reading the final scan and reaching the end of the input file, the buffered image remains available; it can be read additional times by repeating the `jpeg_start_output()/jpeg_read_scanlines()/jpeg_finish_output()` sequence. For example, a useful technique is to use fast one-pass color quantization for display passes made while the image is arriving, followed by a final display pass using two-pass quantization for highest quality. This is done by changing the library parameters before the final output pass. Changing parameters between passes is discussed in detail below.

In general the last scan of a progressive file cannot be recognized as such until after it is read, so a post-input display pass is the best approach if you want special processing in the final pass.

When done with the image, be sure to call `jpeg_finish_decompress()` to release the buffered image (or just use `jpeg_destroy_decompress()`).

If input data arrives faster than it can be displayed, the application can cause the library to decode input data in advance of what's needed to produce output. This is done by calling the routine `jpeg_consume_input()`.

The return value is one of the following:

JPEG\_REACHED\_SOS: reached an SOS marker (the start of a new scan)

JPEG\_REACHED\_EOI: reached the EOI marker (end of image)

JPEG\_ROW\_COMPLETED: completed reading one MCU row of compressed data

JPEG\_SCAN\_COMPLETED: completed reading last MCU row of current scan

JPEG\_SUSPENDED: suspended before completing any of the above (JPEG\_SUSPENDED can occur only if a suspending data source is used.) This routine can be called at any time after initializing the JPEG object. It reads some additional data and returns when one of the indicated significant events occurs. (If called after the EOI marker is reached, it will immediately return JPEG\_REACHED\_EOI without attempting to read more data.)

The library's output processing will automatically call `jpeg_consume_input()` whenever the output processing overtakes the input; thus, simple lockstep display requires no direct calls to `jpeg_consume_input()`. But by adding calls to `jpeg_consume_input()`, you can absorb data in advance of what is being displayed. This has two benefits:

- \* You can limit buildup of unprocessed data in your input buffer.
- \* You can eliminate extra display passes by paying attention to the state of the library's input processing.

The first of these benefits only requires interspersing calls to `jpeg_consume_input()` with your display operations and any other processing you may be doing. To avoid wasting cycles due to backtracking, it's best to call `jpeg_consume_input()` only after a hundred or so new bytes have arrived. This is discussed further under "I/O suspension", above. (Note: the JPEG library currently is not thread-safe. You must not call `jpeg_consume_input()` from one thread of control if a different library routine is working on the same JPEG object in another thread.)

When input arrives fast enough that more than one new scan is available before you start a new output pass, you may as well skip the output pass corresponding to the completed scan. This occurs for free if you pass `cinfo.input_scan_number` as the target scan number to `jpeg_start_output()`. The `input_scan_number` field is simply the index of the scan currently being consumed by the input processor. You can ensure that this is up-to-date by emptying the input buffer just before calling `jpeg_start_output()`: call `jpeg_consume_input()` repeatedly until it returns JPEG\_SUSPENDED or JPEG\_REACHED\_EOI.

The target scan number passed to `jpeg_start_output()` is saved in the `cinfo.output_scan_number` field. The library's output processing calls `jpeg_consume_input()` whenever the current input scan number and row within that scan is less than or equal to the current output scan number and row. Thus, input processing can "get ahead" of the output processing but is not allowed to "fall behind". You can achieve several different effects by manipulating this interlock rule. For example, if you pass a target scan number greater than the current input scan number, the output processor will wait until that scan starts to arrive before producing any output. (To avoid an infinite loop, the target scan number is automatically reset to the last scan number when the end of image is reached. Thus, if you specify a large target scan number, the library will just absorb the entire input file and then perform an output pass. This is effectively the same as what

jpeg\_start\_decompress() does when you don't select buffered-image mode.) When you pass a target scan number equal to the current input scan number, the image is displayed no faster than the current input scan arrives. The final possibility is to pass a target scan number less than the current input scan number; this disables the input/output interlock and causes the output processor to simply display whatever it finds in the image buffer, without waiting for input. (However, the library will not accept a target scan number less than one, so you can't avoid waiting for the first scan.)

When data is arriving faster than the output display processing can advance through the image, jpeg\_consume\_input() will store data into the buffered image beyond the point at which the output processing is reading data out again. If the input arrives fast enough, it may "wrap around" the buffer to the point where the input is more than one whole scan ahead of the output. If the output processing simply proceeds through its display pass without paying attention to the input, the effect seen on-screen is that the lower part of the image is one or more scans better in quality than the upper part. Then, when the next output scan is started, you have a choice of what target scan number to use. The recommended choice is to use the current input scan number at that time, which implies that you've skipped the output scans corresponding to the input scans that were completed while you processed the previous output scan. In this way, the decoder automatically adapts its speed to the arriving data, by skipping output scans as necessary to keep up with the arriving data.

When using this strategy, you'll want to be sure that you perform a final output pass after receiving all the data; otherwise your last display may not be full quality across the whole screen. So the right outer loop logic is something like this:

```
do {
    absorb any waiting input by calling jpeg_consume_input()
    final_pass = jpeg_input_complete(&cinfo);
    adjust output decompression parameters if required
    jpeg_start_output(&cinfo, cinfo.input_scan_number);
    ...
    jpeg_finish_output()
} while (! final_pass);
```

rather than quitting as soon as jpeg\_input\_complete() returns TRUE. This arrangement makes it simple to use higher-quality decoding parameters for the final pass. But if you don't want to use special parameters for the final pass, the right loop logic is like this:

```
for (;;) {
    absorb any waiting input by calling jpeg_consume_input()
    jpeg_start_output(&cinfo, cinfo.input_scan_number);
    ...
    jpeg_finish_output()
    if (jpeg_input_complete(&cinfo) &&
        cinfo.input_scan_number == cinfo.output_scan_number)
```

```
break;
}
```

In this case you don't need to know in advance whether an output pass is to be the last one, so it's not necessary to have reached EOF before starting the final output pass; rather, what you want to test is whether the output pass was performed in sync with the final input scan. This form of the loop will avoid an extra output pass whenever the decoder is able (or nearly able) to keep up with the incoming data.

When the data transmission speed is high, you might begin a display pass, then find that much or all of the file has arrived before you can complete the pass. (You can detect this by noting the `JPEG_REACHED_EOI` return code from `jpeg_consume_input()`, or equivalently by testing `jpeg_input_complete()`.) In this situation you may wish to abort the current display pass and start a new one using the newly arrived information. To do so, just call `jpeg_finish_output()` and then start a new pass with `jpeg_start_output()`.

A variant strategy is to abort and restart display if more than one complete scan arrives during an output pass; this can be detected by noting `JPEG_REACHED_SOS` returns and/or examining `cinfo.input_scan_number`. This idea should be employed with caution, however, since the display process might never get to the bottom of the image before being aborted, resulting in the lower part of the screen being several passes worse than the upper. In most cases it's probably best to abort an output pass only if the whole file has arrived and you want to begin the final output pass immediately.

When receiving data across a communication link, we recommend always using the current input scan number for the output target scan number; if a higher-quality final pass is to be done, it should be started (aborting any incomplete output pass) as soon as the end of file is received. However, many other strategies are possible. For example, the application can examine the parameters of the current input scan and decide whether to display it or not. If the scan contains only chroma data, one might choose not to use it as the target scan, expecting that the scan will be small and will arrive quickly. To skip to the next scan, call `jpeg_consume_input()` until it returns `JPEG_REACHED_SOS` or `JPEG_REACHED_EOI`. Or just use the next higher number as the target scan for `jpeg_start_output()`; but that method doesn't let you inspect the next scan's parameters before deciding to display it.

In buffered-image mode, `jpeg_start_decompress()` never performs input and thus never suspends. An application that uses input suspension with buffered-image mode must be prepared for suspension returns from these routines:

- \* `jpeg_start_output()` performs input only if you request 2-pass quantization and the target scan isn't fully read yet. (This is discussed below.)
- \* `jpeg_read_scanlines()`, as always, returns the number of scanlines that it was able to produce before suspending.

\* `jpeg_finish_output()` will read any markers following the target scan, up to the end of the file or the SOS marker that begins another scan. (But it reads no input if `jpeg_consume_input()` has already reached the end of the file or a SOS marker beyond the target output scan.)

\* `jpeg_finish_decompress()` will read until the end of file, and thus can suspend if the end hasn't already been reached (as can be tested by calling `jpeg_input_complete()`).

`jpeg_start_output()`, `jpeg_finish_output()`, and `jpeg_finish_decompress()` all return TRUE if they completed their tasks, FALSE if they had to suspend. In the event of a FALSE return, the application must load more input data and repeat the call. Applications that use non-suspending data sources need not check the return values of these three routines.

It is possible to change decoding parameters between output passes in the buffered-image mode. The decoder library currently supports only very limited changes of parameters. ONLY THE FOLLOWING parameter changes are allowed after `jpeg_start_decompress()` is called:

- \* `dct_method` can be changed before each call to `jpeg_start_output()`. For example, one could use a fast DCT method for early scans, changing to a higher quality method for the final scan.
- \* `dither_mode` can be changed before each call to `jpeg_start_output()`; of course this has no impact if not using color quantization. Typically one would use ordered dither for initial passes, then switch to Floyd-Steinberg dither for the final pass. Caution: changing dither mode can cause more memory to be allocated by the library. Although the amount of memory involved is not large (a scanline or so), it may cause the initial `max_memory_to_use` specification to be exceeded, which in the worst case would result in an out-of-memory failure.
- \* `do_block_smoothing` can be changed before each call to `jpeg_start_output()`. This setting is relevant only when decoding a progressive JPEG image. During the first DC-only scan, block smoothing provides a very "fuzzy" look instead of the very "blocky" look seen without it; which is better seems a matter of personal taste. But block smoothing is nearly always a win during later stages, especially when decoding a successive-approximation image: smoothing helps to hide the slight blockiness that otherwise shows up on smooth gradients until the lowest coefficient bits are sent.
- \* Color quantization mode can be changed under the rules described below. You \*cannot\* change between full-color and quantized output (because that would alter the required I/O buffer sizes), but you can change which quantization method is used.

When generating color-quantized output, changing quantization method is a very useful way of switching between high-speed and high-quality display. The library allows you to change among its three quantization methods:

1. Single-pass quantization to a fixed color cube.  
Selected by `cinfo.two_pass_quantize = FALSE` and `cinfo.colormap = NULL`.
2. Single-pass quantization to an application-supplied colormap.

Selected by setting `cinfo.colormap` to point to the colormap (the value of `two_pass_quantize` is ignored); also set `cinfo.actual_number_of_colors`.

3. Two-pass quantization to a colormap chosen specifically for the image.

Selected by `cinfo.two_pass_quantize = TRUE` and `cinfo.colormap = NULL`. (This is the default setting selected by `jpeg_read_header`, but it is probably NOT what you want for the first pass of progressive display!)

These methods offer successively better quality and lesser speed. However, only the first method is available for quantizing in non-RGB color spaces.

**IMPORTANT:** because the different quantizer methods have very different working-storage requirements, the library requires you to indicate which one(s) you intend to use before you call `jpeg_start_decompress()`. (If we did not require this, the `max_memory_to_use` setting would be a complete fiction.)

You do this by setting one or more of these three `cinfo` fields to `TRUE`:

`enable_1pass_quant` Fixed color cube colormap  
`enable_external_quant` Externally-supplied colormap  
`enable_2pass_quant` Two-pass custom colormap

All three are initialized `FALSE` by `jpeg_read_header()`. But `jpeg_start_decompress()` automatically sets `TRUE` the one selected by the current `two_pass_quantize` and `colormap` settings, so you only need to set the enable flags for any other quantization methods you plan to change to later.

After setting the enable flags correctly at `jpeg_start_decompress()` time, you can change to any enabled quantization method by setting `two_pass_quantize` and `colormap` properly just before calling `jpeg_start_output()`. The following special rules apply:

1. You must explicitly set `cinfo.colormap` to `NULL` when switching to 1-pass or 2-pass mode from a different mode, or when you want the 2-pass quantizer to be re-run to generate a new colormap.
2. To switch to an external colormap, or to change to a different external colormap than was used on the prior pass, you must call `jpeg_new_colormap()` after setting `cinfo.colormap`.

**NOTE:** if you want to use the same colormap as was used in the prior pass, you should not do either of these things. This will save some nontrivial switchover costs.

(These requirements exist because `cinfo.colormap` will always be non-`NULL` after completing a prior output pass, since both the 1-pass and 2-pass quantizers set it to point to their output colormaps. Thus you have to do one of these two things to notify the library that something has changed. Yup, it's a bit klugy, but it's necessary to do it this way for backwards compatibility.)

Note that in buffered-image mode, the library generates any requested colormap during `jpeg_start_output()`, not during `jpeg_start_decompress()`.

When using two-pass quantization, `jpeg_start_output()` makes a pass over the buffered image to determine the optimum color map; it therefore may take a significant amount of time, whereas ordinarily it does little work. The

progress monitor hook is called during this pass, if defined. It is also important to realize that if the specified target scan number is greater than or equal to the current input scan number, `jpeg_start_output()` will attempt to consume input as it makes this pass. If you use a suspending data source, you need to check for a `FALSE` return from `jpeg_start_output()` under these conditions. The combination of 2-pass quantization and a not-yet-fully-read target scan is the only case in which `jpeg_start_output()` will consume input.

Application authors who support buffered-image mode may be tempted to use it for all JPEG images, even single-scan ones. This will work, but it is inefficient: there is no need to create an image-sized coefficient buffer for single-scan images. Requesting buffered-image mode for such an image wastes memory. Worse, it can cost time on large images, since the buffered data has to be swapped out or written to a temporary file. If you are concerned about maximum performance on baseline JPEG files, you should use buffered-image mode only when the incoming file actually has multiple scans. This can be tested by calling `jpeg_has_multiple_scans()`, which will return a correct result at any time after `jpeg_read_header()` completes.

It is also worth noting that when you use `jpeg_consume_input()` to let input processing get ahead of output processing, the resulting pattern of access to the coefficient buffer is quite nonsequential. It's best to use the memory manager `jmemnobs.c` if you can (ie, if you have enough real or virtual main memory). If not, at least make sure that `max_memory_to_use` is set as high as possible. If the JPEG memory manager has to use a temporary file, you will probably see a lot of disk traffic and poor performance. (This could be improved with additional work on the memory manager, but we haven't gotten around to it yet.)

In some applications it may be convenient to use `jpeg_consume_input()` for all input processing, including reading the initial markers; that is, you may wish to call `jpeg_consume_input()` instead of `jpeg_read_header()` during startup. This works, but note that you must check for `JPEG_REACHED_SOS` and `JPEG_REACHED_EOI` return codes as the equivalent of `jpeg_read_header()`'s codes. Once the first SOS marker has been reached, you must call `jpeg_start_decompress()` before `jpeg_consume_input()` will consume more input; it'll just keep returning `JPEG_REACHED_SOS` until you do. If you read a tables-only file this way, `jpeg_consume_input()` will return `JPEG_REACHED_EOI` without ever returning `JPEG_REACHED_SOS`; be sure to check for this case. If this happens, the decompressor will not read any more input until you call `jpeg_abort()` to reset it. It is OK to call `jpeg_consume_input()` even when not using buffered-image mode, but in that case it's basically a no-op after the initial markers have been read: it will just return `JPEG_SUSPENDED`.

Abbreviated datastreams and multiple images  
-----



A JPEG compression or decompression object can be reused to process multiple images. This saves a small amount of time per image by eliminating the "create" and "destroy" operations, but that isn't the real purpose of the feature. Rather, reuse of an object provides support for abbreviated JPEG datastreams. Object reuse can also simplify processing a series of images in a single input or output file. This section explains these features.

A JPEG file normally contains several hundred bytes worth of quantization and Huffman tables. In a situation where many images will be stored or transmitted with identical tables, this may represent an annoying overhead. The JPEG standard therefore permits tables to be omitted. The standard defines three classes of JPEG datastreams:

- \* "Interchange" datastreams contain an image and all tables needed to decode the image. These are the usual kind of JPEG file.
- \* "Abbreviated image" datastreams contain an image, but are missing some or all of the tables needed to decode that image.
- \* "Abbreviated table specification" (henceforth "tables-only") datastreams contain only table specifications.

To decode an abbreviated image, it is necessary to load the missing table(s) into the decoder beforehand. This can be accomplished by reading a separate tables-only file. A variant scheme uses a series of images in which the first image is an interchange (complete) datastream, while subsequent ones are abbreviated and rely on the tables loaded by the first image. It is assumed that once the decoder has read a table, it will remember that table until a new definition for the same table number is encountered.

It is the application designer's responsibility to figure out how to associate the correct tables with an abbreviated image. While abbreviated datastreams can be useful in a closed environment, their use is strongly discouraged in any situation where data exchange with other applications might be needed. Caveat designer.

The JPEG library provides support for reading and writing any combination of tables-only datastreams and abbreviated images. In both compression and decompression objects, a quantization or Huffman table will be retained for the lifetime of the object, unless it is overwritten by a new table definition.

To create abbreviated image datastreams, it is only necessary to tell the compressor not to emit some or all of the tables it is using. Each quantization and Huffman table struct contains a boolean field "sent\_table", which normally is initialized to FALSE. For each table used by the image, the header-writing process emits the table and sets sent\_table = TRUE unless it is already TRUE. (In normal usage, this prevents outputting the same table definition multiple times, as would otherwise occur because the chroma components typically share tables.) Thus, setting this field to TRUE before calling jpeg\_start\_compress() will prevent the table from being written at

all.

If you want to create a "pure" abbreviated image file containing no tables, just call "jpeg\_suppress\_tables(&cinfo, TRUE)" after constructing all the tables. If you want to emit some but not all tables, you'll need to set the individual sent\_table fields directly.

To create an abbreviated image, you must also call jpeg\_start\_compress() with a second parameter of FALSE, not TRUE. Otherwise jpeg\_start\_compress() will force all the sent\_table fields to FALSE. (This is a safety feature to prevent abbreviated images from being created accidentally.)

To create a tables-only file, perform the same parameter setup that you normally would, but instead of calling jpeg\_start\_compress() and so on, call jpeg\_write\_tables(&cinfo). This will write an abbreviated datastream containing only SOI, DQT and/or DHT markers, and EOI. All the quantization and Huffman tables that are currently defined in the compression object will be emitted unless their sent\_tables flag is already TRUE, and then all the sent\_tables flags will be set TRUE.

A sure-fire way to create matching tables-only and abbreviated image files is to proceed as follows:

```
create JPEG compression object
set JPEG parameters
set destination to tables-only file
jpeg_write_tables(&cinfo);
set destination to image file
jpeg_start_compress(&cinfo, FALSE);
write data...
jpeg_finish_compress(&cinfo);
```

Since the JPEG parameters are not altered between writing the table file and the abbreviated image file, the same tables are sure to be used. Of course, you can repeat the jpeg\_start\_compress() ... jpeg\_finish\_compress() sequence many times to produce many abbreviated image files matching the table file.

You cannot suppress output of the computed Huffman tables when Huffman optimization is selected. (If you could, there'd be no way to decode the image...) Generally, you don't want to set optimize\_coding = TRUE when you are trying to produce abbreviated files.

In some cases you might want to compress an image using tables which are not stored in the application, but are defined in an interchange or tables-only file readable by the application. This can be done by setting up a JPEG decompression object to read the specification file, then copying the tables into your compression object. See jpeg\_copy\_critical\_parameters() for an example of copying quantization tables.

To read abbreviated image files, you simply need to load the proper tables into the decompression object before trying to read the abbreviated image. If the proper tables are stored in the application program, you can just allocate the table structs and fill in their contents directly. For example, to load a fixed quantization table into table slot "n":

```
if (cinfo.quant_tbl_ptrs[n] == NULL)
    cinfo.quant_tbl_ptrs[n] = jpeg_alloc_quant_table((j_common_ptr) &cinfo);
quant_ptr = cinfo.quant_tbl_ptrs[n]; /* quant_ptr is JQUANT_TBL* */
for (i = 0; i < 64; i++) {
    /* Qtable[] is desired quantization table, in natural array order */
    quant_ptr->quantval[i] = Qtable[i];
}
```

Code to load a fixed Huffman table is typically (for AC table "n"):

```
if (cinfo.ac_huff_tbl_ptrs[n] == NULL)
    cinfo.ac_huff_tbl_ptrs[n] = jpeg_alloc_huff_table((j_common_ptr) &cinfo);
huff_ptr = cinfo.ac_huff_tbl_ptrs[n]; /* huff_ptr is JHUFF_TBL* */
for (i = 1; i <= 16; i++) {
    /* counts[i] is number of Huffman codes of length i bits, i=1..16 */
    huff_ptr->bits[i] = counts[i];
}
for (i = 0; i < 256; i++) {
    /* symbols[] is the list of Huffman symbols, in code-length order */
    huff_ptr->huffval[i] = symbols[i];
}
```

(Note that trying to set `cinfo.quant_tbl_ptrs[n]` to point directly at a constant `JQUANT_TBL` object is not safe. If the incoming file happened to contain a quantization table definition, your master table would get overwritten! Instead allocate a working table copy and copy the master table into it, as illustrated above. Ditto for Huffman tables, of course.)

You might want to read the tables from a tables-only file, rather than hard-wiring them into your application. The `jpeg_read_header()` call is sufficient to read a tables-only file. You must pass a second parameter of `FALSE` to indicate that you do not require an image to be present. Thus, the typical scenario is

```
create JPEG decompression object
set source to tables-only file
jpeg_read_header(&cinfo, FALSE);
set source to abbreviated image file
jpeg_read_header(&cinfo, TRUE);
set decompression parameters
```

```
jpeg_start_decompress(&cinfo);  
read data...  
jpeg_finish_decompress(&cinfo);
```

In some cases, you may want to read a file without knowing whether it contains an image or just tables. In that case, pass `FALSE` and check the return value from `jpeg_read_header()`: it will be `JPEG_HEADER_OK` if an image was found, `JPEG_HEADER_TABLES_ONLY` if only tables were found. (A third return value, `JPEG_SUSPENDED`, is possible when using a suspending data source manager.) Note that `jpeg_read_header()` will not complain if you read an abbreviated image for which you haven't loaded the missing tables; the missing-table check occurs later, in `jpeg_start_decompress()`.

It is possible to read a series of images from a single source file by repeating the `jpeg_read_header() ... jpeg_finish_decompress()` sequence, without releasing/recreating the JPEG object or the data source module. (If you did reinitialize, any partial bufferload left in the data source buffer at the end of one image would be discarded, causing you to lose the start of the next image.) When you use this method, stored tables are automatically carried forward, so some of the images can be abbreviated images that depend on tables from earlier images.

If you intend to write a series of images into a single destination file, you might want to make a specialized data destination module that doesn't flush the output buffer at `term_destination()` time. This would speed things up by some trifling amount. Of course, you'd need to remember to flush the buffer after the last image. You can make the later images be abbreviated ones by passing `FALSE` to `jpeg_start_compress()`.

### Special markers

-----

Some applications may need to insert or extract special data in the JPEG datastream. The JPEG standard provides marker types "COM" (comment) and "APP0" through "APP15" (application) to hold application-specific data. Unfortunately, the use of these markers is not specified by the standard. COM markers are fairly widely used to hold user-supplied text. The JFIF file format spec uses APP0 markers with specified initial strings to hold certain data. Adobe applications use APP14 markers beginning with the string "Adobe" for miscellaneous data. Other APPn markers are rarely seen, but might contain almost anything.

If you wish to store user-supplied text, we recommend you use COM markers and place readable 7-bit ASCII text in them. Newline conventions are not standardized --- expect to find LF (Unix style), CR/LF (DOS style), or CR (Mac style). A robust COM reader should be able to cope with random binary

garbage, including nulls, since some applications generate COM markers containing non-ASCII junk. (But yours should not be one of them.)

For program-supplied data, use an APPn marker, and be sure to begin it with an identifying string so that you can tell whether the marker is actually yours. It's probably best to avoid using APP0 or APP14 for any private markers. (NOTE: the upcoming SPIFF standard will use APP8 markers; we recommend you not use APP8 markers for any private purposes, either.)

Keep in mind that at most 65533 bytes can be put into one marker, but you can have as many markers as you like.

By default, the IJG compression library will write a JFIF APP0 marker if the selected JPEG colorspace is grayscale or YCbCr, or an Adobe APP14 marker if the selected colorspace is RGB, CMYK, or YCCK. You can disable this, but we don't recommend it. The decompression library will recognize JFIF and Adobe markers and will set the JPEG colorspace properly when one is found.

You can write special markers immediately following the datastream header by calling `jpeg_write_marker()` after `jpeg_start_compress()` and before the first call to `jpeg_write_scanlines()`. When you do this, the markers appear after the SOI and the JFIF APP0 and Adobe APP14 markers (if written), but before all else. Specify the marker type parameter as "JPEG\_COM" for COM or "JPEG\_APP0 + n" for APPn. (Actually, `jpeg_write_marker` will let you write any marker type, but we don't recommend writing any other kinds of marker.) For example, to write a user comment string pointed to by `comment_text`:

```
jpeg_write_marker(cinfo, JPEG_COM, comment_text, strlen(comment_text));
```

If it's not convenient to store all the marker data in memory at once, you can instead call `jpeg_write_m_header()` followed by multiple calls to `jpeg_write_m_byte()`. If you do it this way, it's your responsibility to call `jpeg_write_m_byte()` exactly the number of times given in the length parameter to `jpeg_write_m_header()`. (This method lets you empty the output buffer partway through a marker, which might be important when using a suspending data destination module. In any case, if you are using a suspending destination, you should flush its buffer after inserting any special markers. See "I/O suspension".)

Or, if you prefer to synthesize the marker byte sequence yourself, you can just cram it straight into the data destination module.

If you are writing JFIF 1.02 extension markers (thumbnail images), don't forget to set `cinfo.JFIF_minor_version = 2` so that the encoder will write the correct JFIF version number in the JFIF header marker. The library's default is to write version 1.01, but that's wrong if you insert any 1.02 extension markers. (We could probably get away with just defaulting to 1.02, but there used to be broken decoders that would complain about unknown minor version

numbers. To reduce compatibility risks it's safest not to write 1.02 unless you are actually using 1.02 extensions.)

When reading, two methods of handling special markers are available:

1. You can ask the library to save the contents of COM and/or APPn markers into memory, and then examine them at your leisure afterwards.
2. You can supply your own routine to process COM and/or APPn markers on-the-fly as they are read.

The first method is simpler to use, especially if you are using a suspending data source; writing a marker processor that copes with input suspension is not easy (consider what happens if the marker is longer than your available input buffer). However, the second method conserves memory since the marker data need not be kept around after it's been processed.

For either method, you'd normally set up marker handling after creating a decompression object and before calling `jpeg_read_header()`, because the markers of interest will typically be near the head of the file and so will be scanned by `jpeg_read_header`. Once you've established a marker handling method, it will be used for the life of that decompression object (potentially many datastreams), unless you change it. Marker handling is determined separately for COM markers and for each APPn marker code.

To save the contents of special markers in memory, call `jpeg_save_markers(cinfo, marker_code, length_limit)` where `marker_code` is the marker type to save, `JPEG_COM` or `JPEG_APP0+n`. (To arrange to save all the special marker types, you need to call this routine 17 times, for COM and APP0-APP15.) If the incoming marker is longer than `length_limit` data bytes, only `length_limit` bytes will be saved; this parameter allows you to avoid chewing up memory when you only need to see the first few bytes of a potentially large marker. If you want to save all the data, set `length_limit` to `0xFFFF`; that is enough since marker lengths are only 16 bits. As a special case, setting `length_limit` to 0 prevents that marker type from being saved at all. (That is the default behavior, in fact.)

After `jpeg_read_header()` completes, you can examine the special markers by following the `cinfo->marker_list` pointer chain. All the special markers in the file appear in this list, in order of their occurrence in the file (but omitting any markers of types you didn't ask for). Both the original data length and the saved data length are recorded for each list entry; the latter will not exceed `length_limit` for the particular marker type. Note that these lengths exclude the marker length word, whereas the stored representation within the JPEG file includes it. (Hence the maximum data length is really only 65533.)

It is possible that additional special markers appear in the file beyond the SOS marker at which `jpeg_read_header` stops; if so, the marker list will be

extended during reading of the rest of the file. This is not expected to be common, however. If you are short on memory you may want to reset the length limit to zero for all marker types after finishing `jpeg_read_header`, to ensure that the `max_memory_to_use` setting cannot be exceeded due to addition of later markers.

The marker list remains stored until you call `jpeg_finish_decompress` or `jpeg_abort`, at which point the memory is freed and the list is set to empty. (`jpeg_destroy` also releases the storage, of course.)

Note that the library is internally interested in APP0 and APP14 markers; if you try to set a small nonzero length limit on these types, the library will silently force the length up to the minimum it wants. (But you can set a zero length limit to prevent them from being saved at all.) Also, in a 16-bit environment, the maximum length limit may be constrained to less than 65533 by `malloc()` limitations. It is therefore best not to assume that the effective length limit is exactly what you set it to be.

If you want to supply your own marker-reading routine, you do it by calling `jpeg_set_marker_processor()`. A marker processor routine must have the signature

```
boolean jpeg_marker_parser_method (j_decompress_ptr cinfo)
```

Although the marker code is not explicitly passed, the routine can find it in `cinfo->unread_marker`. At the time of call, the marker proper has been read from the data source module. The processor routine is responsible for reading the marker length word and the remaining parameter bytes, if any. Return TRUE to indicate success. (FALSE should be returned only if you are using a suspending data source and it tells you to suspend. See the standard marker processors in `jdmarker.c` for appropriate coding methods if you need to use a suspending data source.)

If you override the default APP0 or APP14 processors, it is up to you to recognize JFIF and Adobe markers if you want colorspace recognition to occur properly. We recommend copying and extending the default processors if you want to do that. (A better idea is to save these marker types for later examination by calling `jpeg_save_markers()`; that method doesn't interfere with the library's own processing of these markers.)

`jpeg_set_marker_processor()` and `jpeg_save_markers()` are mutually exclusive --- if you call one it overrides any previous call to the other, for the particular marker type specified.

A simple example of an external COM processor can be found in `djpeg.c`. Also, see `jpegtran.c` for an example of using `jpeg_save_markers`.

Raw (downsampled) image data

-----

Some applications need to supply already-downsampled image data to the JPEG compressor, or to receive raw downsampled data from the decompressor. The library supports this requirement by allowing the application to write or read raw data, bypassing the normal preprocessing or postprocessing steps. The interface is different from the standard one and is somewhat harder to use. If your interest is merely in bypassing color conversion, we recommend that you use the standard interface and simply set `jpeg_color_space = in_color_space` (or `jpeg_color_space = out_color_space` for decompression). The mechanism described in this section is necessary only to supply or receive downsampled image data, in which not all components have the same dimensions.

To compress raw data, you must supply the data in the colorspace to be used in the JPEG file (please read the earlier section on Special color spaces) and downsampled to the sampling factors specified in the JPEG parameters. You must supply the data in the format used internally by the JPEG library, namely a JSAMPIMAGE array. This is an array of pointers to two-dimensional arrays, each of type JSAMPARRAY. Each 2-D array holds the values for one color component. This structure is necessary since the components are of different sizes. If the image dimensions are not a multiple of the MCU size, you must also pad the data correctly (usually, this is done by replicating the last column and/or row). The data must be padded to a multiple of a DCT block in each component: that is, each downsampled row must contain a multiple of 8 valid samples, and there must be a multiple of 8 sample rows for each component. (For applications such as conversion of digital TV images, the standard image size is usually a multiple of the DCT block size, so that no padding need actually be done.)

The procedure for compression of raw data is basically the same as normal compression, except that you call `jpeg_write_raw_data()` in place of `jpeg_write_scanlines()`. Before calling `jpeg_start_compress()`, you must do the following:

- \* Set `cinfo->raw_data_in` to TRUE. (It is set FALSE by `jpeg_set_defaults()`.) This notifies the library that you will be supplying raw data. Furthermore, set `cinfo->do_fancy_downsampling` to FALSE if you want to use real downsampled data. (It is set TRUE by `jpeg_set_defaults()`.)
- \* Ensure `jpeg_color_space` is correct --- an explicit `jpeg_set_colorspace()` call is a good idea. Note that since color conversion is bypassed, `in_color_space` is ignored, except that `jpeg_set_defaults()` uses it to choose the default `jpeg_color_space` setting.
- \* Ensure the sampling factors, `cinfo->comp_info[i].h_samp_factor` and `cinfo->comp_info[i].v_samp_factor`, are correct. Since these indicate the dimensions of the data you are supplying, it's wise to set them explicitly, rather than assuming the library's defaults are what you want.



To pass raw data to the library, call `jpeg_write_raw_data()` in place of `jpeg_write_scanlines()`. The two routines work similarly except that `jpeg_write_raw_data` takes a `JSAMPIMAGE` data array rather than `JSAMPARRAY`. The scanlines count passed to and returned from `jpeg_write_raw_data` is measured in terms of the component with the largest `v_samp_factor`.

`jpeg_write_raw_data()` processes one MCU row per call, which is to say `v_samp_factor*DCTSIZE` sample rows of each component. The passed `num_lines` value must be at least `max_v_samp_factor*DCTSIZE`, and the return value will be exactly that amount (or possibly some multiple of that amount, in future library versions). This is true even on the last call at the bottom of the image; don't forget to pad your data as necessary.

The required dimensions of the supplied data can be computed for each component as

`cinfo->comp_info[i].width_in_blocks*DCTSIZE` samples per row

`cinfo->comp_info[i].height_in_blocks*DCTSIZE` rows in image

after `jpeg_start_compress()` has initialized those fields. If the valid data is smaller than this, it must be padded appropriately. For some sampling factors and image sizes, additional dummy DCT blocks are inserted to make the image a multiple of the MCU dimensions. The library creates such dummy blocks itself; it does not read them from your supplied data. Therefore you need never pad by more than `DCTSIZE` samples. An example may help here.

Assume 2h2v downsampling of YCbCr data, that is

`cinfo->comp_info[0].h_samp_factor = 2` for Y

`cinfo->comp_info[0].v_samp_factor = 2`

`cinfo->comp_info[1].h_samp_factor = 1` for Cb

`cinfo->comp_info[1].v_samp_factor = 1`

`cinfo->comp_info[2].h_samp_factor = 1` for Cr

`cinfo->comp_info[2].v_samp_factor = 1`

and suppose that the nominal image dimensions (`cinfo->image_width` and `cinfo->image_height`) are 101x101 pixels. Then `jpeg_start_compress()` will compute `downsampled_width = 101` and `width_in_blocks = 13` for Y, `downsampled_width = 51` and `width_in_blocks = 7` for Cb and Cr (and the same for the height fields). You must pad the Y data to at least  $13*8 = 104$  columns and rows, the Cb/Cr data to at least  $7*8 = 56$  columns and rows. The MCU height is `max_v_samp_factor = 2` DCT rows so you must pass at least 16 scanlines on each call to `jpeg_write_raw_data()`, which is to say 16 actual sample rows of Y and 8 each of Cb and Cr. A total of 7 MCU rows are needed, so you must pass a total of  $7*16 = 112$  "scanlines". The last DCT block row of Y data is dummy, so it doesn't matter what you pass for it in the data arrays, but the scanlines count must total up to 112 so that all of the Cb and Cr data gets passed.

Output suspension is supported with raw-data compression: if the data destination module suspends, `jpeg_write_raw_data()` will return 0.

In this case the same data rows must be passed again on the next call.

Decompression with raw data output implies bypassing all postprocessing. You must deal with the color space and sampling factors present in the incoming file. If your application only handles, say, 2h1v YCbCr data, you must check for and fail on other color spaces or other sampling factors. The library will not convert to a different color space for you.

To obtain raw data output, set `cinfo->raw_data_out = TRUE` before `jpeg_start_decompress()` (it is set `FALSE` by `jpeg_read_header()`). Be sure to verify that the color space and sampling factors are ones you can handle. Furthermore, set `cinfo->do_fancy_upsampling = FALSE` if you want to get real downsampled data (it is set `TRUE` by `jpeg_read_header()`). Then call `jpeg_read_raw_data()` in place of `jpeg_read_scanlines()`. The decompression process is otherwise the same as usual.

`jpeg_read_raw_data()` returns one MCU row per call, and thus you must pass a buffer of at least `max_v_samp_factor*DCTSIZE` scanlines (scanline counting is the same as for raw-data compression). The buffer you pass must be large enough to hold the actual data plus padding to DCT-block boundaries. As with compression, any entirely dummy DCT blocks are not processed so you need not allocate space for them, but the total scanline count includes them. The above example of computing buffer dimensions for raw-data compression is equally valid for decompression.

Input suspension is supported with raw-data decompression: if the data source module suspends, `jpeg_read_raw_data()` will return 0. You can also use buffered-image mode to read raw data in multiple passes.

#### Really raw data: DCT coefficients

-----

It is possible to read or write the contents of a JPEG file as raw DCT coefficients. This facility is mainly intended for use in lossless transcoding between different JPEG file formats. Other possible applications include lossless cropping of a JPEG image, lossless reassembly of a multi-strip or multi-tile TIFF/JPEG file into a single JPEG datastream, etc.

To read the contents of a JPEG file as DCT coefficients, open the file and do `jpeg_read_header()` as usual. But instead of calling `jpeg_start_decompress()` and `jpeg_read_scanlines()`, call `jpeg_read_coefficients()`. This will read the entire image into a set of virtual coefficient-block arrays, one array per component. The return value is a pointer to an array of virtual-array descriptors. Each virtual array can be accessed directly using the JPEG memory manager's `access_virt_barray` method (see Memory management, below, and also `read.structure.txt`'s discussion of virtual array handling). Or, for simple transcoding to a different JPEG file format, the array list can just be handed directly to `jpeg_write_coefficients()`.

Each block in the block arrays contains quantized coefficient values in normal array order (not JPEG zigzag order). The block arrays contain only DCT blocks containing real data; any entirely-dummy blocks added to fill out interleaved MCUs at the right or bottom edges of the image are discarded during reading and are not stored in the block arrays. (The size of each block array can be determined from the `width_in_blocks` and `height_in_blocks` fields of the component's `comp_info` entry.) This is also the data format expected by `jpeg_write_coefficients()`.

When you are done using the virtual arrays, call `jpeg_finish_decompress()` to release the array storage and return the decompression object to an idle state; or just call `jpeg_destroy()` if you don't need to reuse the object.

If you use a suspending data source, `jpeg_read_coefficients()` will return NULL if it is forced to suspend; a non-NULL return value indicates successful completion. You need not test for a NULL return value when using a non-suspending data source.

It is also possible to call `jpeg_read_coefficients()` to obtain access to the decoder's coefficient arrays during a normal decode cycle in buffered-image mode. This frammish might be useful for progressively displaying an incoming image and then re-encoding it without loss. To do this, decode in buffered-image mode as discussed previously, then call `jpeg_read_coefficients()` after the last `jpeg_finish_output()` call. The arrays will be available for your use until you call `jpeg_finish_decompress()`.

To write the contents of a JPEG file as DCT coefficients, you must provide the DCT coefficients stored in virtual block arrays. You can either pass block arrays read from an input JPEG file by `jpeg_read_coefficients()`, or allocate virtual arrays from the JPEG compression object and fill them yourself. In either case, `jpeg_write_coefficients()` is substituted for `jpeg_start_compress()` and `jpeg_write_scanlines()`. Thus the sequence is

- \* Create compression object
- \* Set all compression parameters as necessary
- \* Request virtual arrays if needed
- \* `jpeg_write_coefficients()`
- \* `jpeg_finish_compress()`
- \* Destroy or re-use compression object

`jpeg_write_coefficients()` is passed a pointer to an array of virtual block array descriptors; the number of arrays is equal to `cinfo.num_components`.

The virtual arrays need only have been requested, not realized, before `jpeg_write_coefficients()` is called. A side-effect of `jpeg_write_coefficients()` is to realize any virtual arrays that have been requested from the compression object's memory manager. Thus, when obtaining the virtual arrays from the compression object, you should fill the arrays

after calling `jpeg_write_coefficients()`. The data is actually written out when you call `jpeg_finish_compress()`; `jpeg_write_coefficients()` only writes the file header.

When writing raw DCT coefficients, it is crucial that the JPEG quantization tables and sampling factors match the way the data was encoded, or the resulting file will be invalid. For transcoding from an existing JPEG file, we recommend using `jpeg_copy_critical_parameters()`. This routine initializes all the compression parameters to default values (like `jpeg_set_defaults()`), then copies the critical information from a source decompression object. The decompression object should have just been used to read the entire JPEG input file --- that is, it should be awaiting `jpeg_finish_decompress()`.

`jpeg_write_coefficients()` marks all tables stored in the compression object as needing to be written to the output file (thus, it acts like `jpeg_start_compress(cinfo, TRUE)`). This is for safety's sake, to avoid emitting abbreviated JPEG files by accident. If you really want to emit an abbreviated JPEG file, call `jpeg_suppress_tables()`, or set the tables' individual `sent_table` flags, between calling `jpeg_write_coefficients()` and `jpeg_finish_compress()`.

#### Progress monitoring

-----

Some applications may need to regain control from the JPEG library every so often. The typical use of this feature is to produce a percent-done bar or other progress display. (For a simple example, see `cjpeg.c` or `djpeg.c`.) Although you do get control back frequently during the data-transferring pass (the `jpeg_read_scanlines` or `jpeg_write_scanlines` loop), any additional passes will occur inside `jpeg_finish_compress` or `jpeg_start_decompress`; those routines may take a long time to execute, and you don't get control back until they are done.

You can define a progress-monitor routine which will be called periodically by the library. No guarantees are made about how often this call will occur, so we don't recommend you use it for mouse tracking or anything like that. At present, a call will occur once per MCU row, scanline, or sample row group, whichever unit is convenient for the current processing mode; so the wider the image, the longer the time between calls. During the data transferring pass, only one call occurs per call of `jpeg_read_scanlines` or `jpeg_write_scanlines`, so don't pass a large number of scanlines at once if you want fine resolution in the progress count. (If you really need to use the callback mechanism for time-critical tasks like mouse tracking, you could insert additional calls inside some of the library's inner loops.)

To establish a progress-monitor callback, create a struct `jpeg_progress_mgr`, fill in its `progress_monitor` field with a pointer to your callback routine,

and set `cinfo->progress` to point to the struct. The callback will be called whenever `cinfo->progress` is non-NULL. (This pointer is set to NULL by `jpeg_create_compress` or `jpeg_create_decompress`; the library will not change it thereafter. So if you allocate dynamic storage for the progress struct, make sure it will live as long as the JPEG object does. Allocating from the JPEG memory manager with lifetime `JPOOL_PERMANENT` will work nicely.) You can use the same callback routine for both compression and decompression.

The `jpeg_progress_mgr` struct contains four fields which are set by the library:

```
long pass_counter; /* work units completed in this pass */
long pass_limit; /* total number of work units in this pass */
int completed_passes; /* passes completed so far */
int total_passes; /* total number of passes expected */
```

During any one pass, `pass_counter` increases from 0 up to (not including) `pass_limit`; the step size is usually but not necessarily 1. The `pass_limit` value may change from one pass to another. The expected total number of passes is in `total_passes`, and the number of passes already completed is in `completed_passes`. Thus the fraction of work completed may be estimated as

```
-----
total_passes
```

ignoring the fact that the passes may not be equal amounts of work.

When decompressing, `pass_limit` can even change within a pass, because it depends on the number of scans in the JPEG file, which isn't always known in advance. The computed fraction-of-work-done may jump suddenly (if the library discovers it has overestimated the number of scans) or even decrease (in the opposite case). It is not wise to put great faith in the work estimate.

When using the decompressor's buffered-image mode, the progress monitor work estimate is likely to be completely unhelpful, because the library has no way to know how many output passes will be demanded of it. Currently, the library sets `total_passes` based on the assumption that there will be one more output pass if the input file end hasn't yet been read (`jpeg_input_complete()` isn't TRUE), but no more output passes if the file end has been reached when the output pass is started. This means that `total_passes` will rise as additional output passes are requested. If you have a way of determining the input file size, estimating progress based on the fraction of the file that's been read will probably be more useful than using the library's value.

## Memory management

-----

This section covers some key facts about the JPEG library's built-in memory manager. For more info, please read `structure.txt`'s section about the memory manager, and consult the source code if necessary.

All memory and temporary file allocation within the library is done via the memory manager. If necessary, you can replace the "back end" of the memory manager to control allocation yourself (for example, if you don't want the library to use `malloc()` and `free()` for some reason).

Some data is allocated "permanently" and will not be freed until the JPEG object is destroyed. Most data is allocated "per image" and is freed by `jpeg_finish_compress`, `jpeg_finish_decompress`, or `jpeg_abort`. You can call the memory manager yourself to allocate structures that will automatically be freed at these times. Typical code for this is

```
ptr = (*cinfo->mem->alloc_small) ((j_common_ptr) cinfo, JPOOL_IMAGE, size);
```

Use `JPOOL_PERMANENT` to get storage that lasts as long as the JPEG object.

Use `alloc_large` instead of `alloc_small` for anything bigger than a few Kbytes.

There are also `alloc_sarray` and `alloc_barray` routines that automatically build 2-D sample or block arrays.

The library's minimum space requirements to process an image depend on the image's width, but not on its height, because the library ordinarily works with "strip" buffers that are as wide as the image but just a few rows high. Some operating modes (eg, two-pass color quantization) require full-image buffers. Such buffers are treated as "virtual arrays": only the current strip need be in memory, and the rest can be swapped out to a temporary file.

If you use the simplest memory manager back end (`jmemo.c`), then no temporary files are used; virtual arrays are simply `malloc()`'d. Images bigger than memory can be processed only if your system supports virtual memory. The other memory manager back ends support temporary files of various flavors and thus work in machines without virtual memory. They may also be useful on Unix machines if you need to process images that exceed available swap space.

When using temporary files, the library will make the in-memory buffers for its virtual arrays just big enough to stay within a "maximum memory" setting. Your application can set this limit by setting `cinfo->mem->max_memory_to_use` after creating the JPEG object. (Of course, there is still a minimum size for the buffers, so the max-memory setting is effective only if it is bigger than the minimum space needed.) If you allocate any large structures yourself, you must allocate them before `jpeg_start_compress()` or `jpeg_start_decompress()` in order to have them counted against the max memory limit. Also keep in mind that space allocated with `alloc_small()` is ignored, on the assumption that it's too small to be worth worrying about; so a reasonable safety margin should be left when setting `max_memory_to_use`.

If you use the `jmemo.c` or `jmemo.c` memory manager back end, it is important to clean up the JPEG object properly to ensure that the temporary files get deleted. (This is especially crucial with `jmemo.c`, where the "temporary files" may be extended-memory segments; if they are not freed, DOS will require a reboot to recover the memory.) Thus, with these memory managers, it's a good idea to provide a signal handler that will trap any

early exit from your program. The handler should call either `jpeg_abort()` or `jpeg_destroy()` for any active JPEG objects. A handler is not needed with `jmemnobs.c`, and shouldn't be necessary with `jmemansi.c` or `jmemmac.c` either, since the C library is supposed to take care of deleting files made with `tmpfile()`.

## Memory usage

-----

Working memory requirements while performing compression or decompression depend on image dimensions, image characteristics (such as colorspace and JPEG process), and operating mode (application-selected options).

As of v6b, the decompressor requires:

1. About 24K in more-or-less-fixed-size data. This varies a bit depending on operating mode and image characteristics (particularly color vs. grayscale), but it doesn't depend on image dimensions.
2. Strip buffers (of size proportional to the image width) for IDCT and upsampling results. The worst case for commonly used sampling factors is about 34 bytes \* width in pixels for a color image. A grayscale image only needs about 8 bytes per pixel column.
3. A full-image DCT coefficient buffer is needed to decode a multi-scan JPEG file (including progressive JPEGs), or whenever you select buffered-image mode. This takes 2 bytes/coefficient. At typical 2x2 sampling, that's 3 bytes per pixel for a color image. Worst case (1x1 sampling) requires 6 bytes/pixel. For grayscale, figure 2 bytes/pixel.
4. To perform 2-pass color quantization, the decompressor also needs a 128K color lookup table and a full-image pixel buffer (3 bytes/pixel). This does not count any memory allocated by the application, such as a buffer to hold the final output image.

The above figures are valid for 8-bit JPEG data precision and a machine with 32-bit ints. For 12-bit JPEG data, double the size of the strip buffers and quantization pixel buffer. The "fixed-size" data will be somewhat smaller with 16-bit ints, larger with 64-bit ints. Also, CMYK or other unusual color spaces will require different amounts of space.

The full-image coefficient and pixel buffers, if needed at all, do not have to be fully RAM resident; you can have the library use temporary files instead when the total memory usage would exceed a limit you set. (But if your OS supports virtual memory, it's probably better to just use `jmemnobs` and let the OS do the swapping.)

The compressor's memory requirements are similar, except that it has no need for color quantization. Also, it needs a full-image DCT coefficient buffer if Huffman-table optimization is asked for, even if progressive mode is not requested.

If you need more detailed information about memory usage in a particular situation, you can enable the MEM\_STATS code in jmemmgr.c.

#### Library compile-time options

-----

A number of compile-time options are available by modifying jmorecfg.h.

The JPEG standard provides for both the baseline 8-bit DCT process and a 12-bit DCT process. The IJG code supports 12-bit lossy JPEG if you define BITS\_IN\_JSAMPLE as 12 rather than 8. Note that this causes JSAMPLE to be larger than a char, so it affects the surrounding application's image data.

The sample applications cjpeg and djpeg can support 12-bit mode only for PPM and GIF file formats; you must disable the other file formats to compile a 12-bit cjpeg or djpeg. (install.txt has more information about that.)

At present, a 12-bit library can handle *only* 12-bit images, not both precisions. (If you need to include both 8- and 12-bit libraries in a single application, you could probably do it by defining NEED\_SHORT\_EXTERNAL\_NAMES for just one of the copies. You'd have to access the 8-bit and 12-bit copies from separate application source files. This is untested ... if you try it, we'd like to hear whether it works!)

Note that a 12-bit library always compresses in Huffman optimization mode, in order to generate valid Huffman tables. This is necessary because our default Huffman tables only cover 8-bit data. If you need to output 12-bit files in one pass, you'll have to supply suitable default Huffman tables.

You may also want to supply your own DCT quantization tables; the existing quality-scaling code has been developed for 8-bit use, and probably doesn't generate especially good tables for 12-bit.

The maximum number of components (color channels) in the image is determined by MAX\_COMPONENTS. The JPEG standard allows up to 255 components, but we expect that few applications will need more than four or so.

On machines with unusual data type sizes, you may be able to improve performance or reduce memory space by tweaking the various typedefs in jmorecfg.h. In particular, on some RISC CPUs, access to arrays of "short"s is quite slow; consider trading memory for speed by making JCOEF, INT16, and UINT16 be "int" or "unsigned int". UINT8 is also a candidate to become int. You probably don't want to make JSAMPLE be int unless you have lots of memory to burn.

You can reduce the size of the library by compiling out various optional functions. To do this, undefine xxx\_SUPPORTED symbols as necessary.

You can also save a few K by not having text error messages in the library;



the standard error message table occupies about 5Kb. This is particularly reasonable for embedded applications where there's no good way to display a message anyway. To do this, remove the creation of the message table (`jpeg_std_message_table[]`) from `jerror.c`, and alter `format_message` to do something reasonable without it. You could output the numeric value of the message code number, for example. If you do this, you can also save a couple more K by modifying the `TRACEMSn()` macros in `jerror.h` to expand to nothing; you don't need trace capability anyway, right?

#### Portability considerations

-----

The JPEG library has been written to be extremely portable; the sample applications `cjpeg` and `djpeg` are slightly less so. This section summarizes the design goals in this area. (If you encounter any bugs that cause the library to be less portable than is claimed here, we'd appreciate hearing about them.)

The code works fine on ANSI C, C++, and pre-ANSI C compilers, using any of the popular system include file setups, and some not-so-popular ones too. See `install.txt` for configuration procedures.

The code is not dependent on the exact sizes of the C data types. As distributed, we make the assumptions that

- char is at least 8 bits wide
- short is at least 16 bits wide
- int is at least 16 bits wide
- long is at least 32 bits wide

(These are the minimum requirements of the ANSI C standard.) Wider types will work fine, although memory may be used inefficiently if char is much larger than 8 bits or short is much bigger than 16 bits. The code should work equally well with 16- or 32-bit ints.

In a system where these assumptions are not met, you may be able to make the code work by modifying the typedefs in `jmorecfg.h`. However, you will probably have difficulty if int is less than 16 bits wide, since references to plain int abound in the code.

char can be either signed or unsigned, although the code runs faster if an unsigned char type is available. If char is wider than 8 bits, you will need to redefine `JOCTET` and/or provide custom data source/destination managers so that `JOCTET` represents exactly 8 bits of data on external storage.

The JPEG library proper does not assume ASCII representation of characters. But some of the image file I/O modules in `cjpeg/djpeg` do have ASCII dependencies in file-header manipulation; so does `cjpeg's select_file_type()` routine.

The JPEG library does not rely heavily on the C library. In particular, C stdio is used only by the data source/destination modules and the error handler, all of which are application-replaceable. (cjpeg/djpeg are more heavily dependent on stdio.) malloc and free are called only from the memory manager "back end" module, so you can use a different memory allocator by replacing that one file.

The code generally assumes that C names must be unique in the first 15 characters. However, global function names can be made unique in the first 6 characters by defining NEED\_SHORT\_EXTERNAL\_NAMES.

More info about porting the code may be gleaned by reading jconfig.txt, jmorecfg.h, and jinclude.h.

Notes for MS-DOS implementors

-----

The IJG code is designed to work efficiently in 80x86 "small" or "medium" memory models (i.e., data pointers are 16 bits unless explicitly declared "far"; code pointers can be either size). You may be able to use small model to compile cjpeg or djpeg by itself, but you will probably have to use medium model for any larger application. This won't make much difference in performance. You *will* take a noticeable performance hit if you use a large-data memory model (perhaps 10%-25%), and you should avoid "huge" model if at all possible.

The JPEG library typically needs 2Kb-3Kb of stack space. It will also malloc about 20K-30K of near heap space while executing (and lots of far heap, but that doesn't count in this calculation). This figure will vary depending on selected operating mode, and to a lesser extent on image size. There is also about 5Kb-6Kb of constant data which will be allocated in the near data segment (about 4Kb of this is the error message table). Thus you have perhaps 20K available for other modules' static data and near heap space before you need to go to a larger memory model. The C library's static data will account for several K of this, but that still leaves a good deal for your needs. (If you are tight on space, you could reduce the sizes of the I/O buffers allocated by jdatasrc.c and jdatadst.c, say from 4K to 1K. Another possibility is to move the error message table to far memory; this should be doable with only localized hacking on jerror.c.)

About 2K of the near heap space is "permanent" memory that will not be released until you destroy the JPEG object. This is only an issue if you save a JPEG object between compression or decompression operations.

Far data space may also be a tight resource when you are dealing with large images. The most memory-intensive case is decompression with two-pass color

quantization, or single-pass quantization to an externally supplied color map. This requires a 128Kb color lookup table plus strip buffers amounting to about 40 bytes per column for typical sampling ratios (eg, about 25600 bytes for a 640-pixel-wide image). You may not be able to process wide images if you have large data structures of your own.

Of course, all of these concerns vanish if you use a 32-bit flat-memory-model compiler, such as DJGPP or Watcom C. We highly recommend flat model if you can use it; the JPEG library is significantly faster in flat model.

- \* Copyright (C) 1994-1996, Thomas G. Lane.
- \* This file is part of the Independent JPEG Group's software.
- \* For conditions of distribution and use, see the accompanying README file.

[...]

/\* Portions of this code are based on the PBMPLUS library, which is:

\*\*

\*\* Copyright (C) 1988 by Jef Poskanzer.

\*\*

\*\* Permission to use, copy, modify, and distribute this software and its  
\*\* documentation for any purpose and without fee is hereby granted, provided  
\*\* that the above copyright notice appear in all copies and that both that  
\*\* copyright notice and this permission notice appear in supporting  
\*\* documentation. This software is provided "as is" without express or  
\*\* implied warranty.

/\*

\* wrgif.c

\*

\* Copyright (C) 1991-1997, Thomas G. Lane.

- \* This file is part of the Independent JPEG Group's software.
- \* For conditions of distribution and use, see the accompanying README file.

\* This file contains routines to write output images in GIF format.

\*

\*\*\*\*\*

\* NOTE: to avoid entanglements with Unisys' patent on LZW compression, \*  
\* this code has been modified to output "uncompressed GIF" files. \*  
\* There is no trace of the LZW algorithm in this file. \*

\*\*\*\*\*

\*

\* These routines may need modification for non-Unix environments or  
\* specialized applications. As they stand, they assume output to  
\* an ordinary stdio stream.

\*/

/\*

- \* This code is loosely based on ppmtogif from the PBMPLUS distribution
- \* of Feb. 1991. That file contains the following copyright notice:
- \* Based on GIFENCOD by David Rowley <mgardi@watdscu.waterloo.edu>.
- \* Lempel-Ziv compression based on "compress" by Spencer W. Thomas et al.

```

* Copyright (C) 1989 by Jef Poskanzer.
* Permission to use, copy, modify, and distribute this software and its
* documentation for any purpose and without fee is hereby granted, provided
* that the above copyright notice appear in all copies and that both that
* copyright notice and this permission notice appear in supporting
* documentation. This software is provided "as is" without express or
* implied warranty.
*
* We are also required to state that
* "The Graphics Interchange Format(c) is the Copyright property of
* CompuServe Incorporated. GIF(sm) is a Service Mark property of
* CompuServe Incorporated."
*/

```

## 1.14 KazLib 1.20

### 1.14.1 Available under license :

```

/*
* Portable Exception Handling for ANSI C.
* Copyright (C) 1999 Kaz Kylheku <kaz@ashi.footprints.net>
*
* Free Software License:
*
* All rights are reserved by the author, with the following exceptions:
* Permission is granted to freely reproduce and distribute this software,
* possibly in exchange for a fee, provided that this copyright notice appears
* intact. Permission is also granted to adapt this software to produce
* derivative works, as long as the modified versions carry this copyright
* notice and additional notices stating that the work has been modified.
* This source code may be translated into executable form and incorporated
* into proprietary software; there is no requirement for such software to
* contain a copyright notice related to this source.
* $Id: except.c,v 1.27.2.2 2001/07/27 01:20:34 kaz Exp $
* $Name: kazlib_1_20 $
*/

```

## 1.15 libpng 1.5.2

### 1.15.1 Available under license :

This copy of the libpng notices is provided for your convenience. In case of any discrepancy between this copy and the notices in the file png.h that is included in the libpng distribution, the latter shall prevail.

COPYRIGHT NOTICE, DISCLAIMER, and LICENSE:

If you modify libpng you may insert additional notices immediately following

this sentence.

This code is released under the libpng license.

libpng versions 1.2.6, August 15, 2004, through 1.5.2, March 31, 2011, are Copyright (c) 2004, 2006-2011 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.2.5 with the following individual added to the list of Contributing Authors

Cosmin Truta

libpng versions 1.0.7, July 1, 2000, through 1.2.5 - October 3, 2002, are Copyright (c) 2000-2002 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.0.6 with the following individuals added to the list of Contributing Authors

Simon-Pierre Cadieux

Eric S. Raymond

Gilles Vollant

and with the following additions to the disclaimer:

There is no warranty against interference with your enjoyment of the library or against infringement. There is no warranty that our efforts or the library will fulfill any of your particular purposes or needs. This library is provided with all faults, and the entire risk of satisfactory quality, performance, accuracy, and effort is with the user.

libpng versions 0.97, January 1998, through 1.0.6, March 20, 2000, are Copyright (c) 1998, 1999 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-0.96, with the following individuals added to the list of Contributing Authors:

Tom Lane

Glenn Randers-Pehrson

Willem van Schaik

libpng versions 0.89, June 1996, through 0.96, May 1997, are Copyright (c) 1996, 1997 Andreas Dilger Distributed according to the same disclaimer and license as libpng-0.88, with the following individuals added to the list of Contributing Authors:

John Bowler

Kevin Bracey

Sam Bushell

Magnus Holmgren

Greg Roelofs

Tom Tanner

libpng versions 0.5, May 1995, through 0.88, January 1996, are  
Copyright (c) 1995, 1996 Guy Eric Schalnat, Group 42, Inc.

For the purposes of this copyright and license, "Contributing Authors"  
is defined as the following set of individuals:

Andreas Dilger  
Dave Martindale  
Guy Eric Schalnat  
Paul Schmidt  
Tim Wegner

The PNG Reference Library is supplied "AS IS". The Contributing Authors  
and Group 42, Inc. disclaim all warranties, expressed or implied,  
including, without limitation, the warranties of merchantability and of  
fitness for any purpose. The Contributing Authors and Group 42, Inc.  
assume no liability for direct, indirect, incidental, special, exemplary,  
or consequential damages, which may result from the use of the PNG  
Reference Library, even if advised of the possibility of such damage.

Permission is hereby granted to use, copy, modify, and distribute this  
source code, or portions hereof, for any purpose, without fee, subject  
to the following restrictions:

1. The origin of this source code must not be misrepresented.
2. Altered versions must be plainly marked as such and must not  
be misrepresented as being the original source.
3. This Copyright notice may not be removed or altered from any  
source or altered source distribution.

The Contributing Authors and Group 42, Inc. specifically permit, without  
fee, and encourage the use of this source code as a component to  
supporting the PNG file format in commercial products. If you use this  
source code in a product, acknowledgment is not required but would be  
appreciated.

A "png\_get\_copyright" function is available, for convenient use in "about"  
boxes and the like:

```
printf("%s",png_get_copyright(NULL));
```

Also, the PNG logo (in PNG format, of course) is supplied in the  
files "pngbar.png" and "pngbar.jpg (88x31) and "pngnow.png" (98x31).

Libpng is OSI Certified Open Source Software. OSI Certified Open Source is a certification mark of the Open Source Initiative.

Glenn Randers-Pehrson  
glennrp at users.sourceforge.net  
March 31, 2011

## 1.16 libstrophe 1.1.8

### 1.16.1 Available under license :

libstrophe XMPP client library  
Copyright (C) 2005-2009 Collecta, Inc.

This program is dual licensed under the MIT and GPLv3 licenses.  
Please see the files MIT-LICENSE.txt and GPL-LICENSE.txt for details.  
Copyright (c) 2005-2009 Collecta, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

GNU GENERAL PUBLIC LICENSE  
Version 3, 29 June 2007

Copyright (C) 2007 Free Software Foundation, Inc. <<http://fsf.org/>>  
Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

#### Preamble

The GNU General Public License is a free, copyleft license for software and other kinds of works.

The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program--to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. 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 them 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 prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: responsibilities to respect the freedom of others.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. 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.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.



Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

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

## TERMS AND CONDITIONS

### 0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If

the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

## 1. Source Code.

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work's System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

## 2. Basic Permissions.

All rights granted under this License are granted for the term of

copyright on the Program, and are irrevocable provided the stated conditions are met. This License explicitly affirms your unlimited permission to run the unmodified Program. The output from running a covered work is covered by this License only if the output, given its content, constitutes a covered work. This License acknowledges your rights of fair use or other equivalent, as provided by copyright law.

You may make, run and propagate covered works that you do not convey, without conditions so long as your license otherwise remains in force. You may convey covered works to others for the sole purpose of having them make modifications exclusively for you, or provide you with facilities for running those works, provided that you comply with the terms of this License in conveying all material for which you do not control copyright. Those thus making or running the covered works for you must do so exclusively on your behalf, under your direction and control, on terms that prohibit them from making any copies of your copyrighted material outside their relationship with you.

Conveying under any other circumstances is permitted solely under the conditions stated below. Sublicensing is not allowed; section 10 makes it unnecessary.

### 3. Protecting Users' Legal Rights From Anti-Circumvention Law.

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work's users, your or third parties' legal rights to forbid circumvention of technological measures.

### 4. Conveying Verbatim Copies.

You may convey 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; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

#### 5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

- a) The work must carry prominent notices stating that you modified it, and giving a relevant date.
- b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to "keep intact all notices".
- c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.
- d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an "aggregate" if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation's users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

#### 6. Conveying Non-Source Forms.

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

- a) Convey the object code in, or embodied in, a physical product

(including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product,

doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

If you convey an object code work under this section in, or with, or specifically for use in, a User Product, and the conveying occurs as part of a transaction in which the right of possession and use of the User Product is transferred to the recipient in perpetuity or for a fixed term (regardless of how the transaction is characterized), the Corresponding Source conveyed under this section must be accompanied by the Installation Information. But this requirement does not apply if neither you nor any third party retains the ability to install modified object code on the User Product (for example, the work has been installed in ROM).

The requirement to provide Installation Information does not include a requirement to continue to provide support service, warranty, or updates for a work that has been modified or installed by the recipient, or for the User Product in which it has been modified or installed. Access to a network may be denied when the modification itself materially and adversely affects the operation of the network or violates the rules and protocols for communication across the network.

Corresponding Source conveyed, and Installation Information provided, in accord with this section must be in a format that is publicly documented (and with an implementation available to the public in source code form), and must require no special password or key for unpacking, reading or copying.

## 7. Additional Terms.

"Additional permissions" are terms that supplement the terms of this License by making exceptions from one or more of its conditions. Additional permissions that are applicable to the entire Program shall be treated as though they were included in this License, to the extent

that they are valid under applicable law. If additional permissions apply only to part of the Program, that part may be used separately under those permissions, but the entire Program remains governed by this License without regard to the additional permissions.

When you convey a copy of a covered work, you may at your option remove any additional permissions from that copy, or from any part of it. (Additional permissions may be written to require their own removal in certain cases when you modify the work.) You may place additional permissions on material, added by you to a covered work, for which you have or can give appropriate copyright permission.

Notwithstanding any other provision of this License, for material you add to a covered work, you may (if authorized by the copyright holders of that material) supplement the terms of this License with terms:

- a) Disclaiming warranty or limiting liability differently from the terms of sections 15 and 16 of this License; or
- b) Requiring preservation of specified reasonable legal notices or author attributions in that material or in the Appropriate Legal Notices displayed by works containing it; or
- c) Prohibiting misrepresentation of the origin of that material, or requiring that modified versions of such material be marked in reasonable ways as different from the original version; or
- d) Limiting the use for publicity purposes of names of licensors or authors of the material; or
- e) Declining to grant rights under trademark law for use of some trade names, trademarks, or service marks; or
- f) Requiring indemnification of licensors and authors of that material by anyone who conveys the material (or modified versions of it) with contractual assumptions of liability to the recipient, for any liability that these contractual assumptions directly impose on those licensors and authors.

All other non-permissive additional terms are considered "further restrictions" within the meaning of section 10. If the Program as you received it, or any part of it, contains a notice stating that it is governed by this License along with a term that is a further restriction, you may remove that term. If a license document contains a further restriction but permits relicensing or conveying under this License, you may add to a covered work material governed by the terms of that license document, provided that the further restriction does not survive such relicensing or conveying.

If you add terms to a covered work in accord with this section, you must place, in the relevant source files, a statement of the additional terms that apply to those files, or a notice indicating where to find the applicable terms.

Additional terms, permissive or non-permissive, may be stated in the form of a separately written license, or stated as exceptions; the above requirements apply either way.

## 8. Termination.

You may not propagate or modify a covered work except as expressly provided under this License. Any attempt otherwise to propagate or modify it is void, and will automatically terminate your rights under this License (including any patent licenses granted under the third paragraph of section 11).

However, if you cease all violation of this License, then your license from a particular copyright holder is reinstated (a) provisionally, unless and until the copyright holder explicitly and finally terminates your license, and (b) permanently, if the copyright holder fails to notify you of the violation by some reasonable means prior to 60 days after the cessation.

Moreover, your license from a particular copyright holder is reinstated permanently if the copyright holder notifies you of the violation by some reasonable means, this is the first time you have received notice of violation of this License (for any work) from that copyright holder, and you cure the violation prior to 30 days after your receipt of the notice.

Termination of your rights under this section does not terminate the licenses of parties who have received copies or rights from you under this License. If your rights have been terminated and not permanently reinstated, you do not qualify to receive new licenses for the same material under section 10.

## 9. Acceptance Not Required for Having Copies.

You are not required to accept this License in order to receive or run a copy of the Program. Ancillary propagation of a covered work occurring solely as a consequence of using peer-to-peer transmission to receive a copy likewise does not require acceptance. However, nothing other than this License grants you permission to propagate or modify any covered work. These actions infringe copyright if you do not accept this License. Therefore, by modifying or propagating a covered work, you indicate your acceptance of this License to do so.



## 10. Automatic Licensing of Downstream Recipients.

Each time you convey a covered work, the recipient automatically receives a license from the original licensors, to run, modify and propagate that work, subject to this License. You are not responsible for enforcing compliance by third parties with this License.

An "entity transaction" is a transaction transferring control of an organization, or substantially all assets of one, or subdividing an organization, or merging organizations. If propagation of a covered work results from an entity transaction, each party to that transaction who receives a copy of the work also receives whatever licenses to the work the party's predecessor in interest had or could give under the previous paragraph, plus a right to possession of the Corresponding Source of the work from the predecessor in interest, if the predecessor has it or can get it with reasonable efforts.

You may not impose any further restrictions on the exercise of the rights granted or affirmed under this License. For example, you may not impose a license fee, royalty, or other charge for exercise of rights granted under this License, and you may not initiate litigation (including a cross-claim or counterclaim in a lawsuit) alleging that any patent claim is infringed by making, using, selling, offering for sale, or importing the Program or any portion of it.

## 11. Patents.

A "contributor" is a copyright holder who authorizes use under this License of the Program or a work on which the Program is based. The work thus licensed is called the contributor's "contributor version".

A contributor's "essential patent claims" are all patent claims owned or controlled by the contributor, whether already acquired or hereafter acquired, that would be infringed by some manner, permitted by this License, of making, using, or selling its contributor version, but do not include claims that would be infringed only as a consequence of further modification of the contributor version. For purposes of this definition, "control" includes the right to grant patent sublicenses in a manner consistent with the requirements of this License.

Each contributor grants you a non-exclusive, worldwide, royalty-free patent license under the contributor's essential patent claims, to make, use, sell, offer for sale, import and otherwise run, modify and propagate the contents of its contributor version.

In the following three paragraphs, a "patent license" is any express

agreement or commitment, however denominated, not to enforce a patent (such as an express permission to practice a patent or covenant not to sue for patent infringement). To "grant" such a patent license to a party means to make such an agreement or commitment not to enforce a patent against the party.

If you convey a covered work, knowingly relying on a patent license, and the Corresponding Source of the work is not available for anyone to copy, free of charge and under the terms of this License, through a publicly available network server or other readily accessible means, then you must either (1) cause the Corresponding Source to be so available, or (2) arrange to deprive yourself of the benefit of the patent license for this particular work, or (3) arrange, in a manner consistent with the requirements of this License, to extend the patent license to downstream recipients. "Knowingly relying" means you have actual knowledge that, but for the patent license, your conveying the covered work in a country, or your recipient's use of the covered work in a country, would infringe one or more identifiable patents in that country that you have reason to believe are valid.

If, pursuant to or in connection with a single transaction or arrangement, you convey, or propagate by procuring conveyance of, a covered work, and grant a patent license to some of the parties receiving the covered work authorizing them to use, propagate, modify or convey a specific copy of the covered work, then the patent license you grant is automatically extended to all recipients of the covered work and works based on it.

A patent license is "discriminatory" if it does not include within the scope of its coverage, prohibits the exercise of, or is conditioned on the non-exercise of one or more of the rights that are specifically granted under this License. You may not convey a covered work if you are a party to an arrangement with a third party that is in the business of distributing software, under which you make payment to the third party based on the extent of your activity of conveying the work, and under which the third party grants, to any of the parties who would receive the covered work from you, a discriminatory patent license (a) in connection with copies of the covered work conveyed by you (or copies made from those copies), or (b) primarily for and in connection with specific products or compilations that contain the covered work, unless you entered into that arrangement, or that patent license was granted, prior to 28 March 2007.

Nothing in this License shall be construed as excluding or limiting any implied license or other defenses to infringement that may otherwise be available to you under applicable patent law.

12. No Surrender of Others' Freedom.

If 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 convey a covered work so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not convey it at all. For example, if you agree to terms that obligate you to collect a royalty for further conveying from those to whom you convey the Program, the only way you could satisfy both those terms and this License would be to refrain entirely from conveying the Program.

#### 13. Use with the GNU Affero General Public License.

Notwithstanding any other provision of this License, you have permission to link or combine any covered work with a work licensed under version 3 of the GNU Affero General Public License into a single combined work, and to convey the resulting work. The terms of this License will continue to apply to the part which is the covered work, but the special requirements of the GNU Affero General Public License, section 13, concerning interaction through a network will apply to the combination as such.

#### 14. Revised Versions of this License.

The Free Software Foundation may publish revised and/or new versions of the GNU 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 that a certain numbered version of the GNU General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that numbered version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of the GNU General Public License, you may choose any version ever published by the Free Software Foundation.

If the Program specifies that a proxy can decide which future versions of the GNU General Public License can be used, that proxy's public statement of acceptance of a version permanently authorizes you to choose that version for the Program.

Later license versions may give you additional or different permissions. However, no additional obligations are imposed on any author or copyright holder as a result of your choosing to follow a later version.

15. Disclaimer of Warranty.

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.

16. Limitation of Liability.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MODIFIES AND/OR CONVEYS 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.

17. Interpretation of Sections 15 and 16.

If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively state the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>

This program 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 3 of the License, or (at your option) any later version.

This program 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.

You should have received a copy of the GNU General Public License along with this program. If not, see <http://www.gnu.org/licenses/>.

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

```
<program> Copyright (C) <year> <name of author>  
This program comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.  
This is free software, and you are welcome to redistribute it  
under certain conditions; type 'show c' for details.
```

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an "about box".

You should also get your employer (if you work as a programmer) or school, if any, to sign a "copyright disclaimer" for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

The GNU General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License. But first, please read <http://www.gnu.org/philosophy/why-not-lgpl.html>.

## 1.17 libusb 1.0.8

### 1.17.1 Available under license :

GNU LESSER GENERAL PUBLIC LICENSE  
Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.  
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

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

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

#### Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

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

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

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is

modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating

system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

## GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, 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 library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.



1. You may copy and distribute verbatim copies of the Library's complete 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 distribute a copy of this License along with the Library.

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.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, 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) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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

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

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you 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.

If distribution of 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 satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood

that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be 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.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library

facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library 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.

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

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

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

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.

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

13. The Free Software Foundation may publish revised and/or new versions of the Lesser 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 Library 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 Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, 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

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO

WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "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 LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. 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 LIBRARY 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 LIBRARY (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 LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

#### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library 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 Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice

That's all there is to it!

## 1.18 lighttpd 1.4.28

### 1.18.1 Available under license :

Copyright (c) 2004, Jan Kneschke, incremental  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- Neither the name of the 'incremental' nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)



ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

/\*

\* The apr\_md5\_encode() routine uses much code obtained from the FreeBSD 3.0

\* MD5 crypt() function, which is licenced as follows:

\* -----

\* "THE BEER-WARE LICENSE" (Revision 42):

\* <phk@login.dknet.dk> wrote this file. As long as you retain this notice you

\* can do whatever you want with this stuff. If we meet some day, and you think

\* this stuff is worth it, you can buy me a beer in return. Poul-Henning Kamp

\* -----

\*/

/\* MD5C.C - RSA Data Security, Inc., MD5 message-digest algorithm

\*/

/\* Copyright (C) 1991-2, RSA Data Security, Inc. Created 1991. All rights reserved.

License to copy and use this software is granted provided that it is identified as the "RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing this software or this function.

License is also granted to make and use derivative works provided that such works are identified as "derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing the derived work.

RSA Data Security, Inc. makes no representations concerning either the merchantability of this software or the suitability of this software for any particular purpose. It is provided "as is" without express or implied warranty of any kind.

These notices must be retained in any copies of any part of this documentation and/or software.

\*/

## 1.19 lighttpd 1.4.28

### 1.19.1 Available under license :

Copyright (c) 2004, Jan Kneschke, incremental

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this

list of conditions and the following disclaimer.

- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- Neither the name of the 'incremental' nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

## 1.20 lua 5.1.5 5.1.5

### 1.20.1 Available under license :

Lua License

-----

Lua is licensed under the terms of the MIT license reproduced below. This means that Lua is free software and can be used for both academic and commercial purposes at absolutely no cost.

For details and rationale, see <http://www.lua.org/license.html> .

=====

Copyright (C) 1994-2012 Lua.org, PUC-Rio.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

=====

(end of COPYRIGHT)

## 1.21 openkit-ios na

### 1.21.1 Available under license :

Copyright 2012 OpenKit

Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.  
You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software  
distributed under the License is distributed on an "AS IS" BASIS,  
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.  
See the License for the specific language governing permissions and  
limitations under the License.

## 1.22 openssl 1.0.1q :1

### 1.22.1 Notifications :

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit  
(<http://www.openssl.org/>)

This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

### 1.22.2 Available under license :

LICENSE ISSUES

=====

The OpenSSL toolkit stays under a dual license, i.e. both the conditions of  
the OpenSSL License and the original SSLeay license apply to the toolkit.  
See below for the actual license texts. Actually both licenses are BSD-style  
Open Source licenses. In case of any license issues related to OpenSSL  
please contact [openssl-core@openssl.org](mailto:openssl-core@openssl.org).

## OpenSSL License

-----

```
/* =====  
* Copyright (c) 1998-2011 The OpenSSL Project. All rights reserved.  
*  
* Redistribution and use in source and binary forms, with or without  
* modification, are permitted provided that the following conditions  
* are met:  
*  
* 1. Redistributions of source code must retain the above copyright  
* notice, this list of conditions and the following disclaimer.  
*  
* 2. Redistributions in binary form must reproduce the above copyright  
* notice, this list of conditions and the following disclaimer in  
* the documentation and/or other materials provided with the  
* distribution.  
*  
* 3. All advertising materials mentioning features or use of this  
* software must display the following acknowledgment:  
* "This product includes software developed by the OpenSSL Project  
* for use in the OpenSSL Toolkit. (http://www.openssl.org/)"  
*  
* 4. The names "OpenSSL Toolkit" and "OpenSSL Project" must not be used to  
* endorse or promote products derived from this software without  
* prior written permission. For written permission, please contact  
* openssl-core@openssl.org.  
*  
* 5. Products derived from this software may not be called "OpenSSL"  
* nor may "OpenSSL" appear in their names without prior written  
* permission of the OpenSSL Project.  
*  
* 6. Redistributions of any form whatsoever must retain the following  
* acknowledgment:  
* "This product includes software developed by the OpenSSL Project  
* for use in the OpenSSL Toolkit (http://www.openssl.org/)"  
*  
* THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT ``AS IS'' AND ANY  
* EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE  
* IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR  
* PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE OpenSSL PROJECT OR  
* ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,  
* SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT  
* NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;  
* LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)  
* HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,  
* STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
```

\* ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED  
\* OF THE POSSIBILITY OF SUCH DAMAGE.

\* =====

\*

\* This product includes cryptographic software written by Eric Young  
\* (eay@cryptsoft.com). This product includes software written by Tim  
\* Hudson (tjh@cryptsoft.com).

\*

\*/

#### Original SSLeay License

-----

/\* Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com)

\* All rights reserved.

\*

\* This package is an SSL implementation written  
\* by Eric Young (eay@cryptsoft.com).

\* The implementation was written so as to conform with Netscapes SSL.

\*

\* This library is free for commercial and non-commercial use as long as  
\* the following conditions are aheared to. The following conditions  
\* apply to all code found in this distribution, be it the RC4, RSA,  
\* lhash, DES, etc., code; not just the SSL code. The SSL documentation  
\* included with this distribution is covered by the same copyright terms  
\* except that the holder is Tim Hudson (tjh@cryptsoft.com).

\*

\* Copyright remains Eric Young's, and as such any Copyright notices in  
\* the code are not to be removed.

\* If this package is used in a product, Eric Young should be given attribution  
\* as the author of the parts of the library used.

\* This can be in the form of a textual message at program startup or  
\* in documentation (online or textual) provided with the package.

\*

\* Redistribution and use in source and binary forms, with or without  
\* modification, are permitted provided that the following conditions  
\* are met:

\* 1. Redistributions of source code must retain the copyright  
\* notice, this list of conditions and the following disclaimer.

\* 2. Redistributions in binary form must reproduce the above copyright  
\* notice, this list of conditions and the following disclaimer in the  
\* documentation and/or other materials provided with the distribution.

\* 3. All advertising materials mentioning features or use of this software  
\* must display the following acknowledgement:

\* "This product includes cryptographic software written by  
\* Eric Young (eay@cryptsoft.com)"

\* The word 'cryptographic' can be left out if the rouines from the library  
\* being used are not cryptographic related :-).

\* 4. If you include any Windows specific code (or a derivative thereof) from  
 \* the apps directory (application code) you must include an acknowledgement:  
 \* "This product includes software written by Tim Hudson (tjh@cryptsoft.com)"  
 \*  
 \* THIS SOFTWARE IS PROVIDED BY ERIC YOUNG ``AS IS" AND  
 \* ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE  
 \* IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE  
 \* ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE  
 \* FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL  
 \* DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS  
 \* OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)  
 \* HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT  
 \* LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY  
 \* OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF  
 \* SUCH DAMAGE.  
 \*  
 \* The licence and distribution terms for any publically available version or  
 \* derivative of this code cannot be changed. i.e. this code cannot simply be  
 \* copied and put under another distribution licence  
 \* [including the GNU Public Licence.]  
 \*/

Copyright (C) 1995-1997 Eric Young (eay@cryptsoft.com)  
 All rights reserved.

This package is an DES implementation written by Eric Young (eay@cryptsoft.com).  
 The implementation was written so as to conform with MIT's libdes.

This library is free for commercial and non-commercial use as long as  
 the following conditions are aheared to. The following conditions  
 apply to all code found in this distribution.

Copyright remains Eric Young's, and as such any Copyright notices in  
 the code are not to be removed.

If this package is used in a product, Eric Young should be given attribution  
 as the author of that the SSL library. This can be in the form of a textual  
 message at program startup or in documentation (online or textual) provided  
 with the package.

Redistribution and use in source and binary forms, with or without  
 modification, are permitted provided that the following conditions  
 are met:

1. Redistributions of source code must retain the copyright  
 notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright  
 notice, this list of conditions and the following disclaimer in the  
 documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software  
 must display the following acknowledgement:

This product includes software developed by Eric Young (eay@cryptsoft.com)

THIS SOFTWARE IS PROVIDED BY ERIC YOUNG ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The license and distribution terms for any publically available version or derivative of this code cannot be changed. i.e. this code cannot simply be copied and put under another distribution license [including the GNU Public License.]

The reason behind this being stated in this direct manner is past experience in code simply being copied and the attribution removed from it and then being distributed as part of other packages. This implementation was a non-trivial and unpaid effort.

Copyright (C) 1995-1997 Eric Young (eay@cryptsoft.com)

All rights reserved.

This package is an Blowfish implementation written by Eric Young (eay@cryptsoft.com).

This library is free for commercial and non-commercial use as long as the following conditions are adhered to. The following conditions apply to all code found in this distribution.

Copyright remains Eric Young's, and as such any Copyright notices in the code are not to be removed.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement:

This product includes software developed by Eric Young (eay@cryptsoft.com)

THIS SOFTWARE IS PROVIDED BY ERIC YOUNG ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The license and distribution terms for any publically available version or derivative of this code cannot be changed. i.e. this code cannot simply be copied and put under another distribution license [including the GNU Public License.]

The reason behind this being stated in this direct manner is past experience in code simply being copied and the attribution removed from it and then being distributed as part of other packages. This implementation was a non-trivial and unpaid effort.

## 1.23 prosody 0.9.6

### 1.23.1 Available under license :

Copyright (c) 2008-2011 Matthew Wild

Copyright (c) 2008-2011 Waqas Hussain

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.



# 1.24 pugixml 1.0

## 1.24.1 Available under license :

```
/**
 * pugixml parser - version 1.0
 * -----
 * Copyright (C) 2006-2010, by Arseny Kapoulkine (arseny.kapoulkine@gmail.com)
 * Report bugs and download new versions at http://pugixml.org/
 *
 * This library is distributed under the MIT License. See notice at the end
 * of this file.
 *
 * This work is based on the pugxml parser, which is:
 * Copyright (C) 2003, by Kristen Wegner (kristen@tima.net)
 */

/**
 * Copyright (c) 2006-2010 Arseny Kapoulkine
 *
 * Permission is hereby granted, free of charge, to any person
 * obtaining a copy of this software and associated documentation
 * files (the "Software"), to deal in the Software without
 * restriction, including without limitation the rights to use,
 * copy, modify, merge, publish, distribute, sublicense, and/or sell
 * copies of the Software, and to permit persons to whom the
 * Software is furnished to do so, subject to the following
 * conditions:
 *
 * The above copyright notice and this permission notice shall be
 * included in all copies or substantial portions of the Software.
 *
 * THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,
 * EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES
 * OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND
 * NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT
 * HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY,
 * WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING
 * FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR
 * OTHER DEALINGS IN THE SOFTWARE.
 */
```

# 1.25 rfc3550 - A Transport Protocol for Real-Time Applications 1.0

## 1.25.1 Available under license :

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## 1.26 SHA-1 2.1.

### 1.26.1 Available under license :

Licence

As long as you leave the copyright notice of the original script, or link back to this website, you can use any of the content published on this website free of charge for any use: commercial or noncommercial.

<http://www.webtoolkit.info/>

Licence

As long as you leave the copyright notice of the original script, or link back to this website, you can use any of the content published on this website free of charge for any use: commercial or noncommercial.

<http://www.webtoolkit.info/>

## 1.27 SLRE 1.0

### 1.27.1 Available under license :

```
// Copyright (c) 2004-2012 Sergey Lyubka <valenok@gmail.com>
```

```
// All rights reserved
```

```
//
```

```
// Permission is hereby granted, free of charge, to any person obtaining a copy
```

```
// of this software and associated documentation files (the "Software"), to deal
```

```
// in the Software without restriction, including without limitation the rights
```

```
// to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
```

```
// copies of the Software, and to permit persons to whom the Software is
```

```
// furnished to do so, subject to the following conditions:
```

```
//  
// The above copyright notice and this permission notice shall be included in  
// all copies or substantial portions of the Software.  
//  
// THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR  
// IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,  
// FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE  
// AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER  
// LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,  
// OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN  
// THE SOFTWARE.
```

## 1.28 sqlite 3.7.9

### 1.28.1 Available under license :

SQLite Copyright

SQLite is in the Public Domain

All of the deliverable code in SQLite has been dedicated to the public domain by the authors. All code authors, and representatives of the companies they work for, have signed affidavits dedicating their contributions to the public domain and originals of those signed affidavits are stored in a firesafe at the main offices of Hwaci. Anyone is free to copy, modify, publish, use, compile, sell, or distribute the original SQLite code, either in source code form or as a compiled binary, for any purpose, commercial or non-commercial, and by any means.

The previous paragraph applies to the deliverable code in SQLite - those parts of the SQLite library that you actually bundle and ship with a larger application. Portions of the documentation and some code used as part of the build process might fall under other licenses. The details here are unclear. We do not worry about the licensing of the documentation and build code so much because none of these things are part of the core deliverable SQLite library.

All of the deliverable code in SQLite has been written from scratch. No code has been taken from other projects or from the open internet. Every line of code can be traced back to its original author, and all of those authors have public domain dedications on file. So the SQLite code base is clean and is uncontaminated with licensed code from other projects.

Obtaining An Explicit License To Use SQLite

Even though SQLite is in the public domain and does not require a license, some users want to obtain a license anyway. Some reasons for obtaining a license include:

You are using SQLite in a jurisdiction that does not recognize the public domain.

You are using SQLite in a jurisdiction that does not recognize the right of an author to dedicate their work to the public domain.

You want to hold a tangible legal document as evidence that you have the legal right to use and distribute SQLite.

Your legal department tells you that you have to purchase a license.

If you feel like you really have to purchase a license for SQLite, Hwaci, the company that employs the architect and principal developers of SQLite, will sell you one.

## Contributed Code

In order to keep SQLite completely free and unencumbered by copyright, all new contributors to the SQLite code base are asked to dedicate their contributions to the public domain. If you want to send a patch or enhancement for possible inclusion in the SQLite source tree, please accompany the patch with the following statement:

The author or authors of this code dedicate any and all copyright interest in this code to the public domain. We make this dedication for the benefit of the public at large and to the detriment of our heirs and successors. We intend this dedication to be an overt act of relinquishment in perpetuity of all present and future rights to this code under copyright law.

We are not able to accept patches or changes to SQLite that are not accompanied by a statement such as the above. In addition, if you make changes or enhancements as an employee, then a simple statement such as the above is insufficient. You must also send by surface mail a copyright release signed by a company officer. A signed original of the copyright release should be mailed to:

Hwaci  
6200 Maple Cove Lane  
Charlotte, NC 28269  
USA

A template copyright release is available in PDF or HTML. You can use this release to make future changes. The author disclaims copyright to this source code. In place of a legal notice, here is a blessing:

May you do good and not evil.  
May you find forgiveness for yourself and forgive others.  
May you share freely, never taking more than you give.

# 1.29 upnp (libupnp) 1.6.6

## 1.29.1 Available under license :

Copyright (c) 2000-2003 Intel Corporation  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- \* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- \* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- \* Neither name of Intel Corporation nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS

“AS IS” AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL INTEL OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

## 1.30 winrtsoc 3

### 1.30.1 Available under license :

New BSD License (BSD)  
Copyright (c) 2013, Jeremiah Morrill  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

\* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

\* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

## 1.31 winx -win32sdk 1.2 :1.2

# 1.32 XFree86 4.4.0

## 1.32.1 Available under license :

Licenses

Compiled by The XFree86 Project

December 2003

### 1. Introduction

XFree86[tm] code without an explicit copyright is covered by the XFree86 copyright/license as shown in the next section. Portions of code are covered by other licenses/copyrights, as shown in subsequent sections. In all cases, see individual source files for specific details, copyright owner information, and copyright dates.

### 2. XFree86 License

Copyright (C) 1994-2003 The XFree86 Project, Inc. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the XFree86 Project shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the XFree86 Project.

### 3. X/MIT Licenses

#### 3.1 X Consortium

Copyright (C) <date> X Consortium

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the X Consortium.

X Window System is a trademark of X Consortium, Inc.

### 3.2 The Open Group

Copyright <date> The Open Group

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

## 4. Berkeley-style Licenses

The Berkeley-style licenses are similar to the X/MIT-style licenses, except that they include conditions requiring attributions accompany binary distributions and/or are included with end user documentation and/or advertising material.

### 4.1 General

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 4.2 UCB/LBL

Copyright (c) 1993 The Regents of the University of California. All rights reserved.

This software was developed by the Computer Systems Engineering group at Lawrence Berkeley Laboratory under DARPA contract BG 91-66 and contributed to Berkeley.

All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by the University of California, Lawrence Berkeley Laboratory.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:



1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by the University of California, Berkeley and its contributors.
4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.3 Lennart Augustsson.

Copyright (c) 1999 Lennart Augustsson <augustss@netbsd.org>

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY

DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.4 Chris Costello.

Copyright (c) 1999 Chris Costello

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.5 Christopher G. Demetriou.

Copyright (c) 1993, 1994 Christopher G. Demetriou

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the

documentation and/or other materials provided with the distribution.

3. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by Christopher G. Demetriou.
4. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.6 Todd C. Miller

Copyright (c) 1998 Todd C. Miller <Todd.Miller@courtesan.com>

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS" AND TODD C. MILLER DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL TODD C. MILLER BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

#### 4.7 The NetBSD Foundation, Inc.

Copyright (c) 2003 The NetBSD Foundation, Inc. All rights reserved.

This code is derived from software contributed to The NetBSD Foundation by Ben Collver <collver1@attbi.com>

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by the NetBSD Foundation, Inc. and its contributors.
4. Neither the name of The NetBSD Foundation nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE NETBSD FOUNDATION, INC. AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE FOUNDATION OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.8 Keith Packard

Copyright " 2001 Keith Packard, member of The XFree86 Project, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Keith Packard not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Keith Packard makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

KEITH PACKARD DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL KEITH PACKARD BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

#### 4.9 Theo de Raadt and Damien Miller

Copyright (c) 1995,1999 Theo de Raadt. All rights reserved. Copyright (c) 2001-2002 Damien Miller. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

4.10 Andy Ritger/NVIDIA.

Copyright (c) 2001, Andy Ritger [aritger@nvidia.com](mailto:aritger@nvidia.com)

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- o Neither the name of NVIDIA nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR

ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.11 Eric Sunshine.

Copyright (C) 1999,2000 by Eric Sunshine <sunshine@sunshineco.com> All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.12 Theodore Ts'o.

Copyright Theodore Ts'o, 1994, 1995, 1996, 1997, 1998, 1999. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, and the entire permission notice in its entirety, including the disclaimer of warranties.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.13 Paul Vojta.

Copyright (c) 1994 Paul Vojta. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.14 Thomas Winischhofer

Copyright (C) 2001-2004 Thomas Winischhofer

Redistribution and use in source and binary forms, with or without modifica-

tion, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by Thomas Winischhofer.
4. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 4.15 X-Oz Technologies

Copyright 2003 by David H. Dawes.

Copyright 2003 by X-Oz Technologies.

All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

1. Redistributions of source code must retain the above copyright notice, this list of conditions, and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.



3. The end-user documentation included with the redistribution, if any, must include the following acknowledgment: "This product includes software developed by X-Oz Technologies (<http://www.x-oz.com/>)."  
Alternatively, this acknowledgment may appear in the software itself, if and wherever such third-party acknowledgments normally appear.
4. Except as contained in this notice, the name of X-Oz Technologies shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from X-Oz Technologies.

THIS SOFTWARE IS PROVIDED ``AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL X-OZ TECHNOLOGIES OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

4.16 X-TrueType Server Project, After X-TT Project, and contributors.

Copyright (c) 1998 X-TrueType Server Project, All rights reserved.

Copyright (c) 2003 After X-TT Project, All rights reserved.

Contributors include:

Copyright (c) 1998 Takuya SHIOZAKI, All Rights reserved.

Copyright (c) 1998-1999 Shunsuke Akiyama <[akiyama@jp.FreeBSD.org](mailto:akiyama@jp.FreeBSD.org)>. All rights reserved.

Copyright (c) 1998,1999 Pablo Saratxaga <[srtxg@chanae.alphanet.ch](mailto:srtxg@chanae.alphanet.ch)>

Copyright (c) 1998 Go Watanabe, All rights reserved.

Copyright (c) 2001 Roger So, All rights reserved.

Copyright (c) 1998,1999 Chen Xiangyang, All Rights reserved.

Copyright (c) 1997 Jyunji Takagi, All rights reserved.

Copyright (c) 1998 Kazushi (Jam) Marukawa, All rights reserved.

Copyright (c) 1999 Mutsumi ISHIKAWA, All rights reserved.

Copyright (c) 1999 Nozomi YTOW, All rights reserved.

===Notice

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Notice===

5. BSD-style license with export notice

- 5.1 National Semiconductor Corporation Open Source License for Durango

(BSD License with Export Notice)

Copyright (c) 1999-2001

National Semiconductor Corporation.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright

notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

o Neither the name of the National Semiconductor Corporation nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE NATIONAL SEMICONDUCTOR CORPORATION OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE, INTELLECTUAL PROPERTY INFRINGEMENT, OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

EXPORT LAWS: THIS LICENSE ADDS NO RESTRICTIONS TO THE EXPORT LAWS OF YOUR JURISDICTION. It is licensee's responsibility to comply with any export regulations applicable in licensee's jurisdiction. Under CURRENT (2001) U.S. export regulations this software is eligible for export from the U.S. and can be downloaded by or otherwise exported or reexported worldwide EXCEPT to U.S. embargoed destinations which include Cuba, Iraq, Libya, North Korea, Iran, Syria, Sudan, Afghanistan and any other country to which the U.S. has embargoed goods and services.

## 6. NVIDIA Corp

Copyright (c) 1996 NVIDIA, Corp. All rights reserved.

NOTICE TO USER: The source code is copyrighted under U.S. and international laws. NVIDIA, Corp. of Sunnyvale, California owns the copyright and as design patents pending on the design and interface of the NV chips. Users and possessors of this source code are hereby granted a nonexclusive, royalty-free copyright and design patent license to use this code in individual and commercial software.

Any use of this source code must include, in the user documentation and internal comments to the code, notices to the end user as follows:

Copyright (c) 1996 NVIDIA, Corp. NVIDIA design patents pending in the U.S. and foreign countries.

NVIDIA, CORP. MAKES NO REPRESENTATION ABOUT THE SUITABILITY OF THIS SOURCE CODE FOR ANY PURPOSE. IT IS PROVIDED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND. NVIDIA, CORP. DISCLAIMS ALL WARRANTIES WITH REGARD TO

THIS SOURCE CODE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL NVIDIA, CORP. BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOURCE CODE.

## 7. GLX Public License

GLX PUBLIC LICENSE (Version 1.0 (2/11/99)) ("License")

Subject to any third party claims, Silicon Graphics, Inc. ("SGI") hereby grants permission to Recipient (defined below), under Recipient's copyrights in the Original Software (defined below), to use, copy, modify, merge, publish, distribute, sublicense and/or sell copies of Subject Software (defined below), and to permit persons to whom the Subject Software is furnished in accordance with this License to do the same, subject to all of the following terms and conditions, which Recipient accepts by engaging in any such use, copying, modifying, merging, publishing, distributing, sublicensing or selling:

### 1. Definitions.

(a) "Original Software" means source code of computer software code which is described in Exhibit A as Original Software.

(b) "Modifications" means any addition to or deletion from the substance or structure of either the Original Software or any previous Modifications. When Subject Software is released as a series of files, a Modification means (i) any addition to or deletion from the contents of a file containing Original Software or previous Modifications and (ii) any new file that contains any part of the Original Code or previous Modifications.

(c) "Subject Software" means the Original Software or Modifications or the combination of the Original Software and Modifications, or portions of any of the foregoing.

(d) "Recipient" means an individual or a legal entity exercising rights under, and complying with all of the terms of, this License. For legal entities, "Recipient" includes any entity which controls, is controlled by, or is under common control with Recipient. For purposes of this definition, "control" of an entity means (a) the power, direct or indirect, to direct or manage such entity, or (b) ownership of fifty percent (50%) or more of the outstanding shares or beneficial ownership of such entity.

### 2. Redistribution of Source Code Subject to These Terms. Redistributions of

Subject Software in source code form must retain the notice set forth in Exhibit A, below, in every file. A copy of this License must be included in any documentation for such Subject Software where the recipients' rights relating to Subject Software are described. Recipient may distribute the source code version of Subject Software under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, and (ii) the license terms include this Section 2 and Sections 3, 4, 7, 8, 10, 12 and 13 of this License, which terms may not be modified or superseded by any other terms of such license. If Recipient distributes the source code version under a different license Recipient must make it absolutely clear that any terms which differ from this License are offered by Recipient alone, not by SGI. Recipient hereby agrees to indemnify SGI for any liability incurred by SGI as a result of any such terms Recipient offers.

3. Redistribution in Executable Form. The notice set forth in Exhibit A must be conspicuously included in any notice in an executable version of Subject Software, related documentation or collateral in which Recipient describes the user's rights relating to the Subject Software. Recipient may distribute the executable version of Subject Software under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, and (ii) the license terms include this Section 3 and Sections 4, 7, 8, 10, 12 and 13 of this License, which terms may not be modified or superseded by any other terms of such license. If Recipient distributes the executable version under a different license Recipient must make it absolutely clear that any terms which differ from this License are offered by Recipient alone, not by SGI. Recipient hereby agrees to indemnify SGI for any liability incurred by SGI as a result of any such terms Recipient offers.

4. Termination. This License and the rights granted hereunder will terminate automatically if Recipient fails to comply with terms herein and fails to cure such breach within 30 days of the breach. Any sublicense to the Subject Software which is properly granted shall survive any termination of this License absent termination by the terms of such sublicense. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

5. No Trademark Rights. This License does not grant any rights to use any trade name, trademark or service mark whatsoever. No trade name, trademark or service mark of SGI may be used to endorse or promote products derived from the Subject Software without prior written permission of SGI.

6. No Other Rights. This License does not grant any rights with respect to the OpenGL API or to any software or hardware implementation thereof or to any other software whatsoever, nor shall any other rights or licenses not expressly granted hereunder arise by implication, estoppel or otherwise with respect to the Subject Software. Title to and ownership of the Original Soft-

ware at all times remains with SGI. All rights in the Original Software not expressly granted under this License are reserved.

7. Compliance with Laws; Non-Infringement. Recipient shall comply with all applicable laws and regulations in connection with use and distribution of the Subject Software, including but not limited to, all export and import control laws and regulations of the U.S. government and other countries. Recipient may not distribute Subject Software that (i) in any way infringes (directly or contributorily) the rights (including patent, copyright, trade secret, trademark or other intellectual property rights of any kind) of any other person or entity or (ii) breaches any representation or warranty, express, implied or statutory, which under any applicable law it might be deemed to have been distributed.

8. Claims of Infringement. If Recipient at any time has knowledge of any one or more third party claims that reproduction, modification, use, distribution, import or sale of Subject Software (including particular functionality or code incorporated in Subject Software) infringes the third party's intellectual property rights, Recipient must place in a well-identified web page bearing the title "LEGAL" a description of each such claim and a description of the party making each such claim in sufficient detail that a user of the Subject Software will know whom to contact regarding the claim. Also, upon gaining such knowledge of any such claim, Recipient must conspicuously include the URL for such web page in the Exhibit A notice required under Sections 2 and 3, above, and in the text of any related documentation, license agreement or collateral in which Recipient describes end user's rights relating to the Subject Software. If Recipient obtains such knowledge after it makes Subject Software available to any other person or entity, Recipient shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to inform those who received the Subject Software that new knowledge has been obtained.

9. DISCLAIMER OF WARRANTY. SUBJECT SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE SUBJECT SOFTWARE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON- INFRINGING. SGI ASSUMES NO RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE. SHOULD ANY SOFTWARE PROVE DEFECTIVE IN ANY RESPECT, SGI ASSUMES NO COST OR LIABILITY FOR ANY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY SUBJECT SOFTWARE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

10. LIMITATION OF LIABILITY. UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY), CONTRACT, OR OTHERWISE, SHALL SGI OR ANY SGI LICENSOR BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, WORK STOPPAGE, LOSS OF DATA, COMPUTER FAILURE OR MALFUNCTION, OR ANY AND ALL OTHER

COMMERCIAL DAMAGES OR LOSSES, EVEN IF SUCH PARTY SHALL HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM SGI'S NEGLIGENCE TO THE EXTENT APPLICABLE LAW PROHIBITS SUCH LIMITATION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THAT EXCLUSION AND LIMITATION MAY NOT APPLY TO RECIPIENT.

11. Indemnity. Recipient shall be solely responsible for damages arising, directly or indirectly, out of its utilization of rights under this License. Recipient will defend, indemnify and hold harmless Silicon Graphics, Inc. from and against any loss, liability, damages, costs or expenses (including the payment of reasonable attorneys fees) arising out of Recipient's use, modification, reproduction and distribution of the Subject Software or out of any representation or warranty made by Recipient.

12. U.S. Government End Users. The Subject Software is a "commercial item" consisting of "commercial computer software" as such terms are defined in title 48 of the Code of Federal Regulations and all U.S. Government End Users acquire only the rights set forth in this License and are subject to the terms of this License.

13. Miscellaneous. This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed so as to achieve as nearly as possible the same economic effect as the original provision and the remainder of this License will remain in effect. This License shall be governed by and construed in accordance with the laws of the United States and the State of California as applied to agreements entered into and to be performed entirely within California between California residents. Any litigation relating to this License shall be subject to the exclusive jurisdiction of the Federal Courts of the Northern District of California (or, absent subject matter jurisdiction in such courts, the courts of the State of California), with venue lying exclusively in Santa Clara County, California, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not apply to this License.

#### Exhibit A

The contents of this file are subject to Sections 2, 3, 4, 7, 8, 10, 12 and 13 of the GLX Public License Version 1.0 (the "License"). You may not use this file except in compliance with those sections of the License. You may obtain a copy of the License at Silicon Graphics, Inc., attn: Legal Services, 2011 N. Shoreline Blvd., Mountain View, CA 94043 or at <http://www.sgi.com/software/opensource/glx/license.html>.

Software distributed under the License is distributed on an "AS IS" basis.

ALL WARRANTIES ARE DISCLAIMED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE OR OF NON-INFRINGEMENT. See the License for the specific language governing rights and limitations under the License.

The Original Software is GLX version 1.2 source code, released February, 1999. The developer of the Original Software is Silicon Graphics, Inc. Those portions of the Subject Software created by Silicon Graphics, Inc. are Copyright (c) 1991-9 Silicon Graphics, Inc. All Rights Reserved.

## 8. CID Font Code Public License

CID FONT CODE PUBLIC LICENSE (Version 1.0 (3/31/99))("License")

Subject to any applicable third party claims, Silicon Graphics, Inc. ("SGI") hereby grants permission to Recipient (defined below), under SGI's copyrights in the Original Software (defined below), to use, copy, modify, merge, publish, distribute, sublicense and/or sell copies of Subject Software (defined below) in both source code and executable form, and to permit persons to whom the Subject Software is furnished in accordance with this License to do the same, subject to all of the following terms and conditions, which Recipient accepts by engaging in any such use, copying, modifying, merging, publication, distributing, sublicensing or selling:

### 1. Definitions.

a. "Original Software" means source code of computer software code that is described in Exhibit A as Original Software.

b. "Modifications" means any addition to or deletion from the substance or structure of either the Original Software or any previous Modifications. When Subject Software is released as a series of files, a Modification means (i) any addition to or deletion from the contents of a file containing Original Software or previous Modifications and (ii) any new file that contains any part of the Original Code or previous Modifications.

c. "Subject Software" means the Original Software or Modifications or the combination of the Original Software and Modifications, or portions of any of the foregoing.

d. "Recipient" means an individual or a legal entity exercising rights under the terms of this License. For legal entities, "Recipient" includes any entity that controls, is controlled by, or is under common control with Recipient. For purposes of this definition, "control" of an entity means (i) the power, direct or indirect, to direct or manage such entity, or (ii) ownership of fifty



percent (50%) or more of the outstanding shares or beneficial ownership of such entity.

e. "Required Notice" means the notice set forth in Exhibit A to this License.

f. "Accompanying Technology" means any software or other technology that is not a Modification and that is distributed or made publicly available by Recipient with the Subject Software. Separate software files that do not contain any Original Software or any previous Modification shall not be deemed a Modification, even if such software files are aggregated as part of a product, or in any medium of storage, with any file that does contain Original Software or any previous Modification.

2. License Terms. All distribution of the Subject Software must be made subject to the terms of this License. A copy of this License and the Required Notice must be included in any documentation for Subject Software where Recipient's rights relating to Subject Software and/or any Accompanying Technology are described. Distributions of Subject Software in source code form must also include the Required Notice in every file distributed. In addition, a ReadMe file entitled "Important Legal Notice" must be distributed with each distribution of one or more files that incorporate Subject Software. That file must be included with distributions made in both source code and executable form. A copy of the License and the Required Notice must be included in that file. Recipient may distribute Accompanying Technology under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, (ii) such other license terms do not modify or supersede the terms of this License as applicable to the Subject Software, (iii) Recipient hereby indemnifies SGI for any liability incurred by SGI as a result of the distribution of Accompanying Technology or the use of other license terms.

3. Termination. This License and the rights granted hereunder will terminate automatically if Recipient fails to comply with terms herein and fails to cure such breach within 30 days of the breach. Any sublicense to the Subject Software that is properly granted shall survive any termination of this License absent termination by the terms of such sublicense. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

4. Trademark Rights. This License does not grant any rights to use any trade name, trademark or service mark whatsoever. No trade name, trademark or service mark of SGI may be used to endorse or promote products derived from or incorporating any Subject Software without prior written permission of SGI.

5. No Other Rights. No rights or licenses not expressly granted hereunder shall arise by implication, estoppel or otherwise. Title to and ownership of

the Original Software at all times remains with SGI. All rights in the Original Software not expressly granted under this License are reserved.

6. Compliance with Laws; Non-Infringement. Recipient shall comply with all applicable laws and regulations in connection with use and distribution of the Subject Software, including but not limited to, all export and import control laws and regulations of the U.S. government and other countries. Recipient may not distribute Subject Software that (i) in any way infringes (directly or contributorily) the rights (including patent, copyright, trade secret, trademark or other intellectual property rights of any kind) of any other person or entity, or (ii) breaches any representation or warranty, express, implied or statutory, which under any applicable law it might be deemed to have been distributed.

7. Claims of Infringement. If Recipient at any time has knowledge of any one or more third party claims that reproduction, modification, use, distribution, import or sale of Subject Software (including particular functionality or code incorporated in Subject Software) infringes the third party's intellectual property rights, Recipient must place in a well-identified web page bearing the title "LEGAL" a description of each such claim and a description of the party making each such claim in sufficient detail that a user of the Subject Software will know whom to contact regarding the claim. Also, upon gaining such knowledge of any such claim, Recipient must conspicuously include the URL for such web page in the Required Notice, and in the text of any related documentation, license agreement or collateral in which Recipient describes end user's rights relating to the Subject Software. If Recipient obtains such knowledge after it makes Subject Software available to any other person or entity, Recipient shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to provide such knowledge to those who received the Subject Software.

8. DISCLAIMER OF WARRANTY. SUBJECT SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE SUBJECT SOFTWARE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. SGI ASSUMES NO RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE. SHOULD ANY SOFTWARE PROVE DEFECTIVE IN ANY RESPECT, SGI ASSUMES NO COST OR LIABILITY FOR ANY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY SUBJECT SOFTWARE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

9. LIMITATION OF LIABILITY. UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY), CONTRACT, OR OTHERWISE, SHALL SGI OR ANY SGI LICENSOR BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SUBJECT SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SUBJECT SOFTWARE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF CERTAIN DAMAGES, SO THIS EXCLUSION AND

LIMITATION MAY NOT APPLY TO RECIPIENT TO THE EXTENT SO DISALLOWED.

10. Indemnity. Recipient shall be solely responsible for damages arising, directly or indirectly, out of its utilization of rights under this License. Recipient will defend, indemnify and hold SGI and its successors and assigns harmless from and against any loss, liability, damages, costs or expenses (including the payment of reasonable attorneys fees) arising out of (Recipient's use, modification, reproduction and distribution of the Subject Software or out of any representation or warranty made by Recipient.

11. U.S. Government End Users. The Subject Software is a "commercial item" consisting of "commercial computer software" as such terms are defined in title 48 of the Code of Federal Regulations and all U.S. Government End Users acquire only the rights set forth in this License and are subject to the terms of this License.

12. Miscellaneous. This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable by any judicial or administrative authority having proper jurisdiction with respect thereto, such provision shall be reformed so as to achieve as nearly as possible the same economic effect as the original provision and the remainder of this License will remain in effect. This License shall be governed by and construed in accordance with the laws of the United States and the State of California as applied to agreements entered into and to be performed entirely within California between California residents. Any litigation relating to this License shall be subject to the exclusive jurisdiction of the Federal Courts of the Northern District of California (or, absent subject matter jurisdiction in such courts, the courts of the State of California), with venue lying exclusively in Santa Clara County, California, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation that provides that the language of a contract shall be construed against the drafter shall not apply to this License.

Exhibit A

Copyright (c) 1994-1999 Silicon Graphics, Inc.

The contents of this file are subject to the CID Font Code Public License Version 1.0 (the "License"). You may not use this file except in compliance with the License. You may obtain a copy of the License at Silicon Graphics, Inc., attn: Legal Services, 2011 N. Shoreline Blvd., Mountain View, CA 94043 or at <http://www.sgi.com/software/opensource/cid/license.html>

Software distributed under the License is distributed on an "AS IS" basis.

ALL WARRANTIES ARE DISCLAIMED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED

WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE OR OF NON-INFRINGEMENT. See the License for the specific language governing rights and limitations under the License.

The Original Software (as defined in the License) is CID font code that was developed by Silicon Graphics, Inc. Those portions of the Subject Software (as defined in the License) that were created by Silicon Graphics, Inc. are Copyright (c) 1994-1999 Silicon Graphics, Inc. All Rights Reserved.

[NOTE: When using this text in connection with Subject Software delivered solely in object code form, Recipient may replace the words "this file" with "this software" in both the first and second sentences.]

#### 9. Bigelow & Holmes Inc and URW++ GmbH Luxi font license

Luxi fonts copyright (c) 2001 by Bigelow & Holmes Inc. Luxi font instruction code copyright (c) 2001 by URW++ GmbH. All Rights Reserved. Luxi is a registered trademark of Bigelow & Holmes Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of these Fonts and associated documentation files (the "Font Software"), to deal in the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, sublicense, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software.

The Font Software may not be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may not be modified nor may additional glyphs or characters be added to the Fonts. This License becomes null and void when the Fonts or Font Software have been modified.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BIGELOW & HOLMES INC. OR URW++ GMBH. BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Bigelow & Holmes Inc. and URW++ GmbH. shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from Bigelow & Holmes Inc. and URW++ GmbH.

For further information, contact:

info@urwpp.de or design@bigelowandholmes.com

## 10. FreeType License

### 0. Definitions

Throughout this license, the terms 'package', 'FreeType Project', and 'FreeType archive' refer to the set of files originally distributed by the authors (David Turner, Robert Wilhelm, and Werner Lemberg) as the 'FreeType Project', be they named as alpha, beta or final release.

'You' refers to the licensee, or person using the project, where 'using' is a generic term including compiling the project's source code as well as linking it to form a 'program' or 'executable'. This program is referred to as 'a program using the FreeType engine'.

This license applies to all files distributed in the original FreeType Project, including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The FreeType Project is copyright (C) 1996-2000 by David Turner, Robert Wilhelm, and Werner Lemberg. All rights reserved except as specified below.

### 1. No Warranty

THE FREETYPE PROJECT IS PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OR THE INABILITY TO USE, OF THE FREETYPE PROJECT.

### 2. Redistribution

This license grants a worldwide, royalty-free, perpetual and irrevocable right and license to use, execute, perform, compile, display, copy, create derivative works of, distribute and sublicense the FreeType Project (in both source and object code forms) and derivative works thereof for any purpose; and to authorize others to exercise some or all of the rights granted herein, subject to the following conditions:

- o Redistribution of source code must retain the license file ('FTL.TXT') unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright

notices of the unaltered, original files must be preserved in all copies of source files.

- o Redistribution in binary form must provide a disclaimer that states that the software is based in part of the work of the FreeType Team, in the distribution documentation. We also encourage you to put an URL to the FreeType web page in your documentation, though this isn't mandatory.

These conditions apply to any software derived from or based on the FreeType Project, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

### 3. Advertising

Neither the FreeType authors and contributors nor you shall use the name of the other for commercial, advertising, or promotional purposes without specific prior written permission.

We suggest, but do not require, that you use one or more of the following phrases to refer to this software in your documentation or advertising materials: 'FreeType Project', 'FreeType Engine', 'FreeType library', or 'FreeType Distribution'.

As you have not signed this license, you are not required to accept it. However, as the FreeType Project is copyrighted material, only this license, or another one contracted with the authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the FreeType Project, you indicate that you understand and accept all the terms of this license.

### 4. Contacts

There are two mailing lists related to FreeType:

- o [freetype@freetype.org](mailto:freetype@freetype.org)

Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution. If you are looking for support, start in this list if you haven't found anything to help you in the documentation.

- o [devel@freetype.org](mailto:devel@freetype.org)

Discusses bugs, as well as engine internals, design issues, specific licenses, porting, etc.

- o <http://www.freetype.org>

Holds the current FreeType web page, which will allow you to download our latest development version and read online documentation.

You can also contact us individually at:

David Turner <david.turner@freetype.org>

Robert Wilhelm <robert.wilhelm@freetype.org>

Werner Lemberg <werner.lemberg@freetype.org>

## 11. Bitstream Vera Fonts Copyright

Copyright (c) 2003 by Bitstream, Inc. All Rights Reserved. Bitstream

Vera is a trademark of Bitstream, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of the fonts accompanying this license ("Fonts") and associated documentation files (the "Font Software"), to reproduce and distribute the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software typefaces.

The Font Software may be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may be modified and additional glyphs or characters may be added to the Fonts, only if the fonts are renamed to names not containing either the words "Bitstream" or the word "Vera".

This License becomes null and void to the extent applicable to Fonts or Font Software that has been modified and is distributed under the "Bitstream Vera" names.

The Font Software may be sold as part of a larger software package but no copy of one or more of the Font Software typefaces may be sold by itself.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BITSTREAM OR THE GNOME FOUNDATION BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR

## INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Gnome, the Gnome Foundation, and Bitstream Inc., shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from the Gnome Foundation or Bitstream Inc., respectively. For further information, contact: fonts at gnome dot org.

Generated from XFree86: xc/programs/Xserver/hw/xfree86/doc/sgml/LICENSE.sgml,v 1.22 dawes Exp \$

\$XFree86: xc/programs/Xserver/hw/xfree86/doc/LICENSE,v 1.26 2004/01/04 20:57:06 dawes Exp \$  
Licenses

The X.Org Foundation

March 2004

### 1. Introduction

The X.org Foundation X Window System distribution is a compilation of code and documentation from many sources. This document is intended primarily as a guide to the licenses used in the distribution: you must check each file and/or package for precise redistribution terms. None-the-less, this summary may be useful to many users. No software incorporating the XFree86 1.1 license has been incorporated.

This document is based on the compilation from XFree86.

### 2. XFree86 License

XFree86 code without an explicit copyright is covered by the following copyright/license:

Copyright (C) 1994-2003 The XFree86 Project, Inc. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.



Except as contained in this notice, the name of the XFree86 Project shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the XFree86 Project.

### 3. Other Licenses

Portions of code are covered by the following licenses/copyrights. See individual files for the copyright dates.

#### 3.1. X/MIT Copyrights

##### 3.1.1. X Consortium

Copyright (C) <date> X Consortium

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the X Consortium.

X Window System is a trademark of X Consortium, Inc.

##### 3.1.2. The Open Group

Copyright <date> The Open Group

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A

PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

### 3.2. Berkeley-based copyrights:

o

#### 3.2.1. General

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 3.2.2. UCB/LBL

Copyright (c) 1993 The Regents of the University of California. All rights reserved.

This software was developed by the Computer Systems Engineering group at Lawrence Berkeley Laboratory under DARPA contract BG 91-66 and contributed to Berkeley.

All advertising materials mentioning features or use of this software must display the following acknowledgement: This product includes software developed by the University of California, Lawrence Berkeley Laboratory.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following

disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

All advertising materials mentioning features or use of this software must display the following acknowledgement:

This product includes software developed by the University of California, Berkeley and its contributors.

Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 3.2.3. The NetBSD Foundation, Inc.

Copyright (c) 2003 The NetBSD Foundation, Inc. All rights reserved.

This code is derived from software contributed to The NetBSD Foundation by Ben Collver <collver1@attbi.com>

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

All advertising materials mentioning features or use of this software must display the following acknowledgement:

This product includes software developed by the NetBSD Foundation, Inc. and its contributors.

Neither the name of The NetBSD Foundation nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE NETBSD FOUNDATION, INC. AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE FOUNDATION OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 3.2.4. Theodore Ts'o.

Copyright Theodore Ts'o, 1994, 1995, 1996, 1997, 1998, 1999. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, and the entire permission notice in its entirety, including the disclaimer of warranties.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF NOT ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 3.2.5. Theo de Raadt and Damien Miller

Copyright (c) 1995,1999 Theo de Raadt. All rights reserved. Copyright (c) 2001-2002 Damien Miller. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 3.2.6. Todd C. Miller

Copyright (c) 1998 Todd C. Miller <Todd.Miller@courtesan.com>

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS" AND TODD C. MILLER DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL TODD C. MILLER BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

### 3.2.7. Thomas Winischhofer

Copyright (C) 2001-2004 Thomas Winischhofer

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 3.3. NVIDIA Corp

Copyright (c) 1996 NVIDIA, Corp. All rights reserved.

NOTICE TO USER: The source code is copyrighted under U.S. and international laws. NVIDIA, Corp. of Sunnyvale, California owns the copyright and as design patents pending on the design and interface of the NV chips. Users and possessors of this source code are hereby granted a nonexclusive, royalty-free copyright and design patent license to use this code in individual and commercial software.

Any use of this source code must include, in the user documentation and internal comments to the code, notices to the end user as follows:

Copyright (c) 1996 NVIDIA, Corp. NVIDIA design patents pending in the U.S. and foreign countries.

NVIDIA, CORP. MAKES NO REPRESENTATION ABOUT THE SUITABILITY OF THIS SOURCE CODE FOR ANY PURPOSE. IT IS PROVIDED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND. NVIDIA, CORP. DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOURCE CODE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL NVIDIA, CORP. BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOURCE CODE.

#### 3.4. GLX Public License

GLX PUBLIC LICENSE (Version 1.0 (2/11/99)) ("License")

Subject to any third party claims, Silicon Graphics, Inc. ("SGI") hereby grants permission to Recipient (defined below), under Recipient's copyrights in the Original Software (defined below), to use, copy, modify, merge, publish, distribute, sublicense and/or sell copies of Subject Software (defined below), and to permit persons to whom the Subject Software is furnished in accordance with this License to do the same, subject to all of the following terms and conditions, which Recipient accepts by engaging in any such use, copying, modifying, merging, publishing, distributing, sublicensing or selling:

##### 1. Definitions.

- (a) "Original Software" means source code of computer software code which is described in Exhibit A as Original Software.
- (b) "Modifications" means any addition to or deletion from the substance or structure of either the Original Software or any previous Modifications. When Subject Software is released as a series of files, a Modification means (i) any addition to or deletion from the contents of a file containing Original Software or previous Modifications and (ii) any new file that contains any part of the Original Code or previous Modifications.
- (c) "Subject Software" means the Original Software or Modifications or the combination of the Original Software and Modifications, or portions of any of the foregoing.
- (d) "Recipient" means an individual or a legal entity exercising rights under, and complying with all of the terms of, this License. For legal entities, "Recipient" includes any entity which controls, is controlled by, or is under common control with Recipient. For purposes of this definition, "control" of an entity means (a) the power, direct or indirect, to direct or manage such entity, or (b) ownership of fifty percent (50%) or more of the outstanding shares or beneficial ownership of such entity.

2. Redistribution of Source Code Subject to These Terms. Redistributions of Subject Software in source code form must retain the notice set forth in Exhibit A, below, in every file. A copy of this License must be included in any documentation for such Subject Software where the recipients' rights relating to Subject Software are described. Recipient may distribute the source code version of Subject Software under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, and (ii) the license terms include this Section 2 and Sections 3, 4, 7, 8, 10, 12 and 13 of this License, which terms may not be modified or superseded by any other terms of such license. If Recipient distributes the source code version under a different license Recipient must make it absolutely clear that any terms which differ from this License are offered by Recipient alone, not by SGI. Recipient hereby agrees to indemnify SGI for any liability incurred by SGI as a result of any such terms Recipient offers.

3. Redistribution in Executable Form. The notice set forth in Exhibit A must be conspicuously included in any notice in an executable version of Subject Software, related documentation or collateral in which Recipient describes the user's rights relating to the Subject Software. Recipient may distribute the executable version of Subject Software under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, and (ii) the license terms include this Section 3 and Sections 4, 7, 8, 10, 12 and 13 of this License, which terms may not be modified or superseded by any other terms of such license. If Recipient distributes the executable version under a different license Recipient must make it absolutely clear that any terms which differ from this License are offered by Recipient alone, not by SGI. Recipient hereby agrees to indemnify SGI for any liability incurred by SGI as a result of any such terms Recipient offers.

4. Termination. This License and the rights granted hereunder will terminate automatically if Recipient fails to comply with terms herein and fails to cure such breach within 30 days of the breach. Any sublicense to the Subject Software which is properly granted shall survive any termination of this License absent termination by the terms of such sublicense. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

5. No Trademark Rights. This License does not grant any rights to use any trade name, trademark or service mark whatsoever. No trade name, trademark or service mark of SGI may be used to endorse or promote products derived from the Subject Software without prior written permission of SGI.

6. No Other Rights. This License does not grant any rights with respect to the OpenGL API or to any software or hardware implementation thereof or to any other software whatsoever, nor shall any other rights or licenses not expressly granted hereunder arise by implication, estoppel or otherwise with respect to the Subject Software. Title to and ownership of the Original Software at all times remains with SGI. All rights in the Original Software not expressly granted under this License are reserved.

7. Compliance with Laws; Non-Infringement. Recipient shall comply with all applicable laws and regulations in connection with use and distribution of the Subject Software, including but not limited to, all export and import control laws and regulations of the U.S. government and other countries. Recipient may not distribute Subject Software that (i) in any way infringes (directly or contributorily) the rights (including patent, copyright, trade secret, trademark or other intellectual property rights of any kind) of any other person or entity or (ii) breaches any representation or warranty, express, implied or statutory, which under any applicable law it might be deemed to have been distributed.

8. Claims of Infringement. If Recipient at any time has knowledge of any one or more third party claims that reproduction, modification, use, distribution, import or sale of Subject Software (including particular functionality or code incorporated in Subject Software) infringes the third party's intellectual property rights, Recipient must place in a well-identified web page bearing the title "LEGAL" a description of each such claim and a description of the party making each such claim in sufficient detail that a user of the Subject Software will know whom to contact regarding the claim. Also, upon gaining such knowledge of any such claim, Recipient must conspicuously include the URL for such web page in the Exhibit A notice required under Sections 2 and 3, above, and in the text of any related documentation, license agreement or collateral in which Recipient describes end user's rights relating to the Subject Software. If Recipient obtains such knowledge after it makes Subject Software available to any other person or entity, Recipient shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to inform those who received the Subject Software that new knowledge has been obtained.

9. DISCLAIMER OF WARRANTY. SUBJECT SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, WITHOUT

WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE SUBJECT SOFTWARE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON- INFRINGING. SGI ASSUMES NO RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE. SHOULD ANY SOFTWARE PROVE DEFECTIVE IN ANY RESPECT, SGI ASSUMES NO COST OR LIABILITY FOR ANY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY SUBJECT SOFTWARE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

10. LIMITATION OF LIABILITY. UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY), CONTRACT, OR OTHERWISE, SHALL SGI OR ANY SGI LICENSOR BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, WORK STOPPAGE, LOSS OF DATA, COMPUTER FAILURE OR MALFUNCTION, OR ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES, EVEN IF SUCH PARTY SHALL HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM SGI'S NEGLIGENCE TO THE EXTENT APPLICABLE LAW PROHIBITS SUCH LIMITATION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THAT EXCLUSION AND LIMITATION MAY NOT APPLY TO RECIPIENT.

11. Indemnity. Recipient shall be solely responsible for damages arising, directly or indirectly, out of its utilization of rights under this License. Recipient will defend, indemnify and hold harmless Silicon Graphics, Inc. from and against any loss, liability, damages, costs or expenses (including the payment of reasonable attorneys fees) arising out of Recipient's use, modification, reproduction and distribution of the Subject Software or out of any representation or warranty made by Recipient.

12. U.S. Government End Users. The Subject Software is a "commercial item" consisting of "commercial computer software" as such terms are defined in title 48 of the Code of Federal Regulations and all U.S. Government End Users acquire only the rights set forth in this License and are subject to the terms of this License.

13. Miscellaneous. This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed so as to achieve as nearly as possible the same economic effect as the original provision and the remainder of this License will remain in effect. This License shall be governed by and construed in accordance with the laws of the United States and the State of California as applied to agreements entered into and to be performed entirely within California between California residents. Any litigation relating to this License shall be subject to the exclusive jurisdiction of the Federal Courts of the Northern District of California (or, absent subject matter jurisdiction in such courts, the courts of the State of California), with venue lying exclusively in Santa Clara County, California, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not apply to this License.

Exhibit A

The contents of this file are subject to Sections 2, 3, 4, 7, 8, 10, 12 and 13 of the GLX Public License Version 1.0 (the "License"). You may not use this file except in compliance with those sections of the License. You may obtain



a copy of the License at Silicon Graphics, Inc., attn: Legal Services, 2011 N. Shoreline Blvd., Mountain View, CA 94043 or at <http://www.sgi.com/software/opensource/glx/license.html>.

Software distributed under the License is distributed on an "AS IS" basis. ALL WARRANTIES ARE DISCLAIMED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE OR OF NON- INFRINGEMENT. See the License for the specific language governing rights and limitations under the License.

The Original Software is GLX version 1.2 source code, released February, 1999. The developer of the Original Software is Silicon Graphics, Inc. Those portions of the Subject Software created by Silicon Graphics, Inc. are Copyright (c) 1991-9 Silicon Graphics, Inc. All Rights Reserved.

### 3.5. CID Font Code Public License

CID FONT CODE PUBLIC LICENSE (Version 1.0 (3/31/99))("License")

Subject to any applicable third party claims, Silicon Graphics, Inc. ("SGI") hereby grants permission to Recipient (defined below), under SGI's copyrights in the Original Software (defined below), to use, copy, modify, merge, publish, distribute, sublicense and/or sell copies of Subject Software (defined below) in both source code and executable form, and to permit persons to whom the Subject Software is furnished in accordance with this License to do the same, subject to all of the following terms and conditions, which Recipient accepts by engaging in any such use, copying, modifying, merging, publication, distributing, sublicensing or selling:

#### 1. Definitions.

- a. "Original Software" means source code of computer software code that is described in Exhibit A as Original Software.
- b. "Modifications" means any addition to or deletion from the substance or structure of either the Original Software or any previous Modifications. When Subject Software is released as a series of files, a Modification means (i) any addition to or deletion from the contents of a file containing Original Software or previous Modifications and (ii) any new file that contains any part of the Original Code or previous Modifications.
- c. "Subject Software" means the Original Software or Modifications or the combination of the Original Software and Modifications, or portions of any of the foregoing.
- d. "Recipient" means an individual or a legal entity exercising rights under the terms of this License. For legal entities, "Recipient" includes any entity that controls, is controlled by, or is under common control with Recipient. For purposes of this definition, "control" of an entity means (i) the power, direct or indirect, to direct or manage such entity, or (ii) ownership of fifty percent (50%) or more of the outstanding shares or beneficial ownership of such entity.
- e. "Required Notice" means the notice set forth in Exhibit A to this License.
- f. "Accompanying Technology" means any software or other technology that is not a Modification and that is distributed or made publicly available by Recipient with the Subject Software. Separate software files that do not contain any Original Software or any previous Modification shall not be deemed a Modification, even if such software files are aggregated as part of a product, or in any medium of storage, with any file that does contain Original Software or any previous Modification.

2. License Terms. All distribution of the Subject Software must be made subject to the terms of this License. A copy of this License and the Required Notice must be included in any documentation for Subject Software where Recipient's rights relating to Subject Software and/or any Accompanying Technology are described. Distributions of Subject Software in source code form must also include the Required Notice in every file distributed. In addition, a

ReadMe file entitled "Important Legal Notice" must be distributed with each distribution of one or more files that incorporate Subject Software. That file must be included with distributions made in both source code and executable form. A copy of the License and the Required Notice must be included in that file. Recipient may distribute Accompanying Technology under a license of Recipient's choice, which may contain terms different from this License, provided that (i) Recipient is in compliance with the terms of this License, (ii) such other license terms do not modify or supersede the terms of this License as applicable to the Subject Software, (iii) Recipient hereby indemnifies SGI for any liability incurred by SGI as a result of the distribution of Accompanying Technology or the use of other license terms.

3. Termination. This License and the rights granted hereunder will terminate automatically if Recipient fails to comply with terms herein and fails to cure such breach within 30 days of the breach. Any sublicense to the Subject Software that is properly granted shall survive any termination of this License absent termination by the terms of such sublicense. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

4. Trademark Rights. This License does not grant any rights to use any trade name, trademark or service mark whatsoever. No trade name, trademark or service mark of SGI may be used to endorse or promote products derived from or incorporating any Subject Software without prior written permission of SGI.

5. No Other Rights. No rights or licenses not expressly granted hereunder shall arise by implication, estoppel or otherwise. Title to and ownership of the Original Software at all times remains with SGI. All rights in the Original Software not expressly granted under this License are reserved.

6. Compliance with Laws; Non-Infringement. Recipient shall comply with all applicable laws and regulations in connection with use and distribution of the Subject Software, including but not limited to, all export and import control laws and regulations of the U.S. government and other countries. Recipient may not distribute Subject Software that (i) in any way infringes (directly or contributorily) the rights (including patent, copyright, trade secret, trademark or other intellectual property rights of any kind) of any other person or entity, or (ii) breaches any representation or warranty, express, implied or statutory, which under any applicable law it might be deemed to have been distributed.

7. Claims of Infringement. If Recipient at any time has knowledge of any one or more third party claims that reproduction, modification, use, distribution, import or sale of Subject Software (including particular functionality or code incorporated in Subject Software) infringes the third party's intellectual property rights, Recipient must place in a well-identified web page bearing the title "LEGAL" a description of each such claim and a description of the party making each such claim in sufficient detail that a user of the Subject Software will know whom to contact regarding the claim. Also, upon gaining such knowledge of any such claim, Recipient must conspicuously include the URL for such web page in the Required Notice, and in the text of any related documentation, license agreement or collateral in which Recipient describes end user's rights relating to the Subject Software. If Recipient obtains such knowledge after it makes Subject Software available to any other person or entity, Recipient shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to provide such knowledge to those who received the Subject Software.

8. DISCLAIMER OF WARRANTY. SUBJECT SOFTWARE IS PROVIDED ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE SUBJECT SOFTWARE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. SGI ASSUMES NO RISK AS TO THE QUALITY AND PERFORMANCE OF THE SOFTWARE. SHOULD ANY SOFTWARE PROVE DEFECTIVE IN ANY

RESPECT, SGI ASSUMES NO COST OR LIABILITY FOR ANY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY SUBJECT SOFTWARE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

9. LIMITATION OF LIABILITY. UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE OR STRICT LIABILITY), CONTRACT, OR OTHERWISE, SHALL SGI OR ANY SGI LICENSOR BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SUBJECT SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SUBJECT SOFTWARE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF CERTAIN DAMAGES, SO THIS EXCLUSION AND LIMITATION MAY NOT APPLY TO RECIPIENT TO THE EXTENT SO DISALLOWED.

10. Indemnity. Recipient shall be solely responsible for damages arising, directly or indirectly, out of its utilization of rights under this License. Recipient will defend, indemnify and hold SGI and its successors and assigns harmless from and against any loss, liability, damages, costs or expenses (including the payment of reasonable attorneys fees) arising out of (Recipient's use, modification, reproduction and distribution of the Subject Software or out of any representation or warranty made by Recipient.

11. U.S. Government End Users. The Subject Software is a "commercial item" consisting of "commercial computer software" as such terms are defined in title 48 of the Code of Federal Regulations and all U.S. Government End Users acquire only the rights set forth in this License and are subject to the terms of this License.

12. Miscellaneous. This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable by any judicial or administrative authority having proper jurisdiction with respect thereto, such provision shall be reformed so as to achieve as nearly as possible the same economic effect as the original provision and the remainder of this License will remain in effect. This License shall be governed by and construed in accordance with the laws of the United States and the State of California as applied to agreements entered into and to be performed entirely within California between California residents. Any litigation relating to this License shall be subject to the exclusive jurisdiction of the Federal Courts of the Northern District of California (or, absent subject matter jurisdiction in such courts, the courts of the State of California), with venue lying exclusively in Santa Clara County, California, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation that provides that the language of a contract shall be construed against the drafter shall not apply to this License.

Exhibit A

Copyright (c) 1994-1999 Silicon Graphics, Inc.

The contents of this file are subject to the CID Font Code Public License Version 1.0 (the "License"). You may not use this file except in compliance with the License. You may obtain a copy of the License at Silicon Graphics, Inc., attn: Legal Services, 2011 N. Shoreline Blvd., Mountain View, CA 94043 or at <http://www.sgi.com/software/opensource/cid/license.html>

Software distributed under the License is distributed on an "AS IS" basis. ALL WARRANTIES ARE DISCLAIMED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE OR OF NON-INFRINGEMENT. See the

License for the specific language governing rights and limitations under the License.

The Original Software (as defined in the License) is CID font code that was developed by Silicon Graphics, Inc. Those portions of the Subject Software (as defined in the License) that were created by Silicon Graphics, Inc. are Copyright (c) 1994-1999 Silicon Graphics, Inc. All Rights Reserved.

[NOTE: When using this text in connection with Subject Software delivered solely in object code form, Recipient may replace the words "this file" with "this software" in both the first and second sentences.]

### 3.6. Bitstream Vera Fonts Copyright

The fonts have a generous copyright, allowing derivative works (as long as "Bitstream" or "Vera" are not in the names), and full redistribution (so long as they are not \*sold\* by themselves). They can be bundled, redistributed and sold with any software.

The fonts are distributed under the following copyright:

Copyright (c) 2003 by Bitstream, Inc. All Rights Reserved. Bitstream Vera is a trademark of Bitstream, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of the fonts accompanying this license ("Fonts") and associated documentation files (the "Font Software"), to reproduce and distribute the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software typefaces.

The Font Software may be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may be modified and additional glyphs or characters may be added to the Fonts, only if the fonts are renamed to names not containing either the words "Bitstream" or the word "Vera".

This License becomes null and void to the extent applicable to Fonts or Font Software that has been modified and is distributed under the "Bitstream Vera" names.

The Font Software may be sold as part of a larger software package but no copy of one or more of the Font Software typefaces may be sold by itself.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BITSTREAM OR THE GNOME FOUNDATION BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Gnome, the Gnome Foundation, and Bitstream Inc., shall not be

used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from the Gnome Foundation or Bitstream Inc., respectively. For further information, contact: fonts at gnome dot org.

### 3.7. Bigelow & Holmes Inc and URW++ GmbH Luxi font license

Luxi fonts copyright (c) 2001 by Bigelow & Holmes Inc. Luxi font instruction code copyright (c) 2001 by URW++ GmbH. All Rights Reserved. Luxi is a registered trademark of Bigelow & Holmes Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of these Fonts and associated documentation files (the "Font Software"), to deal in the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, sublicense, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software.

The Font Software may not be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may not be modified nor may additional glyphs or characters be added to the Fonts. This License becomes null and void when the Fonts or Font Software have been modified.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BIGELOW & HOLMES INC. OR URW++ GMBH. BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Bigelow & Holmes Inc. and URW++ GmbH. shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from Bigelow & Holmes Inc. and URW++ GmbH.

For further information, contact:

info@urwpp.de or design@bigelowandholmes.com

/\*

Copyright (c) 1990, 1991, 1992 X Consortium

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the X Consortium.

\*

\* Copyright 1990, 1991, 1992 by UniSoft Group Limited.

\*

\* Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of UniSoft not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. UniSoft makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

\*

\* \$XConsortium: Copyright, v 1.3 94/04/17 21:00:08 rws Exp \$

\*/

Copyright (c) 1998, 1999, 2000 Thai Open Source Software Center Ltd  
and Clark Cooper

Copyright (c) 2001, 2002 Expat maintainers.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY

CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

\$XFree86: xc/extras/fontconfig/COPYING,v 1.1.1.1 2003/06/04 02:56:24 dawes Exp \$

Copyright " 2001 Keith Packard, member of The XFree86 Project, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Keith Packard not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Keith Packard makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

KEITH PACKARD DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL KEITH PACKARD BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Luxi fonts copyright (c) 2001 by Bigelow & Holmes Inc. Luxi font instruction code copyright (c) 2001 by URW++ GmbH. All Rights Reserved. Luxi is a registered trademark of Bigelow & Holmes Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of these Fonts and associated documentation files (the "Font Software"), to deal in the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, sublicense, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software.

The Font Software may not be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may not be modified nor may additional glyphs or characters be added to the Fonts. This License becomes null and void when the Fonts or Font Software have been modified.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT

OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BIGELOW & HOLMES INC. OR URW++ GMBH. BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Bigelow & Holmes Inc. and URW++ GmbH. shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from Bigelow & Holmes Inc. and URW++ GmbH.

For further information, contact:

info@urwpp.de

or

design@bigelowandholmes.com

Copyright 1989-1991, Bitstream Inc., Cambridge, MA.

You are hereby granted permission under all Bitstream propriety rights to use, copy, modify, sublicense, sell, and redistribute the Bitstream Speedo software and the Bitstream Charter and Courier outline fonts for any purpose and without restrictions; provided, that this notice is left intact on all copies of such software or font and that Bitstream's trademark is acknowledged as shown below on all unmodified copies of such font.

BITSTREAM CHARTER is a registered trademark of Bitstream Inc.

BITSTREAM INC. DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. BITSTREAM SHALL NOT BE LIABLE FOR ANY DIRECT OR INDIRECT DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, LOST DATA, OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE SPEEDO SOFTWARE OR THE BITSTREAM CHARTER OUTLINE FONT.

Bitstream Vera Fonts Copyright

The fonts have a generous copyright, allowing derivative works (as long as "Bitstream" or "Vera" are not in the names), and full redistribution (so long as they are not \*sold\* by themselves). They can be bundled, redistributed and sold with any software.

The fonts are distributed under the following copyright:

Copyright

=====

Copyright (c) 2003 by Bitstream, Inc. All Rights Reserved. Bitstream



Vera is a trademark of Bitstream, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of the fonts accompanying this license ("Fonts") and associated documentation files (the "Font Software"), to reproduce and distribute the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software typefaces.

The Font Software may be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may be modified and additional glyphs or characters may be added to the Fonts, only if the fonts are renamed to names not containing either the words "Bitstream" or the word "Vera".

This License becomes null and void to the extent applicable to Fonts or Font Software that has been modified and is distributed under the "Bitstream Vera" names.

The Font Software may be sold as part of a larger software package but no copy of one or more of the Font Software typefaces may be sold by itself.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BITSTREAM OR THE GNOME FOUNDATION BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Gnome, the Gnome Foundation, and Bitstream Inc., shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from the Gnome Foundation or Bitstream Inc., respectively. For further information, contact: fonts at gnome dot org.

Copyright FAQ  
=====

1. I don't understand the resale restriction... What gives?

Bitstream is giving away these fonts, but wishes to ensure its competitors can't just drop the fonts as is into a font sale system and sell them as is. It seems fair that if Bitstream can't make money from the Bitstream Vera fonts, their competitors should not be able to do so either. You can sell the fonts as part of any software package, however.

2. I want to package these fonts separately for distribution and sale as part of a larger software package or system. Can I do so?

Yes. A RPM or Debian package is a "larger software package" to begin with, and you aren't selling them independently by themselves.

See 1. above.

3. Are derivative works allowed?

Yes!

4. Can I change or add to the font(s)?

Yes, but you must change the name(s) of the font(s).

5. Under what terms are derivative works allowed?

You must change the name(s) of the fonts. This is to ensure the quality of the fonts, both to protect Bitstream and Gnome. We want to ensure that if an application has opened a font specifically of these names, it gets what it expects (though of course, using fontconfig, substitutions could still could have occurred during font opening). You must include the Bitstream copyright. Additional copyrights can be added, as per copyright law. Happy Font Hacking!

6. If I have improvements for Bitstream Vera, is it possible they might get adopted in future versions?

Yes. The contract between the Gnome Foundation and Bitstream has provisions for working with Bitstream to ensure quality additions to the Bitstream Vera font family. Please contact us if you have such additions. Note, that in general, we will want such additions for the entire family, not just a single font, and that you'll have to keep both Gnome and Jim Lyles, Vera's designer, happy! To make sense to add glyphs to the font, they must be stylistically in keeping with Vera's design. Vera cannot become a "ransom note" font. Jim Lyles will be providing a document describing the design elements used in Vera, as a guide and aid for people interested in contributing to Vera.

7. I want to sell a software package that uses these fonts: Can I do so?

Sure. Bundle the fonts with your software and sell your software with the fonts. That is the intent of the copyright.

8. If applications have built the names "Bitstream Vera" into them, can I override this somehow to use fonts of my choosing?

This depends on exact details of the software. Most open source systems and software (e.g., Gnome, KDE, etc.) are now converting to use fontconfig (see [www.fontconfig.org](http://www.fontconfig.org)) to handle font configuration, selection and substitution; it has provisions for overriding font names and substituting alternatives. An example is provided by the supplied local.conf file, which chooses the family Bitstream Vera for "sans", "serif" and "monospace". Other software (e.g., the XFree86 core server) has other mechanisms for font substitution.

This package contains the set of russian fonts for X11 Release 6.

Copyright (C) 1994-1995 Cronyx Ltd.

Changes Copyright (C) 1996 by Andrey A. Chernov, Moscow, Russia.

Version: 1.0

This software may be used, modified, copied, distributed, and sold, in both source and binary form provided that the above copyright and these terms are retained. Under no circumstances is the author responsible for the proper functioning of this software, nor does the author assume any responsibility for damages incurred with its use.

/\*

\* Copyright (C) 1989-95 GROUPE BULL

\*

\* Permission is hereby granted, free of charge, to any person obtaining a copy  
\* of this software and associated documentation files (the "Software"), to  
\* deal in the Software without restriction, including without limitation the  
\* rights to use, copy, modify, merge, publish, distribute, sublicense, and/or  
\* sell copies of the Software, and to permit persons to whom the Software is  
\* furnished to do so, subject to the following conditions:

\*

\* The above copyright notice and this permission notice shall be included in  
\* all copies or substantial portions of the Software.

\*

\* THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR  
\* IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,  
\* FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL  
\* GROUPE BULL BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN  
\* AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN  
\* CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

\*

\* Except as contained in this notice, the name of GROUPE BULL shall not be  
\* used in advertising or otherwise to promote the sale, use or other dealings  
\* in this Software without prior written authorization from GROUPE BULL.

\*/

Arnaud LE HORS BULL Research FRANCE -- Koala Project  
(XPM - X PixMap format version 2 & 3)

Internet: lehors@sophia.inria.fr

Surface Mail: Arnaud LE HORS, INRIA - Sophia Antipolis,  
2004, route des Lucioles, 06565 Valbonne Cedex -- FRANCE

Voice phone: (33) 93.65.77.71, Fax: (33) 93 65 77 66, Telex: 97 00 50 F

Copyright 1992, 1993, 1994, 1997 Henry Spencer. All rights reserved.

This software is not subject to any license of the American Telephone  
and Telegraph Company or of the Regents of the University of California.

Permission is granted to anyone to use this software for any purpose on  
any computer system, and to alter it and redistribute it, subject  
to the following restrictions:

1. The author is not responsible for the consequences of use of this  
software, no matter how awful, even if they arise from flaws in it.
2. The origin of this software must not be misrepresented, either by  
explicit claim or by omission. Since few users ever read sources,  
credits must appear in the documentation.
3. Altered versions must be plainly marked as such, and must not be  
misrepresented as being the original software. Since few users  
ever read sources, credits must appear in the documentation.
4. This notice may not be removed or altered.

Luxi fonts copyright (c) 2001 by Bigelow & Holmes Inc. Luxi font  
instruction code copyright (c) 2001 by URW++ GmbH. All Rights  
Reserved. Luxi is a registered trademark of Bigelow & Holmes Inc.

Permission is hereby granted, free of charge, to any person obtaining  
a copy of these Fonts and associated documentation files (the "Font  
Software"), to deal in the Font Software, including without  
limitation the rights to use, copy, merge, publish, distribute,  
sublicense, and/or sell copies of the Font Software, and to permit  
persons to whom the Font Software is furnished to do so, subject to  
the following conditions:

The above copyright and trademark notices and this permission notice  
shall be included in all copies of one or more of the Font Software.

The Font Software may not be modified, altered, or added to, and in  
particular the designs of glyphs or characters in the Fonts may not  
be modified nor may additional glyphs or characters be added to the  
Fonts. This License becomes null and void when the Fonts or Font  
Software have been modified.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BIGELOW & HOLMES INC. OR URW++ GMBH. BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the names of Bigelow & Holmes Inc. and URW++ GmbH. shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from Bigelow & Holmes Inc. and URW++ GmbH.

For further information, contact:

info@urwpp.de

or

design@bigelowandholmes.com

The Catharon Open Source LICENSE

-----

2000-Jul-04

Copyright (C) 2000 by Catharon Productions, Inc.

## Introduction

=====

This license applies to source files distributed by Catharon Productions, Inc. in several archive packages. This license applies to all files found in such packages which do not fall under their own explicit license.

This license was inspired by the BSD, Artistic, and IJG (Independent JPEG Group) licenses, which all encourage inclusion and use of free software in commercial and freeware products alike. As a consequence, its main points are that:

- o We don't promise that this software works. However, we are interested in any kind of bug reports. (^ as is' distribution)
  
- o You can use this software for whatever you want, in parts or

full form, without having to pay us. ('royalty-free' usage)

o You may not pretend that you wrote this software. If you use it, or only parts of it, in a program, you must acknowledge somewhere in your documentation that you have used the Catharon Code. ('credits')

We specifically permit and encourage the inclusion of this software, with or without modifications, in commercial products. We disclaim all warranties covering the packages distributed by Catharon Productions, Inc. and assume no liability related to their use.

### Legal Terms

=====

#### 0. Definitions

-----

Throughout this license, the terms 'Catharon Package', 'package', and 'Catharon Code' refer to the set of files originally distributed by Catharon Productions, Inc.

'You' refers to the licensee, or person using the project, where 'using' is a generic term including compiling the project's source code as well as linking it to form a 'program' or 'executable'. This program is referred to as 'a program using one of the Catharon Packages'.

This license applies to all files distributed in the original Catharon Package(s), including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The Catharon Packages are copyright (C) 2000 by Catharon Productions, Inc. All rights reserved except as specified below.

#### 1. No Warranty

-----

THE CATHARON PACKAGES ARE PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OF OR THE INABILITY TO

## USE THE CATHARON PACKAGE.

### 2. Redistribution

-----

This license grants a worldwide, royalty-free, perpetual and irrevocable right and license to use, execute, perform, compile, display, copy, create derivative works of, distribute and sublicense the Catharon Packages (in both source and object code forms) and derivative works thereof for any purpose; and to authorize others to exercise some or all of the rights granted herein, subject to the following conditions:

- o Redistribution of source code must retain this license file ('license.txt') unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright notices of the unaltered, original files must be preserved in all copies of source files.
  
- o Redistribution in binary form must provide a disclaimer that states that the software is based in part on the work of Catharon Productions, Inc. in the distribution documentation.

These conditions apply to any software derived from or based on the Catharon Packages, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

### 3. Advertising

-----

Neither Catharon Productions, Inc. and contributors nor you shall use the name of the other for commercial, advertising, or promotional purposes without specific prior written permission.

We suggest, but do not require, that you use the following phrase to refer to this software in your documentation: 'this software is based in part on the Catharon Typography Project'.

As you have not signed this license, you are not required to accept it. However, as the Catharon Packages are copyrighted material, only this license, or another one contracted with the authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the Catharon Packages, you indicate that you understand and accept all the terms of this license.

--- end of license.txt ---

(c) Copyright 1989-1992, Bitstream Inc., Cambridge, MA.

You are hereby granted permission under all Bitstream propriety rights to use, copy, modify, sublicense, sell, and redistribute the 4 Bitstream Charter (r) Type 1 outline fonts and the 4 Courier Type 1 outline fonts for any purpose and without restriction; provided, that this notice is left intact on all copies of such fonts and that Bitstream's trademark is acknowledged as shown below on all unmodified copies of the 4 Charter Type 1 fonts.

BITSTREAM CHARTER is a registered trademark of Bitstream Inc. This notice applies to the files in this directory. They are taken from the libiconv-1.1 package, which is covered by the LGPL license. The files in this directory have been placed under the following copyright, with permission from the Free Software Foundation.

Copyright (c) 1999-2000 Free Software Foundation, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE FREE SOFTWARE FOUNDATION BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the Free Software Foundation shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the Free Software Foundation.

Notes:

1. This copyright applies only to the files in this directory, and not to the remaining files in libiconv.



2. The Free Software Foundation does not encourage the use of the above license for newly written software.

IBM Courier - Copyright (c) IBM Corporation 1990, 1991

You are hereby granted permission under the terms of the IBM/MIT X Consortium Courier Typefont agreement to execute, reproduce, distribute, display, market, sell and otherwise transfer copies of the IBM Courier font to third parties.

The font is provided "AS IS" without charge. NO WARRANTIES OR INDEMNIFICATION ARE GIVEN, WHETHER EXPRESS OR IMPLIED INCLUDING, BUT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

License information

-----

The x86emu library is under a BSD style license, compatible with the XFree86 and X licenses used by XFree86. The original x86emu libraries were under the GNU General Public License. Due to license incompatibilities between the GPL and the XFree86 license, the original authors of the code decided to allow a license change. If you have submitted code to the original x86emu project, and you don't agree with the license change, please contact us and let us know. Your code will be removed to comply with your wishes.

If you have any questions about this, please send email to [x86emu@linuxlabs.com](mailto:x86emu@linuxlabs.com) or [KendallB@scitechsoft.com](mailto:KendallB@scitechsoft.com) for clarification.

These fonts are redistributable under the standard X11/XFree86 license.

This is the LEGAL NOTICE pertaining to the Lucida fonts from Bigelow & Holmes:

NOTICE TO USER: The source code, including the glyphs or icons forming a part of the OPEN LOOK™ Graphic User Interface, on this tape and in these files is copyrighted under U.S. and international laws. Sun Microsystems, Inc. of Mountain View, California owns the copyright and has design patents pending on many of the icons. AT&T is the owner of the OPEN LOOK trademark associated with the materials on this tape. Users and possessors of this source code are hereby granted a nonexclusive, royalty-free copyright and design patent license to use this code in individual and commercial software. A royalty-free, nonexclusive trademark license to refer to the code and output as "OPEN LOOK" compatible is available from AT&T if, and only if, the appearance of the icons or glyphs is not changed in any manner except as absolutely necessary to accommodate the standard resolution of the screen or other output device, the code and output is not changed except as authorized herein, and the code and output is validated by AT&T. Bigelow & Holmes is the owner of the Lucida (R) trademark for the fonts and bit-mapped images associated with the materials on this

tape. Users are granted a royalty-free, nonexclusive license to use the trademark only to identify the fonts and bit-mapped images if, and only if, the fonts and bit-mapped images are not modified in any way by the user.

Any use of this source code must include, in the user documentation and internal comments to the code, notices to the end user as follows:

(c) Copyright 1989 Sun Microsystems, Inc. Sun design patents pending in the U.S. and foreign countries. OPEN LOOK is a trademark of AT&T. Used by written permission of the owners.

(c) Copyright Bigelow & Holmes 1986, 1985. Lucida is a registered trademark of Bigelow & Holmes. Permission to use the Lucida trademark is hereby granted only in association with the images and fonts described in this file.

SUN MICROSYSTEMS, INC., AT&T, AND BIGELOW & HOLMES MAKE NO REPRESENTATIONS ABOUT THE SUITABILITY OF THIS SOURCE CODE FOR ANY PURPOSE. IT IS PROVIDED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND. SUN MICROSYSTEMS, INC., AT&T AND BIGELOW & HOLMES, SEVERALLY AND INDIVIDUALLY, DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOURCE CODE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SUN MICROSYSTEMS, INC., AT&T OR BIGELOW & HOLMES BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOURCE CODE.

This license is derived from the Bigelow & Holmes Font License found at <http://www.xfree86.org/current/LICENSE2.html>

The following reasonable modifications have been made to the Bigelow & Holmes Font License:

\* All references to Luxi have been replaced with Meltho

\* All references to Bigelow & Holmes Inc. and URW++ GmbH have been replaced with Beth Mardutho: The Syriac Institute

\* The registered trademark notice belonging to Bigelow & Holmes Inc. has been removed

\* Contact information has been modified to show that the contact person for these fonts is the Director of the Institute, George Kiraz.

-----  
Meltho fonts and font code copyright " 2002 by Beth Mardutho:  
The Syriac Institute. All Right Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of these Fonts and associated documentation files (the "Font Software"), to deal in the Font Software, including without limitation the rights to use, copy, merge, publish, distribute, sublicense, and/or sell copies of the Font Software, and to permit persons to whom the Font Software is furnished to do so, subject to the following conditions:

The above copyright and trademark notices and this permission notice shall be included in all copies of one or more of the Font Software.

The Font Software may not be modified, altered, or added to, and in particular the designs of glyphs or characters in the Fonts may not be modified nor may additional glyphs or characters be added to the Fonts. This License becomes null and void when the Fonts or Font Software have been modified.

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL BETH MARDUTHO: THE SYRIAC INSTITUTE BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

Except as contained in this notice, the name of Beth Mardutho: The Syriac Institute shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Font Software without prior written authorization from Beth Mardutho: The Syriac Institute.

For further information, contact:

George Kiraz, Director of Beth Mardutho

gkiraz@bethmardutho.org

This is the LEGAL NOTICE pertaining to the Lucida fonts from Bigelow & Holmes:

NOTICE TO USER: The source code, including the glyphs or icons forming a part of the OPEN LOOK™ Graphic User Interface, on this tape and in these files is copyrighted under U.S. and international laws. Sun Microsystems, Inc. of Mountain View, California owns the copyright and has design patents pending on many of the icons. AT&T is the owner of the OPEN LOOK trademark associated with the materials on this tape. Users and possessors of this source code are hereby granted a nonexclusive, royalty-free copyright and design patent license to use this code in individual and commercial software. A royalty-free, nonexclusive trademark license to refer to the code and output as "OPEN LOOK" compatible is available from AT&T if, and only if, the appearance of the icons or glyphs is not changed in any manner except as absolutely necessary to accommodate the standard resolution of the screen or other output device, the code and output is not changed except as authorized herein, and the code and output is validated by AT&T. Bigelow & Holmes is the owner of the Lucida (R) trademark for the fonts and bit-mapped images associated with the materials on this tape. Users are granted a royalty-free, nonexclusive license to use the trademark only to identify the fonts and bit-mapped images if, and only if, the fonts and bit-mapped images are not modified in any way by the user.

Any use of this source code must include, in the user documentation and internal comments to the code, notices to the end user as follows:

(c) Copyright 1989 Sun Microsystems, Inc. Sun design patents pending in the U.S. and foreign countries. OPEN LOOK is a trademark of AT&T. Used by written permission of the owners.

(c) Copyright Bigelow & Holmes 1986, 1985. Lucida is a registered trademark of Bigelow & Holmes. Permission to use the Lucida trademark is hereby granted only in association with the images and fonts described in this file.

SUN MICROSYSTEMS, INC., AT&T, AND BIGELOW & HOLMES  
MAKE NO REPRESENTATIONS ABOUT THE SUITABILITY OF

THIS SOURCE CODE FOR ANY PURPOSE. IT IS PROVIDED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND. SUN MICROSYSTEMS, INC., AT&T AND BIGELOW & HOLMES, SEVERALLY AND INDIVIDUALLY, DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOURCE CODE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SUN MICROSYSTEMS, INC., AT&T OR BIGELOW & HOLMES BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOURCE CODE.

The FreeType 2 font engine is copyrighted work, and cannot be used legally without a software license. In order to make this project usable to a vast majority of developers, we distribute it under two dual licenses.

What this means is that \*you\* must choose \*one\* license among those described below, then obey all its terms and conditions when using FreeType 2 in any of your projects or products:

- The FreeType License, found in the file "FTL.TXT", which is an BSD-style open-source license \*with\* an advertising clause that forces you to explicitly cite the FreeType project in your product's documentation. All details are in the license file

- The GNU General Public License, found in "GPL.TXT", which is the traditional and "viral" GPL license, that forces you to redistribute the `_complete_` sources of all your products that simply use FreeType 2.

Note that the contributed PCF driver comes with a license similar to that of X Window System which is compatible to the above two licenses (see file `src/pcf/readme`).

The FreeType Project LICENSE

-----

Copyright 1996-1999 by  
David Turner, Robert Wilhelm, and Werner Lemberg

## Introduction

=====

The FreeType Project is distributed in several archive packages; some of them may contain, in addition to the FreeType font engine, various tools and contributions which rely on, or relate to, the FreeType Project.

This license applies to all files found in such packages, and which do not fall under their own explicit license. The license affects thus the FreeType font engine, the test programs, documentation and makefiles, at the very least.

This license was inspired by the BSD, Artistic, and IJG (Independent JPEG Group) licenses, which all encourage inclusion and use of free software in commercial and freeware products alike. As a consequence, its main points are that:

- o We don't promise that this software works. However, we are be interested in any kind of bug reports. (^ as is' distribution)
- o You can use this software for whatever you want, in parts or full form, without having to pay us. (^ royalty-free' usage)
- o You may not pretend that you wrote this software. If you use it, or only parts of it, in a program, you must acknowledge somewhere in your documentation that you've used the FreeType code. (^ credits')

We specifically permit and encourage the inclusion of this software, with or without modifications, in commercial products, provided that all warranty or liability claims are assumed by the product vendor.

## Legal Terms

=====

### 0. Definitions

-----

Throughout this license, the terms `package', `FreeType Project', and `FreeType archive' refer to the set of files originally distributed by the authors (David Turner, Robert Wilhelm, and Werner Lemberg) as the `FreeType project', be they named as alpha, beta or final release.

`You' refers to the licensee, or person using the project, where

`using' is a generic term including compiling the project's source code as well as linking it to form a `program' or `executable'. This program is referred to as `a program using the FreeType engine'.

This license applies to all files distributed in the original FreeType archive, including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The FreeType project is copyright (C) 1996-1999 by David Turner, Robert Wilhelm, and Werner Lemberg. All rights reserved except as specified below.

#### 1. No Warranty

-----

THE FREETYPE ARCHIVE IS PROVIDED `AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OR THE INABILITY TO USE, OF THE FREETYPE PROJECT.

As you have not signed this license, you are not required to accept it. However, as the FreeType project is copyrighted material, only this license, or another one contracted with the authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the FreeType project, you indicate that you understand and accept all the terms of this license.

#### 2. Redistribution

-----

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistribution of source code must retain this license file (licence.txt) unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright notices of the unaltered, original files must be preserved in all copies of source files.

o Redistribution in binary form must provide a disclaimer that states that the software is based in part of the work of the FreeType Team, in the distribution documentation. We also encourage you to put an URL to the FreeType web page in your documentation, though this isn't mandatory.

These conditions apply to any software derived from or based on the FreeType code, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

### 3. Advertising

-----

The names of FreeType's authors and contributors may not be used to endorse or promote products derived from this software without specific prior written permission.

We suggest, but do not require, that you use one or more of the following phrases to refer to this software in your documentation or advertising materials: `FreeType Project', `FreeType Engine', `FreeType library', or `FreeType Distribution'.

### 4. Contacts

-----

There are two mailing lists related to FreeType:

o [freetype@freetype.org](mailto:freetype@freetype.org)

Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution.

If you are looking for support, start in this list if you haven't found anything to help you in the documentation.

o [devel@freetype.org](mailto:devel@freetype.org)

Discusses bugs, as well as engine internals, design issues, specific licenses, porting, etc.

o <http://www.freetype.org>

Holds the current FreeType web page, which will allow you to download our latest development version and read online documentation.

You can also contact us individually at:



David Turner <david.turner@freetype.org>  
Robert Wilhelm <robert.wilhelm@freetype.org>  
Werner Lemberg <werner.lemberg@freetype.org>

--- end of license.txt ---

The FreeType Project LICENSE

-----

2002-Apr-11

Copyright 1996-2002 by  
David Turner, Robert Wilhelm, and Werner Lemberg

Introduction

=====

The FreeType Project is distributed in several archive packages; some of them may contain, in addition to the FreeType font engine, various tools and contributions which rely on, or relate to, the FreeType Project.

This license applies to all files found in such packages, and which do not fall under their own explicit license. The license affects thus the FreeType font engine, the test programs, documentation and makefiles, at the very least.

This license was inspired by the BSD, Artistic, and IJG (Independent JPEG Group) licenses, which all encourage inclusion and use of free software in commercial and freeware products alike. As a consequence, its main points are that:

- o We don't promise that this software works. However, we will be interested in any kind of bug reports. (^ as is' distribution)
- o You can use this software for whatever you want, in parts or full form, without having to pay us. (^ royalty-free' usage)
- o You may not pretend that you wrote this software. If you use it, or only parts of it, in a program, you must acknowledge somewhere in your documentation that you have used the FreeType code. (^ credits')

We specifically permit and encourage the inclusion of this software, with or without modifications, in commercial products. We disclaim all warranties covering The FreeType Project and

assume no liability related to The FreeType Project.

Finally, many people asked us for a preferred form for a credit/disclaimer to use in compliance with this license. We thus encourage you to use the following text:

""

Portions of this software are copyright " 1996-2002 The FreeType Project (www.freetype.org). All rights reserved.

""

## Legal Terms

=====

### 0. Definitions

-----

Throughout this license, the terms `package`, `FreeType Project`, and `FreeType archive` refer to the set of files originally distributed by the authors (David Turner, Robert Wilhelm, and Werner Lemberg) as the `FreeType Project`, be they named as alpha, beta or final release.

`You' refers to the licensee, or person using the project, where `using' is a generic term including compiling the project's source code as well as linking it to form a `program' or `executable'. This program is referred to as `a program using the FreeType engine'.

This license applies to all files distributed in the original FreeType Project, including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The FreeType Project is copyright (C) 1996-2000 by David Turner, Robert Wilhelm, and Werner Lemberg. All rights reserved except as specified below.

### 1. No Warranty

-----

THE FREETYPE PROJECT IS PROVIDED `AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR

PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OR THE INABILITY TO USE, OF THE FREETYPE PROJECT.

## 2. Redistribution

-----

This license grants a worldwide, royalty-free, perpetual and irrevocable right and license to use, execute, perform, compile, display, copy, create derivative works of, distribute and sublicense the FreeType Project (in both source and object code forms) and derivative works thereof for any purpose; and to authorize others to exercise some or all of the rights granted herein, subject to the following conditions:

- o Redistribution of source code must retain this license file ('FTL.TXT') unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright notices of the unaltered, original files must be preserved in all copies of source files.
  
- o Redistribution in binary form must provide a disclaimer that states that the software is based in part of the work of the FreeType Team, in the distribution documentation. We also encourage you to put an URL to the FreeType web page in your documentation, though this isn't mandatory.

These conditions apply to any software derived from or based on the FreeType Project, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

## 3. Advertising

-----

Neither the FreeType authors and contributors nor you shall use the name of the other for commercial, advertising, or promotional purposes without specific prior written permission.

We suggest, but do not require, that you use one or more of the following phrases to refer to this software in your documentation or advertising materials: 'FreeType Project', 'FreeType Engine', 'FreeType library', or 'FreeType Distribution'.

As you have not signed this license, you are not required to accept it. However, as the FreeType Project is copyrighted material, only this license, or another one contracted with the

authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the FreeType Project, you indicate that you understand and accept all the terms of this license.

#### 4. Contacts

-----

There are two mailing lists related to FreeType:

o [freetype@freetype.org](mailto:freetype@freetype.org)

Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution. If you are looking for support, start in this list if you haven't found anything to help you in the documentation.

o [devel@freetype.org](mailto:devel@freetype.org)

Discusses bugs, as well as engine internals, design issues, specific licenses, porting, etc.

o <http://www.freetype.org>

Holds the current FreeType web page, which will allow you to download our latest development version and read online documentation.

You can also contact us individually at:

David Turner <[david.turner@freetype.org](mailto:david.turner@freetype.org)>

Robert Wilhelm <[robert.wilhelm@freetype.org](mailto:robert.wilhelm@freetype.org)>

Werner Lemberg <[werner.lemberg@freetype.org](mailto:werner.lemberg@freetype.org)>

--- end of LICENSE.TXT ---

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1990, 1991, 1992 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.

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.

GNU GENERAL PUBLIC LICENSE  
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. 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.

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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

11. 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.

12. 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

##### Appendix: How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) 19yy <name of author>
```

This program 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.

This program 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.

You should have received a copy of the GNU General Public License  
along with this program; if not, write to the Free Software  
Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA.

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this  
when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) 19yy name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate  
parts of the General Public License. Of course, the commands you use may  
be called something other than `show w' and `show c'; they could even be  
mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your  
school, if any, to sign a "copyright disclaimer" for the program, if  
necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.
```

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into  
proprietary programs. If your program is a subroutine library, you may  
consider it more useful to permit linking proprietary applications with the  
library. If this is what you want to do, use the GNU Library General  
Public License instead of this License.

## 1.33 xorg-x11-server 1.1.1

### 1.33.1 Available under license :

```
/*
 * Copyright (C) 1994-1998 The XFree86 Project, Inc. All Rights Reserved.
 *
 * Permission is hereby granted, free of charge, to any person obtaining a copy
```

\* of this software and associated documentation files (the "Software"), to  
\* deal in the Software without restriction, including without limitation the  
\* rights to use, copy, modify, merge, publish, distribute, sublicense, and/or  
\* sell copies of the Software, and to permit persons to whom the Software is  
\* furnished to do so, subject to the following conditions:

\*

\* The above copyright notice and this permission notice shall be included in  
\* all copies or substantial portions of the Software.

\*

\* THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR  
\* IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,  
\* FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE  
\* XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER  
\* IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN  
\* CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

\*

\* Except as contained in this notice, the name of the XFree86 Project shall  
\* not be used in advertising or otherwise to promote the sale, use or other  
\* dealings in this Software without prior written authorization from the  
\* XFree86 Project.

\*/

/\*\*\*\*\*

Copyright (c) 1987 X Consortium

Permission is hereby granted, free of charge, to any person obtaining a copy  
of this software and associated documentation files (the "Software"), to deal  
in the Software without restriction, including without limitation the rights  
to use, copy, modify, merge, publish, distribute, sublicense, and/or sell  
copies of the Software, and to permit persons to whom the Software is  
furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in  
all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR  
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,  
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE  
X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN  
AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN  
CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be  
used in advertising or otherwise to promote the sale, use or other dealings  
in this Software without prior written authorization from the X Consortium.

Copyright 1987 by Digital Equipment Corporation, Maynard, Massachusetts.

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Digital not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

DIGITAL DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL DIGITAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

```
*****/
// $XFree86: dumpkeymap.c,v 1.3 2000/12/05 21:18:34 dawes Exp $
//=====
//
// Copyright (C) 1999,2000 by Eric Sunshine <sunshine@sunshineco.com>
// All rights reserved.
//
// Redistribution and use in source and binary forms, with or without
// modification, are permitted provided that the following conditions are met:
//
// 1. Redistributions of source code must retain the above copyright
// notice, this list of conditions and the following disclaimer.
// 2. Redistributions in binary form must reproduce the above copyright
// notice, this list of conditions and the following disclaimer in the
// documentation and/or other materials provided with the distribution.
// 3. The name of the author may not be used to endorse or promote products
// derived from this software without specific prior written permission.
//
// THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS" AND ANY EXPRESS OR
// IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
// OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN
// NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
// SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED
// TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR
// PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF
// LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING
// NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
// SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
//
```

## 1.34 Zlib 1.2.5.3

### 1.34.1 Available under license :

/\* zlib.h -- interface of the 'zlib' general purpose compression library  
version 1.2.5.3, January 15th, 2012

Copyright (C) 1995-2012 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Jean-loup Gailly      Mark Adler  
jloup@gzip.org      madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), [rfc1951](http://tools.ietf.org/html/rfc1951) (deflate format) and [rfc1952](http://tools.ietf.org/html/rfc1952) (gzip format).

\*/

Boost Software License - Version 1.0 - August 17th, 2003

Permission is hereby granted, free of charge, to any person or organization obtaining a copy of the software and accompanying documentation covered by this license (the "Software") to use, reproduce, display, distribute, execute, and transmit the Software, and to prepare derivative works of the Software, and to permit third-parties to whom the Software is furnished to do so, all subject to the following:

The copyright notices in the Software and this entire statement, including the above license grant, this restriction and the following disclaimer, must be included in all copies of the Software, in whole or in part, and all derivative works of the Software, unless such copies or derivative

works are solely in the form of machine-executable object code generated by a source language processor.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDERS OR ANYONE DISTRIBUTING THE SOFTWARE BE LIABLE FOR ANY DAMAGES OR OTHER LIABILITY, WHETHER IN CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

©2016 Cisco Systems, Inc. All rights reserved.