



The Rockbox Manual for Ipod 3G

rockbox.org
June 3, 2010

Rockbox

<http://www.rockbox.org/>
Open Source Jukebox Firmware

Rockbox and this manual is the collaborative effort of the Rockbox team and its contributors. See the appendix for a complete list of contributors.

© 2003-2010 The Rockbox Team and its contributors, © 2004 Christi Alice Scarborough, © 2003 José Maria Garcia-Valdecasas Bernal & Peter Schlenker.

Version 3.6. Built using pdfL^AT_EX.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled “GNU Free Documentation License”.

Contents

1	Introduction	10
1.1	Welcome	10
1.2	Getting more help	10
1.3	Naming conventions and marks	11
2	Installation	12
2.1	Before Starting	12
2.2	Installing Rockbox	13
2.2.1	Automated Installation	13
2.2.2	Manual Installation	15
2.2.3	Finishing the install	17
2.2.4	Enabling Speech Support (optional)	17
2.3	Running Rockbox	17
2.4	Updating Rockbox	17
2.5	Uninstalling Rockbox	18
2.5.1	Automatic Uninstallation	18
2.5.2	Manual Uninstallation	18
2.6	Troubleshooting	18
3	Quick Start	19
3.1	Basic Overview	19
3.1.1	The player's controls	19
3.1.2	Turning the player on and off	20
3.1.3	Starting the original firmware	20
3.1.4	Putting music on your player	20
3.1.5	The first contact	21
3.1.6	Basic controls	21
3.1.7	Basic concepts	21
3.2	Customising Rockbox	22
4	Browsing and playing	23
4.1	File Browser	23
4.1.1	File Browser Controls	24
4.1.2	Context Menu	24
4.1.3	Virtual Keyboard	26
4.2	Database	27
4.2.1	Introduction	27

4.2.2	Initializing the Database	27
4.2.3	The Database Menu	27
4.2.4	Using the Database	29
4.3	While Playing Screen	30
4.3.1	WPS Key Controls	31
4.3.2	Peak Meter	31
4.3.3	The WPS Context Menu	32
4.4	Working with Playlists	34
4.4.1	Playlist terminology	34
4.4.2	Creating playlists	35
4.4.3	Adding music to playlists	36
4.4.4	Modifying playlists	37
4.4.5	Saving playlists	38
4.4.6	Loading saved playlists	38
4.4.7	Helpful Hints	38
4.5	Hotkeys	38
5	The Main Menu	40
5.1	Introducing the Main Menu	40
5.2	Navigating the Main Menu	40
5.3	Recent Bookmarks	41
5.4	Files	41
5.5	Database	42
5.6	Now Playing/Resume Playback	42
5.7	Settings	42
5.7.1	Sound Settings	42
5.7.2	Playback Settings	42
5.7.3	General Settings	42
5.7.4	Theme Settings	42
5.7.5	Manage Settings	42
5.8	Playlist	43
5.9	Plugins	43
5.10	System	43
5.10.1	Wake-Up Alarm	44
5.11	Quick Screen	44
6	Sound Settings	45
6.1	Volume	45
6.2	Bass	45
6.3	Treble	45
6.4	Balance	46
6.5	Channels	46
6.6	Stereo Width	46
6.7	Crossfeed	46

6.8	Equalizer	48
6.9	Dithering	50
6.10	Timestretch	50
6.11	Compressor	50
7	Playback Settings	52
7.1	Shuffle	52
7.2	Repeat	52
7.3	Play Selected First	53
7.4	Fast-Forward/Rewind	53
7.5	Anti-Skip Buffer	53
7.6	Fade on Stop/Pause	53
7.7	Party Mode	53
7.8	Crossfade	53
7.9	Replaygain	55
7.10	Track Skip Beep	56
7.11	Auto-Change Directory	56
7.12	Pause on Headphone Unplug	56
7.13	Last.fm Log	57
7.14	Cuesheet Support	57
7.15	Skip Length	57
7.16	Prevent Track Skipping	57
7.17	Rewind Before Resume	57
8	General Settings	59
8.1	Playlist	59
8.2	File View	59
8.3	Database	61
8.4	Display	61
8.5	System	63
8.5.1	Start Screen	63
8.5.2	Battery	64
8.5.3	Disk	64
8.5.4	Idle Poweroff	64
8.5.5	Limits	64
8.5.6	Accessory Power Supply	65
8.6	Bookmarking	65
8.7	Language	67
8.8	Voice	67
8.9	Hotkey	68
9	Theme Settings	69
10	Plugins	71

10.1	Games	71
10.1.1	Blackjack	71
10.1.2	BrickMania	72
10.1.3	Bubbles	73
10.1.4	Chessbox	74
10.1.5	Chopper	75
10.1.6	Dice	75
10.1.7	Doom	76
10.1.8	Flipit	78
10.1.9	Goban	79
10.1.10	Invadrox	82
10.1.11	Jackpot	83
10.1.12	Jewels	84
10.1.13	MazezaM	84
10.1.14	Minesweeper	85
10.1.15	Pegbox	86
10.1.16	Pong	87
10.1.17	Reversi	87
10.1.18	Robotfindskitten	88
10.1.19	Rockblox	88
10.1.20	Rockblox1d	89
10.1.21	Rocklife	89
10.1.22	Sliding Puzzle	90
10.1.23	Snake	90
10.1.24	Snake 2	91
10.1.25	Sokoban	92
10.1.26	Solitaire	93
10.1.27	Spacerocks	94
10.1.28	Star	94
10.1.29	Sudoku	95
10.1.30	Wormlet	96
10.1.31	Xobox	99
10.2	Demos	99
10.2.1	Bounce	99
10.2.2	Credits	100
10.2.3	Cube	100
10.2.4	Demystify	101
10.2.5	Fire	102
10.2.6	Fractals	102
10.2.7	Logo	103
10.2.8	Mosaique	103
10.2.9	Oscilloscope	104
10.2.10	PictureFlow	105
10.2.11	Plasma	106

10.2.12 Snow	107
10.2.13 Starfield	107
10.2.14 VU meter	108
10.3 Viewers	108
10.3.1 Shortcuts	109
10.3.2 BMP viewer	110
10.3.3 Chip-8 Emulator	111
10.3.4 Frotz	112
10.3.5 JPEG viewer	113
10.3.6 Lua scripting language	113
10.3.7 Midiplay	114
10.3.8 MPEG Player	114
10.3.9 Search	116
10.3.10 Sort	116
10.3.11 Text Viewer	116
10.3.12 Theme Remove	119
10.3.13 VBRfix	120
10.3.14 ZXBox	121
10.4 Applications	122
10.4.1 Alarm Clock	122
10.4.2 Battery Benchmark	123
10.4.3 Calculator	125
10.4.4 Calendar	125
10.4.5 Chess Clock	126
10.4.6 Clock	127
10.4.7 Disk Tidy	129
10.4.8 Keybox	130
10.4.9 Lamp	130
10.4.10 md5sum	131
10.4.11 Metronome	131
10.4.12 Random Folder Advance Configuration	131
10.4.13 Stats	132
10.4.14 Stopwatch	132
10.4.15 Text Editor	133
11 Advanced Topics	134
11.1 Customising the User Interface	134
11.1.1 Getting Extras	134
11.1.2 Loading Fonts	134
11.1.3 Loading Languages	134
11.1.4 Loading Backdrops	134
11.1.5 UI Viewport	135
11.2 Configuring the Theme	135
11.2.1 Themeing – General Info	135

11.2.2	Themes – Create Your Own	136
11.2.3	Info Viewport (SBS only)	138
11.3	Managing Rockbox Settings	141
11.3.1	Introduction to .cfg Files	141
11.3.2	Specifications for .cfg Files	141
11.3.3	The MANAGE SETTINGS menu	142
11.4	Firmware Loading	143
11.4.1	Using ROLO (Rockbox Loader)	143
11.5	Optimising battery runtime	143
11.5.1	Display backlight	143
11.5.2	Accessory power supply	143
11.5.3	Anti-Skip Buffer	143
11.5.4	Replaygain	143
11.5.5	Audio format and bitrate	144
11.5.6	Sound settings	144
A	File formats	145
A.1	Supported file formats	145
A.2	Supported audio formats	146
A.2.1	Lossy Codecs	146
A.2.2	Lossless Codecs	147
A.2.3	Other Codecs	148
B	Theme Tags	149
B.1	Status Bar	149
B.2	Information from the track tags	149
B.3	Viewports	150
B.4	Power Related Information	150
B.5	Information about the file	151
B.6	Playlist/Song Info	152
B.7	Runtime Database	152
B.8	Sound (DSP) settings	153
B.9	Hold Switch	153
B.10	Virtual LED	153
B.11	Repeat Mode	153
B.12	Playback Mode	153
B.13	Current Screen	153
B.14	List Title (.sbs only)	154
B.15	Changing Volume	154
B.16	Settings	154
B.17	Images	155
B.18	Album Art	156
B.18.1	Limitations	156
B.18.2	Where to put album art	156

B.18.3 How to display the album art	157
B.19 Alignment	158
B.20 Conditional Tags	158
B.21 Subline Tags	158
B.22 Time and Date	159
B.23 Text Translation	159
B.24 Other Tags	160
C Config file options	161
D Menu Overview	166
E User feedback	167
E.1 Bug reports	167
E.1.1 Rules for submitting new bug reports	167
E.2 Feature ideas	167
E.2.1 Rules for submitting a new feature idea	167
E.2.2 Features we will not implement	168
F Credits	169
G Licenses	173
G.1 GNU Free Documentation License	173
G.2 The GNU General Public License	181

1 Introduction

1.1 Welcome

This is the manual for Rockbox. Rockbox is an open source firmware replacement for a growing number of digital audio players. Rockbox aims to be considerably more functional and efficient than your device's stock firmware while remaining easy to use and customisable. Rockbox is written by users, for users. Not only is it free to use, it is also released under the GNU General Public License (GPL), which means that it will always remain free both to use and to change.

Rockbox has been in development since 2001, and receives new features, tweaks and fixes each day to provide you with the best possible experience on your digital audio player. A major goal of Rockbox is to be simple and easy to use, yet remain very customisable and configurable. We believe that you should never need to go through a series of menus for an action you perform frequently. We also believe that you should be able to configure almost anything about Rockbox you could want, pertaining to functionality. Another top priority of Rockbox is audio playback quality – Rockbox, for most models, includes a wider range of sound settings than the device's original firmware. A lot of work has been put into making Rockbox sound the best it can, and improvements are constantly being made. All models have access to a large number of plugins, including many games, applications, and graphical “demos”. You can load different configurations quickly for different purposes (e.g. a large font for in your car, different sound settings for at home). Rockbox features a very wide range of languages, and all supported models also have the ability to talk to you – menus can be voiced and filenames spelled out or spoken.

1.2 Getting more help

This manual is intended to be a comprehensive introduction to the Rockbox firmware. There is, however, more help available. The Rockbox website at <http://www.rockbox.org/> contains very extensive documentation and guides written by members of the Rockbox community and this should be your first port of call when looking for further help.

If you cannot find the information you are searching for on the Rockbox website there are a number of support channels you should have a look at. You can try the Rockbox forums located at <http://forums.rockbox.org/>. The mailing lists are another option, and can be found at <http://www.rockbox.org/mail/>. From that page you can subscribe to the lists and browse the archives. To search the list archives simply use the search field that is located on the left side of the website. Furthermore, you can ask on IRC. The

main channel for Rockbox is `#rockbox` on <irc://irc.freenode.net>. Many helpful developers and users are usually around. Just join and ask your question (don't ask to ask!) – if someone knows the answer you'll usually get an answer pretty quickly. More information including IRC logs can be found at <http://www.rockbox.org/irc/>. We also have a web client so that you can join the Rockbox IRC channel without needing to install additional software onto your computer.

If you think you have found a bug please make sure it actually is a bug and is still present in the most recent version of Rockbox. You should try to confirm that by using the above mentioned support channels first. After that you can submit that issue to our tracker. Refer to section E (page 167) for details on how to use the tracker.

1.3 Naming conventions and marks

We have some conventions (especially for naming) that are intended to be consistent throughout this manual.

Manufacturer and product names are formatted in accordance with the standard rules of English grammar, e.g. “Ipod playback is currently unsupported”. Manufacturer and model names are proper nouns, and thus are written beginning with a capital letter.

This manual has some parts that are marked with icons on the margin to help you finding important parts or parts you could skip. The following icons are used:

Note: This indicates a note. A note starts always with the text “Note”. In order to make finding notes easier each one is accompanied by an icon in the margin as here. Notes are used to mark useful information that may help you to get the most out of Rockbox.





Warning: This is a warning. In contrast to notes mentioned above, a warning should be taken more seriously. Whereas ignoring notes will not cause any serious damage, ignoring warnings *could* cause serious damage to your player. You really should read the warnings, especially if you are new to Rockbox.



This icon marks a section that is intended especially for the blind and visually impaired. As they cannot read the manual in the same way sighted people do we have added some additional descriptions. If you are not blind or visually impaired you can probably completely skip these blocks. To make this easier, there is an icon shown in the margin on the right.



Links to the wiki are abbreviated by the name of the wiki page. Those names are still linked so you can simply follow them like any other link in this manual. If you want to access a wiki page manually go to  <http://www.rockbox.org/wiki/> and type the page name in the “Go” box at the top of the page. Links to wiki pages are also indicated by the symbol  in front of the page name.

2 Installation

Installing Rockbox is generally a quick and easy procedure. However before beginning there are a few things it is important to know.

2.1 Before Starting

USB connection. To transfer Rockbox to your player you need to connect it to your computer. For manual installation/uninstallation, or should autodetection fail during automatic installation, you need to know where to access the player. On Windows this means you need to know the drive letter associated with the player. On Linux you need to know the mount point of your player. On Mac OS X you need to know the volume name of your player.

If you have Itunes installed and it is configured to open automatically when your player is attached (the default behaviour), then wait for it to open and then quit it. You also need to ensure the “Enable use as disk” option is enabled for your player in Itunes. Your player should then enter disk mode automatically when connected to a computer via USB. If your computer does not recognise your player, you may need to enter disk mode manually. Disconnect your player from the computer. Hard reset the player by pressing and holding the **Menu** and **Play** buttons simultaneously. As soon as the player resets, press and hold the **Prev** and **Next** buttons simultaneously. Your player should enter disk mode and you can try reconnecting to the computer.

Administrator/Root rights. Installing the bootloader portion of Rockbox requires you to have administrative (Windows) or root (Linux) rights. Consequently when doing either the automatic or manual bootloader install, please ensure that you are logged in with an administrator account or have root rights.

File system format. Rockbox only works on Ipods formatted with the FAT32 filesystem (i.e. Ipods initialised by Itunes for Windows). It does not work with the HFS+ filesystem (i.e. Ipods initialised by Itunes for the Mac). More information and instructions for converting an Ipod to FAT32 can be found on the [IpodConversionToFAT32](#) wiki page on the Rockbox website. Note that after conversion, you can still use a FAT32 Ipod with a Mac.

2.2 Installing Rockbox

There are two ways to install Rockbox: automated and manual. The automated way is the preferred method of installing Rockbox for the majority of people. Rockbox Utility is a graphical application that does almost everything for you. However, should you encounter a problem, then the manual way is still available to you.

There are three separate components, two of which need to be installed in order to run Rockbox:

The Ipod bootloader. The Ipod bootloader is the program that tells your player how to load and start the original firmware. It is also responsible for any emergency, recovery, or disk modes on your player. This bootloader is stored in special flash memory in your Ipod and comes factory-installed. It is not necessary to modify this in order to install Rockbox.

The Rockbox bootloader. The Rockbox bootloader is loaded from disk by the Ipod bootloader. It is responsible for loading the Rockbox firmware and for providing the dual boot function. It directly replaces the Ipod firmware in the player's boot sequence.

The Rockbox firmware. Similar to the Ipod firmware, most of the Rockbox code is contained in a "build" that resides on your player's drive. This makes it easy to update Rockbox. The build consists of a directory called `.rockbox` which contains all of the Rockbox files, and is located in the root of your player's drive.

Apart from the required parts there are some addons you might be interested in installing.

Fonts. Rockbox can load custom fonts. The fonts are distributed as a separate package and thus need to be installed separately. They are not required to run Rockbox itself but a lot of themes require the fonts package to be installed.

Themes. The appearance of Rockbox can be customised by themes. Depending on your taste you might want to install additional themes to change the look of Rockbox.

2.2.1 Automated Installation

To automatically install Rockbox, download the official installer and housekeeping tool ROCKBOX UTILITY. It allows you to:

- Automatically install all needed components for using Rockbox ("Minimal Installation").
- Automatically install all suggested components ("Complete Installation").
- Selectively install optional components.

- Install additional fonts and themes.
- Install voice files and generate talk clips.
- Uninstall all components you installed using Rockbox Utility.

Prebuilt binaries for Windows, Linux and Mac OS X are available at the  [RockboxUtility](#) wiki page.

When first starting ROCKBOX UTILITY run “Autodetect”, found in the configuration dialog (File → Configure). Autodetection can detect most player types. If autodetection fails or is unable to detect the mountpoint, make sure to enter the correct values. The mountpoint indicates the location of the player in your filesystem. On Windows, this is the drive letter the player gets assigned, on other systems this is a path in the filesystem.


Choosing a Rockbox version

There are three different versions of Rockbox available from the Rockbox website: Release version, current build and archived daily build. You need to decide which one you want to install and get the appropriate version for your player. If you select either “Minimal Installation” or “Complete Installation” from the “Quick Start” tab, then Rockbox Utility will automatically install the release version of Rockbox. Using the “Installation” tab will allow you to select which version you wish to install.

Release. The release version is the latest stable release, free of known critical bugs. For a manual install, the current stable release of Rockbox is available at <http://www.rockbox.org/download/>.

Current Build. The current build is built at each source code change to the Rockbox SVN repository and represents the current state of Rockbox development. This means that the build could contain bugs but most of the time is safe to use. For a manual install, you can download the current build from <http://build.rockbox.org/>.

Archived Build. In addition to the release version and the current build, there is also an archive of daily builds available for download. These are built once a day from the latest source code in the SVN repository. For a manual install, you can download archived builds from <http://www.rockbox.org/daily.shtml>.

Note: Because current and archived builds are development versions that change frequently, they may behave differently than described in this manual, or they may introduce new (and potentially annoying) bugs. Unless you wish to try the latest and greatest features at the price of possibly greater instability, or you wish to help with development, you should stick with the release. 


Please now go to section 2.2.3 (page 17) to complete the installation procedure.

2.2.2 Manual Installation

The manual installation method is still available to you, should you need or desire it by following the instructions below. If you have used Rockbox Utility to install Rockbox, then you do not need to follow the next section and can skip straight to section 2.2.3 (page 17)

Installing the firmware


1. Download your chosen version of Rockbox from the links in the previous section.
2. Connect your player to the computer via USB or Firewire as described in the manual that came with your player.
3. Take the .zip file that you downloaded and use the “Extract all” command of your unzip program to extract the files onto your player.

Note: The entire contents of the .zip file should be extracted directly to the root of your player’s drive. Do not try to create a separate directory on your player for the Rockbox files! The .zip file already contains the internal structure that Rockbox needs. 


If the contents of the .zip file are extracted correctly, you will have a directory called .rockbox, which contains all the files needed by Rockbox, in the main directory of your player’s drive.


Installing the bootloader

Bootloader installation from Windows

1. Download ipodpatcher.exe from <http://download.rockbox.org/bootloader/ipod/ipodpatcher/win32/ipodpatcher.exe> and run it whilst logged in with an administrator account.
2. If all has gone well, you should see some information displayed about your player and a message asking you if you wish to install the Rockbox bootloader. Press i followed by ENTER, and ipodpatcher will now install the bootloader. After a short time you should see the message “[INFO] Bootloader installed successfully.” Press ENTER again to exit ipodpatcher.
3. **Note:** If ipodpatcher fails to install the bootloader for you, please be certain that you do indeed have a supported iPod model and are logged in as an administrator. If you do, run ipodpatcher once more and try again. If you don’t, then do not attempt to install again. 

Bootloader installation from Mac OS X


1. Attach your player to your Mac and wait for its icon to appear in Finder.
2. Download and open ipodpatcher.dmg from <http://download.rockbox.org/bootloader/ipod/ipodpatcher/macosx/ipodpatcher.dmg> and then double-click on the ipodpatcher icon inside. You can also drag the ipodpatcher icon to a location on your hard drive and launch it from the Terminal.
3. If all has gone well, you should see some information displayed about your player and a message asking you if you wish to install the Rockbox bootloader. Press `i` followed by `ENTER`, and ipodpatcher will now install the bootloader. After a short time you should see the message “[INFO] Bootloader installed successfully.” Press `ENTER` again to exit ipodpatcher and then quit the Terminal application.
4. **Note:** If ipodpatcher fails to install the bootloader for you, please be certain that you do indeed have a supported iPod model. If you do, run ipodpatcher once more and try again. If you don’t, then do not attempt to install again. 
5. Your player will now automatically reconnect itself to your Mac. Wait for it to connect, and then eject and unplug it in the normal way.

Note: You should unplug your ipod immediately after ejecting it to prevent Rockbox immediately rebooting your player into disk mode when it detects that your player is attached to a computer. 

Bootloader installation from Linux

1. Download ipodpatcher from <http://download.rockbox.org/bootloader/ipod/ipodpatcher/linux32x86/ipodpatcher> (32-bit x86 binary) or <http://download.rockbox.org/bootloader/ipod/ipodpatcher/linux64amd64/ipodpatcher> (64-bit amd64 binary). You can save this anywhere you wish, but the next steps will assume you have saved it in your home directory.
2. Attach your player to your computer.
3. Open up a terminal window and type the following commands:

```
_____ CODE _____  
cd $HOME  
chmod +x ipodpatcher  
./ipodpatcher  
_____
```

Note: You need to be the root user in order for ipodpatcher to have sufficient permission to perform raw disk access to your player. 

4. If all has gone well, you should see some information displayed about your player and a message asking you if you wish to install the Rockbox bootloader. Press `i` followed by `ENTER`, and `ipodpatcher` will now install the bootloader. After a short time you should see the message “[INFO] Bootloader installed successfully.” Press `ENTER` again to exit `ipodpatcher`.

2.2.3 Finishing the install

Safely eject / unmount the USB drive, unplug the cable and restart.

2.2.4 Enabling Speech Support (optional)

If you wish to use speech support you will also need a voice file. Voice files allow Rockbox to speak the user interface to you. Rockbox Utility can install an English voice file, or you can download it from <http://www.rockbox.org/daily.shtml> and unzip it to the root of your player. Rockbox Utility can also aid you in the creation of voice files with different voices or in other languages if you have a suitable speech engine installed on your computer. Voice menus are enabled by default and will come into effect after a reboot. See section 8.8 (page 67) for details on voice settings. Rockbox Utility can also aid in the production of talk files, which allow Rockbox to speak file and folder names.

2.3 Running Rockbox

Hard reset the Ipod by holding **Menu** and **Play** simultaneously for a couple of seconds until the player resets. Now Rockbox should load.

Note: If you have loaded music onto your player using iTunes, you will not be able to see your music properly in the `FILE BROWSER`. This is because iTunes changes your files’ names and hides them in directories in the `Ipod_Control` directory. Files placed on your player using iTunes can be viewed by initialising and using Rockbox’s database. See section 4.2 (page 27) for more information.



2.4 Updating Rockbox

Rockbox can be easily updated with Rockbox Utility. You can also update Rockbox manually – download a Rockbox build as detailed above, and unzip the build to the root directory of your player as in the manual installation stage. If your unzip program asks you whether to overwrite files, choose the “Yes to all” option. The new build will be installed over your current build.

The bootloader only changes rarely, and should not normally need to be updated.

Note: If you use Rockbox Utility be aware that it cannot detect manually installed components.



2.5 Uninstalling Rockbox

Note: The Rockbox bootloader allows you to choose between Rockbox and the original firmware. (See section 3.1.3 (page 20) for more information.)



2.5.1 Automatic Uninstallation

You can uninstall Rockbox automatically by using Rockbox Utility. If you installed Rockbox manually you can still use Rockbox Utility for uninstallation but will not be able to do this selectively.

2.5.2 Manual Uninstallation

To uninstall Rockbox and go back to using just the original Ipod software, connect the player to your computer and follow the instructions to install the bootloader but, when prompted by ipodpatcher, enter `u` for uninstall instead of `i` for install.

If you wish to clean up your disk, you may also wish to delete the `.rockbox` directory and its contents. Turn the Ipod off. Turn the player back on and the original Ipod software will load.

2.6 Troubleshooting

Bootloader install problems If you have trouble installing the bootloader, please ensure that you are either logged in as an administrator (Windows), or you have root rights (Linux)

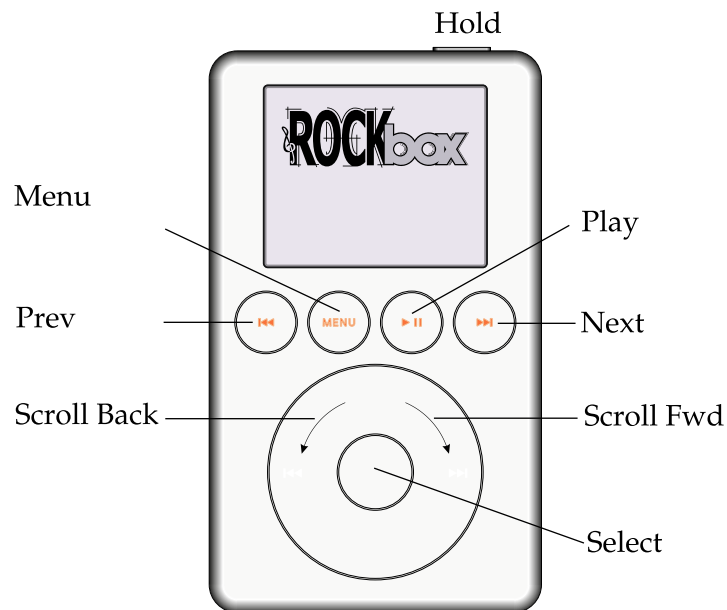
“File Not Found” If you receive a “File Not Found” from the bootloader, then the bootloader cannot find the Rockbox firmware. This is usually a result of not extracting the contents of the `.zip` file to the proper location, and should not happen when Rockbox has been installed with Rockbox Utility.

To fix this, either install Rockbox with the Rockbox Utility which will take care of this for you, or recheck the Manual Install section to see where the files need to be located.

3 Quick Start

3.1 Basic Overview

3.1.1 The player's controls



Throughout this manual, the buttons on the player are labelled according to the picture above. Whenever a button name is prefixed by “Long”, a long press of approximately one second should be performed on that button. The buttons are described in detail in the following paragraph.

Additional information for blind users is available on the Rockbox website at [BlindFAQ](#). ▶

The main controls on the player are a slightly indented touch wheel with a flat round button in the center, and four buttons in a row above the touch wheel. Hold the player with these controls facing you.

The top of the player will have the following, from left to right: remote connector, headphone socket, **Hold** switch.

The dock connector that is used to connect your player to your computer is on the bottom panel of the player.

The button in the middle of the wheel is called **Select**. You can operate the wheel by sliding your finger around it. The row of buttons consists of, from left to right, the **Prev**, **Menu**, **Play**, and **Next** buttons. When the manual says to **Scroll Forward**,

it means to slide your finger clockwise around the wheel. **Scroll Backward** means to slide your finger counterclockwise. Note that the wheel is sensitive, so you will need to move slowly at first and get a feel for how it works.

Note that when the **Hold** switch is pushed toward the center of the player, hold is on, and none of the other controls do anything. Be sure **Hold** is off before trying to use your player.

3.1.2 Turning the player on and off

To turn on and off your Rockbox enabled player use the following keys:

Key	Action
Menu / Play	Start Rockbox.
Long Play	Shutdown Rockbox.

On shutdown, Rockbox automatically saves its settings.

In the unlikely event of a software failure, hardware poweroff or reset can be performed by holding down **Menu** and **Play** simultaneously until the player shuts off or reboots.

3.1.3 Starting the original firmware

Rockbox has a dual-boot feature. To boot into the original firmware, shut down the device as described above. Turn on the **Hold** switch immediately after turning the player on. The Apple logo will display for a few seconds as Rockbox loads the original firmware.

You can also load the original firmware by shutting down the device, then clicking the **Hold** switch on and connecting the iPod to your computer.

Regardless of which method you use to boot to the original firmware, you can return to Rockbox by pressing and holding **Menu** and **Play** simultaneously until the player hard resets.

3.1.4 Putting music on your player

With the player connected to the computer as an MSC/UMS device (like a USB Drive), music files can be put on the player via any standard file transfer method that you would use to copy files between drives (e.g. Drag-and-Drop). The default directory structure that is assumed by some parts of Rockbox (album art searching, and missing-tag fallback in some WPSes) uses the parent directory of a song as the Album name, and the parent directory of that folder as the Artist name. While files may be organized however you like, see section [B.18](#) (page [156](#)) for the requirements for Album Art to work properly, and WPSes may display information incorrectly if your files are not properly tagged, and you have your music organized in a way different than they assume when attempting to guess the Artist and Album names from your filetree. See section [A.2](#) (page [146](#)) for a list of supported audio formats.

3.1.5 The first contact

After you have first started the player, you'll be presented by the MAIN MENU. From this menu you can reach every function of Rockbox, for more information (see section 5.1 (page 40)). To browse the files on you player, select FILES (see section 4.1 (page 23)), and to browse in a view that is based on the meta-data¹ of your audio files, select DATABASE (see section 4.2 (page 27)).

3.1.6 Basic controls

When browsing files and moving through menus you usually get a list view presented. The navigation in these lists are usually the same and should be pretty intuitive. In the tree view use **Scroll Forward** and **Scroll Backward** to move around the selection. Use **Select** or **Next** to select an item. When browsing the file system selecting an audio file plays it. The view switches to the “While playing screen”, usually abbreviated as “WPS” (see section 4.3 (page 30). The dynamic playlist gets replaced with the contents of the current directory. This way you can easily treat directories as playlists. The created dynamic playlist can be extended or modified while playing. This is also known as “on-the-fly playlist”. To go back to the FILE BROWSER stop the playback with the Long **Play** button or return to the file browser while keeping playback running using **Select**. In list views you can go back one step with **Prev**.

3.1.7 Basic concepts

Playlists

Rockbox is playlist oriented. This means that every time you play an audio file, a so-called “dynamic playlist” is generated, unless you play a saved playlist. You can modify the dynamic playlist while playing and also save it to a file. If you do not want to use playlists you can simply play your files directory based. Playlists are covered in detail in section 4.4 (page 34).

Menu

From the menu you can customise Rockbox. Rockbox itself is very customisable. Also there are some special menus for quick access to frequently used functions.

Context Menu

Some views, especially the file browser and the WPS have a context menu. From the file browser this can be accessed with Long **Select**. The contents of the context menu vary, depending on the situation it gets called. The context menu itself presents you with some operations you can perform with the currently highlighted file. In the file browser this is the file (or directory) that is highlighted by the cursor. From the WPS this is

¹ID3 Tags, Vorbis comments, etc.

the currently playing file. Also there are some actions that do not apply to the current file but refer to the screen from which the context menu gets called. One example is the playback menu, which can be called using the context menu from within the WPS.

3.2 Customising Rockbox

Rockbox' User Interface can be customised using "Themes". Themes usually only affect the visual appearance, but an advanced user can create a theme that also changes various other settings like file view, LCD settings and all other settings that can be modified using .cfg files. This topic is discussed in more detail in section 11.3 (page 141). The Rockbox distribution comes with some themes that should look nice on your player.

Note: Some of the themes shipped with Rockbox need additional fonts from the fonts package, so make sure you installed them. Also, if you downloaded additional themes from the Internet make sure you have the needed fonts installed as otherwise the theme may not display properly.



4 Browsing and playing

4.1 File Browser

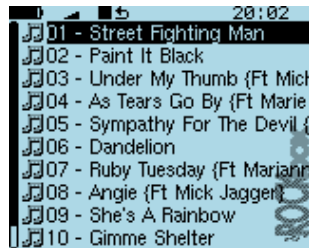



Figure 4.1: The file browser

Rockbox lets you browse your music in either of two ways. The FILE BROWSER lets you navigate through the files and directories on your player, entering directories and executing the default action on each file. To help differentiate files, each file format is displayed with an icon.

The DATABASE BROWSER, on the other hand, allows you to navigate through the music on your player using categories like album, artist, genre, etc.

You can select whether to browse using the FILE BROWSER or the DATABASE BROWSER by selecting either FILES or DATABASE in the MAIN MENU. If you choose the FILE BROWSER, the SHOW FILES setting lets you select what types of files you wish to view. See section 8.2 (page 60) for more information on the SHOW FILES setting.

Note: The FILE BROWSER allows you to manipulate your files in ways that are not available within the DATABASE BROWSER. Read more about DATABASE in section 4.2 (page 27). The remainder of this section deals with the FILE BROWSER. 

4.1.1 File Browser Controls

Key	Action
Scroll	Go to previous/next item in list. If you are on the first/last entry, the cursor will wrap to the last/first entry.
Backward/Scroll Forward	Go to the parent directory.
Prev	Execute the default action on the selected file or enter a directory.
Select or Next	If there is an audio file playing, return to the WHILE PLAYING SCREEN (WPS) without stopping playback.
Play	Stop audio playback.
Long Play	Enter the CONTEXT MENU.
Long Select	Enter the MAIN MENU.
Menu	Switch to the QUICK SCREEN (see section 5.11 (page 44)).
Long Menu	Activate the HOTKEY function (see section 4.5 (page 38)).

4.1.2 Context Menu



Figure 4.2: The Context Menu

The CONTEXT MENU allows you to perform certain operations on files or directories. To access the CONTEXT MENU, position the selector over a file or directory and access the context menu with Long **Select**.

Note: The CONTEXT MENU is a context sensitive menu. If the CONTEXT MENU is invoked on a file, it will display options available for files. If the CONTEXT MENU is invoked on a directory, it will display options for directories.



The CONTEXT MENU contains the following options (unless otherwise noted, each option pertains both to files and directories):

Playlist. Enters the PLAYLIST SUBMENU (see section 4.4.3 (page 36)).

Playlist Catalog. Enters the PLAYLIST CATALOG SUBMENU (see section 4.4.2 (page 35)).

Rename. This function lets the user modify the name of a file or directory.

Cut. Copies the name of the currently selected file or directory to the clipboard and marks it to be ‘cut’.

Copy. Copies the name of the currently selected file or directory to the clipboard and marks it to be ‘copied’.

Paste. Only visible if a file or directory name is on the clipboard. When selected it will move or copy the clipboard to the current directory.

Delete. Deletes the currently selected file. This option applies only to files, and not to directories. Rockbox will ask for confirmation before deleting a file. Press **Play** to confirm deletion or any other key to cancel.

Delete Directory. Deletes the currently selected directory and all of the files and subdirectories it may contain. Deleted directories cannot be recovered. Use this feature with caution!

Set As Backdrop. Set the selected `bmp` file as background image. The bitmaps need to meet the conditions explained in section 11.1.4 (page 134).

Open with. Runs a viewer plugin on the file. Normally, when a file is selected in Rockbox, Rockbox automatically detects the file type and runs the appropriate plugin. The OPEN WITH function can be used to override the default action and select a viewer by hand. For example, this function can be used to view a text file even if the file has a non-standard extension (i.e., the file has an extension of something other than `.txt`). See section 10.3 (page 108) for more details on viewers.

Create Directory. Create a new directory in the current directory on the disk.

Properties. Shows properties such as size and the time and date of the last modification for the selected file. If used on a directory, the number of files and subdirectories will be shown, as well as the total size.

Add to Shortcuts. Adds a link to the selected item in the `shortcuts.link` file. If the file does not already exist it will be created in the root directory. Note that if you create a shortcut to a file, Rockbox will not open it upon selecting, but simply bring you to it’s location in the FILE BROWSER.

4.1.3 Virtual Keyboard

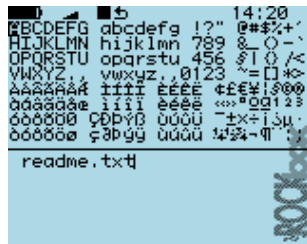


Figure 4.3: The virtual keyboard

This is the virtual keyboard that is used when entering text in Rockbox, for example when renaming a file or creating a new directory. The virtual keyboard can be easily changed by making a text file with the required layout. More information on how to achieve this can be found on the Rockbox website at [LoadableKeyboardLayouts](#).

Also you can switch to Morse code input mode by changing the USE MORSE CODE INPUT setting or by pressing Long **Menu** in the virtual keyboard.

Picker area

Key	Action
Prev / Next	Move the cursor on the virtual keyboard. If you move out of the picker area, you get the previous/next page of characters (if there is more than one).
Scroll Backward / Scroll Forward	Move the cursor on the virtual keyboard. If you move out of the picker area you get to the line edit mode.
Select	Insert the selected keyboard letter at the current line cursor position.
Play	Exit the virtual keyboard and save any changes.
Menu	Exit the virtual keyboard without saving any changes.
Long Menu	Toggle keyboard input mode and Morse code input mode.
Select	Tap to select a character in Morse code input mode.

Line edit mode

Key	Action
Prev / Next	Move the line cursor within the text line.
Select	Delete the character before the line cursor.
Scroll Backward / Scroll Forward	Return to the picker area.

4.2 Database

4.2.1 Introduction

This chapter describes the Rockbox music database system. Using the information contained in the tags (ID3v1, ID3v2, Vorbis Comments, Apev2, etc.) in your audio files, Rockbox builds and maintains a database of the music files on your player and allows you to browse them by Artist, Album, Genre, Song Name, etc. The criteria the database uses to sort the songs can be completely customised. More information on how to achieve this can be found on the Rockbox website at [DataBase](#).

4.2.2 Initializing the Database

The first time you use the database, Rockbox will scan your disk for audio files. This can take quite a while depending on the number of files on your player. This scan happens in the background, so you can choose to return to the Main Menu and continue to listen to music. If you shut down your player, the scan will continue next time you turn it on. After the scan is finished you may be prompted to restart your player before you can use the database.

Ignoring Directories During Database Initialization


You may have directories on your player whose contents should not be added to the database. Placing a file named `database.ignore` in a directory will exclude the files in that directory and all its subdirectories from scanning their tags and adding them to the database. This will speed up the database initialization.

If a subdirectory of an ‘ignored’ directory should still be scanned, place a file named `database.unignore` in it. The files in that directory and its subdirectories will be scanned and added to the database.


4.2.3 The Database Menu

Load To RAM The database can either be kept on disk (to save memory), or loaded into RAM (for fast browsing). Setting this to YES loads the database to RAM, allowing faster browsing and searching. Setting this option to NO keeps the database on


the disk, meaning slower browsing but it does not use extra RAM and saves some battery on boot up.

Note: If you browse your music frequently using the database, you should load to RAM, as this will reduce the overall battery consumption because the disk will not need to spin on each search. 


Auto Update If AUTO UPDATE is set to ON, each time the player boots, the database will automatically be updated.

Note: The AUTO UPDATE will only check for deleted files if the DIRECTORY CACHE (SETTINGS → GENERAL SETTINGS → SYSTEM → DISK → DIRECTORY CACHE) is enabled. UPDATE NOW includes that check whether dircache has been enabled or not. 

Initialize Now You can force Rockbox to rescan your disk for tagged files by using the INITIALIZE NOW function in the DATABASE MENU.

Warning: INITIALIZE NOW removes all database files (removing runtime.db data also) and rebuilds the database from scratch. 

Update Now UPDATE NOW causes the database to detect new and deleted files

Note: Unlike the AUTO UPDATE function, UPDATE NOW will update the database regardless of whether the DIRECTORY CACHE is enabled. Thus, an update using UPDATE NOW may take a long time. 

Unlike INITIALIZE NOW, the UPDATE NOW function does not remove runtime database information.


Gather Runtime Data When enabled, rockbox will record how often and how long a track is being played, when it was last played and its rating. This information can be displayed in the WPS and is used in the database browser to, for example, show the most played, unplayed and most recently played tracks.

Export Modifications This allows for the runtime data to be exported to the file `/.rockbox/database_changelog.txt`, which backs up the runtime data in ASCII format. This is needed when database structures change, because new code cannot read old database code. But, all modifications exported to ASCII format should be readable by all database versions.

Import Modifications. Allows the `/.rockbox/database_changelog.txt` backup to be conveniently loaded into the database. If AUTO UPDATE is enabled this is performed automatically when the database is initialized.

4.2.4 Using the Database

Once the database has been initialized, you can browse your music by Artist, Album, Genre, Song Name, etc. To use the database, go to the MAIN MENU and select DATABASE.

Note: You may need to increase the value of the MAX FILES IN DIR BROWSER setting (SETTINGS → GENERAL SETTINGS → SYSTEM → LIMITS) in order to view long lists of tracks in the ID3 database browser. 

There is no option to turn off database completely. If you do not want to use it just do not do the initial build of the database and do not load it to RAM.

Tag	Type	Origin
filename	string	system
album	string	id tag
albumartist	string	id tag
artist	string	id tag
comment	string	id tag
composer	string	id tag
genre	string	id tag
grouping	string	id tag
title	string	id tag
bitrate	numeric	id tag
discnum	numeric	id tag
year	numeric	id tag
tracknum	numeric	id tag/filename
autoscore	numeric	runtime db
lastplayed	numeric	runtime db
playcount	numeric	runtime db
Pm (play time - min)	numeric	runtime db
Ps (play time - sec)	numeric	runtime db
rating	numeric	runtime db
commitid	numeric	system
entryage	numeric	system
length	numeric	system
Lm (track len - min)	numeric	system
Ls (track len - sec)	numeric	system

4.3 While Playing Screen

The While Playing Screen (WPS) displays various pieces of information about the currently playing audio file. The appearance of the WPS can be configured using WPS configuration files. The items shown depend on your configuration – all items can be turned on or off independently. Refer to section B (page 149) for details on how to change the display of the WPS.

- Status bar: The Status bar shows Battery level, charger status, volume, play mode, repeat mode, shuffle mode and clock. In contrast to all other items, the status bar is always at the top of the screen.
- (Scrolling) path and filename of the current song.
- The ID3 track name.
- The ID3 album name.
- The ID3 artist name.
- Bit rate. VBR files display average bitrate and “(avg)”
- Elapsed and total time.
- A slidebar progress meter representing where in the song you are.
- Peak meter.

See section 11.2 (page 135) for details of customising your WPS (While Playing Screen).

4.3.1 WPS Key Controls

Key	Action
Scroll Forward / Scroll Backward	Volume up/down.
Prev	Go to beginning of track, or if pressed while in the first seconds of a track, go to the previous track.
Long Prev	Rewind in track.
Next	Go to the next track.
Long Next	Fast forward in track.
Play	Toggle play/pause.
Long Play	Stop playback.
Select	Return to the FILE BROWSER / DATABASE.
Long Select	Enter WPS CONTEXT MENU.
Menu	Enter MAIN MENU.
Long Menu	Switch to the QUICK SCREEN (see section 5.11 (page 44)).
Select+ Play	Activate the HOTKEY function (see section 4.5 (page 38)).
Short Next + Long Next	Skip to the next directory.
Short Prev + Long Prev	Skip to the previous directory.

4.3.2 Peak Meter

The peak meter can be displayed on the While Playing Screen and consists of several indicators.

The bar: This is the wide horizontal bar. It represents the current volume value.

The peak indicator: This is a little vertical line at the right end of the bar. It indicates the peak volume value that occurred recently.

The clip indicator: This is a little black block that is displayed at the very right of the scale when an overflow occurs. It usually does not show up during normal playback unless you play an audio file that is distorted heavily.

Note: Note that the clip detection is not very precise. Clipping might occur without being indicated.



The scale: Between the indicators of the right and left channel there are little dots. These dots represent important volume values. In linear mode each dot is a 10% mark. In dBFS mode the dots represent the following values (from right to left): 0 dB, -3 dB, -6 dB, -9 dB, -12 dB, -18 dB, -24 dB, -30 dB, -40 dB, -50 dB, -60 dB.

4.3.3 The WPS Context Menu

Like the context menu for the FILE BROWSER, the WPS CONTEXT MENU allows you quick access to some often used functions.

Playlist

The PLAYLIST submenu allows you to view, save, search and reshuffle the current playlist. To change settings for the PLAYLIST VIEWER press Long **Select** while viewing the current playlist to bring up the PLAYLIST VIEWER MENU. In this menu, you can find the PLAYLIST VIEWER SETTINGS.

Playlist Viewer Settings

Show Icons. This toggles display of the icon for the currently selected playlist entry and the icon for moving a playlist entry

Show Indices. This toggles display of the line numbering for the playlist

Track Display. This toggles between filename only and full path for playlist entries

Save Current Playlist. Allows the current playlist to be saved as a .m3u8 playlist file

Playlist catalog

View catalog. This lists all playlists that are part of the Playlist catalog. You can load a new playlist directly from this list.

Add to playlist. Adds the currently playing file to a playlist. Select the playlist you want the file to be added to and it will get appended to that playlist.

Add to new playlist. Similar to the previous entry this will add the currently playing track to a playlist. You need to enter a name for the new playlist first.

Sound Settings

This is a shortcut to the SOUND SETTINGS MENU, where you can configure volume, bass, treble, and other settings affecting the sound of your music. See section 6 (page 45) for more information.

Playback Settings

This is a shortcut to the PLAYBACK SETTINGS MENU, where you can configure shuffle, repeat, party mode, skip length and other settings affecting the playback of your music.

Rating

The menu entry is only shown if GATHER RUNTIME INFORMATION is enabled. It allows the assignment of a personal rating value (0 – 10) to a track which can be displayed in the WPS and used in the Database browser. The value wraps at 10.

Bookmarks

This allows you to create a bookmark in the currently-playing track.

Show Track Info

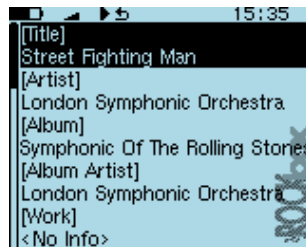


Figure 4.4: The track info viewer

This screen is accessible from the WPS screen, and provides a detailed view of all the identity information about the current track. This info is known as meta data and is stored in audio file formats to keep information on artist, album etc. To access this screen, press Long **Select** to access the WPS CONTEXT MENU and select SHOW TRACK INFO.

Open With...

This OPEN WITH function is the same as the OPEN WITH function in the file browser's CONTEXT MENU.

Delete

Delete the currently playing file. The file will be deleted but the playback of the file will not stop immediately. Instead, the part of the file that has already been buffered (i.e. read into the player's memory) will be played. This may even be the whole track.

Pitch

The PITCH SCREEN allows you to change the rate of playback (i.e. the playback speed and at the same time the pitch) of your player. The rate value can be adjusted between 50% and 200%. 50% means half the normal playback speed and a pitch that is an octave lower than the normal pitch. 200% means double playback speed and a pitch that is an octave higher than the normal pitch.

The rate can be changed in two modes: procentual and semitone. Initially, procentual mode is active.

If you've enabled the TIMESTRETCH option in SOUND SETTINGS and have since re-booted, you can also use timestretch mode. This allows you to change the playback speed without affecting the pitch, and vice versa.

In timestretch mode there are separate displays for pitch and speed, and each can be altered independently. Due to the limitations of the algorithm, speed is limited to be between 35% and 250% of the current pitch value. Pitch must maintain the same ratio as well as remain between 50% and 200%.

The value of the rate, pitch and speed is not persistent, i.e. after the player is turned on it will always be set to 100%. However, the rate, pitch and speed information will be stored in any bookmarks you may create (see section 8.6 (page 65)) and will be restored upon playing back those bookmarks.

Key	Action
Play	Toggle pitch changing mode (cycle through all available modes).
Scroll Forward / Scroll Backward	Increase / Decrease pitch by 0.1% (in procentual mode) or 0.1 semitone (in semitone mode).
Long Scroll Forward / Long Scroll Backward	Increase / Decrease pitch by 1% (in procentual mode) or a semitone (in semitone mode).
Prev / Next	Temporarily change pitch by 2% (beat-match), or modify speed (in timestretch mode).
Menu	Reset pitch and speed to 100%.
Select	Leave the PITCH SCREEN.

4.4 Working with Playlists

4.4.1 Playlist terminology

Some common terms that are used in Rockbox when referring to playlists:

Directory. A playlist! One of the keys to getting the most out of Rockbox is understanding that Rockbox *always* considers the song that it is playing to be part of a playlist, and in some situations, Rockbox will create a playlist automatically. For example, if you are playing the contents of a directory, Rockbox will automatically create a playlist containing all songs in it. This means that just about anything that is described in this chapter with respect to playlists also applies to directories.

Dynamic playlist. A dynamic playlist is a playlist that is created “On the fly.” Any time you insert or queue tracks using the PLAYLIST SUBMENU (see section 4.4.3 (page 36)), you are creating (or adding to) a dynamic playlist.

Insert. In Rockbox, to INSERT an item into a playlist means putting an item into a playlist and leaving it there, even after it is played. As you will see later in this chapter, Rockbox can INSERT into a playlist in several places.

Queue. In Rockbox, to QUEUE a song means to put the song into a playlist and then to remove the song from the playlist once it has been played. The only difference between INSERT and QUEUE is that the QUEUE option removes the song from the playlist once it has been played, and the INSERT option does not.

4.4.2 Creating playlists

Rockbox can create playlists in four different ways.

By selecting (“playing”) a song from the File Browser

Whenever a song is selected from the FILE BROWSER with **Select** or **Next**, Rockbox will automatically create a playlist containing all of the songs in that directory and start playback with the selected song.

Note: If you already have created a dynamic playlist, playing a new song will *erase* the current dynamic playlist and create a new one. If you want to add a song to the current playlist rather than erasing the current playlist, see the section below on how to add music to a playlist.



By using Insert and Queue functions

If playback is stopped, the INSERT and QUEUE functions can be used as described in 4.4.3 to create a new playlist instead of adding to an existing one. This will *erase* any dynamic playlist.

By using the Playlist catalog

The PLAYLIST CATALOG makes it possible to modify and create playlists that are not currently playing. To do this select PLAYLIST CATALOG in the CONTEXT MENU. There

you will have two choices, ADD TO PLAYLIST adds the selected track or directory to an existing playlist and ADD TO A NEW PLAYLIST creates a new playlist containing the selected track or directory.

Note: All playlists in the PLAYLIST CATALOG are stored by default in the /Playlists directory in the root of your player’s disk and playlists stored in other locations are not included in the catalog. It is however possible to move existing playlists there (see section 4.1.2 (page 24)).



By using the Main Menu

To create a playlist containing all music on your player, you can use the CREATE PLAYLIST command in the PLAYLISTS menu found in the MAIN MENU. The created playlist will be named `root.m3u8` and saved in the root of your player’s disk.

4.4.3 Adding music to playlists

Adding music to a dynamic playlist

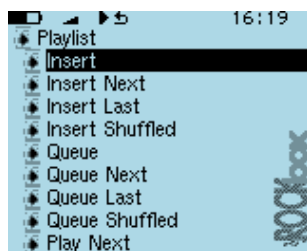


Figure 4.5: The Playlist Submenu

The PLAYLIST SUBMENU is a submenu in the CONTEXT MENU (see section 4.1.2 (page 24)), it allows you to put tracks into a “dynamic playlist”. If there is no music currently playing, Rockbox will create a new dynamic playlist and put the selected track(s) into it. If there is music currently playing, Rockbox will put the selected track(s) into the current playlist. The place in which the newly selected tracks are added to the playlist is determined by the following options:

Insert. Add track(s) immediately after any tracks added via the most recent INSERT operation. If no tracks have yet been added via an INSERT, new tracks will be added immediately after the current playing track. If playback is stopped a new dynamic playlist will get created with the selected tracks.

Insert Next. Add track(s) immediately after current playing track, no matter what else has been inserted.

Insert Last. Add track(s) to end of playlist.

Insert Shuffled. Add track(s) to the playlist in a random order.

Insert Last Shuffled. Add tracks in a random order to the end of the playlist.

Queue. Queue is the same as Insert except queued tracks are deleted immediately from the playlist after they have been played. Also, queued tracks are not saved to the playlist file (see section 5.8 (page 43)).

Queue Next. Queue track(s) immediately after current playing track.


Queue Last. Queue track(s) at end of playlist.

Queue Shuffled. Queue track(s) in a random order.

Queue Last Shuffled. Queue tracks in a random order at the end of the playlist.

Play Next. Replaces all but the current playing track with track(s). Current playing track is queued.

The PLAYLIST SUBMENU can be used to add either single tracks or entire directories to a playlist. If the PLAYLIST SUBMENU is invoked on a single track, it will put only that track into the playlist. On the other hand, if the PLAYLIST SUBMENU is invoked on a directory, Rockbox adds all of the tracks in that directory to the playlist.

Note: You can control whether or not Rockbox includes the contents of subdirectories when adding an entire directory to a playlists. Set the SETTINGS → GENERAL SETTINGS → PLAYLIST → RECURSIVELY INSERT DIRECTORIES setting to YES if you would like Rockbox to include tracks in subdirectories as well as tracks in the currently-selected directory. 

Dynamic playlists are saved so resume will restore them exactly as they were before shutdown.

Note: To view, save or reshuffle the current dynamic playlist use the PLAYLIST sub menu in the WPS context menu or in the MAIN MENU. 

4.4.4 Modifying playlists

Reshuffling

Reshuffling the current playlist is easily done from the PLAYLIST sub menu in the WPS, just select RESHUFFLE.

Moving and removing tracks

To move or remove a track from the current playlist enter the PLAYLIST VIEWER by selecting VIEW CURRENT PLAYLIST in the PLAYLIST submenu in the WPS context menu or the MAIN MENU. Once in the PLAYLIST VIEWER open the context menu on the track you want to move or remove. If you want to move the track, select MOVE in the context menu and then move the blinking cursor to the place where you want the track to be moved and confirm with **Select** or **Next**. To remove a track, simply select REMOVE in the context menu.

4.4.5 Saving playlists

To save the current playlist either enter the PLAYLIST submenu in the WPS CONTEXT MENU (see section 4.3.3 (page 32)) and select SAVE CURRENT PLAYLIST or enter the PLAYLIST OPTIONS menu in the MAIN MENU and select SAVE CURRENT PLAYLIST. Either method will bring you to the VIRTUAL KEYBOARD (see section 4.1.3 (page 26)), enter a filename for your playlist and accept it and you are done.

4.4.6 Loading saved playlists

Through the File Browser

Playlist files, like regular music tracks, can be selected through the FILE BROWSER. When loading a playlist from disk it will replace the current dynamic playlist.

Through the Playlist catalog

The PLAYLIST CATALOG offers a shortcut to all playlists in your player's specified playlist directory. It can be used like the FILE BROWSER.

4.4.7 Helpful Hints

Including subdirectories in playlists

You can control whether or not Rockbox includes the contents of subdirectories when adding an entire directory to a playlists. Set the MAIN MENU → SETTINGS → GENERAL SETTINGS → PLAYLISTS → RECURSIVELY INSERT DIRECTORIES setting to ON if you would like to include tracks in subdirectories as well as tracks in the currently selected directory.

4.5 Hotkeys

Hotkeys are shortcut keys for use in the FILE BROWSER and WPS screens. To use one, press **Select**+ **Play** within the FILE BROWSER or WPS screens. The assigned function will launch with reference to the current file or directory, if applicable. Each screen has its own assignment. If there is no assignment for a given screen, the hotkey is ignored.

The default assignment for the File Browser hotkey is OFF, but the WPS hotkey defaults to VIEW PLAYLIST.

The hotkey assignments are changed in the Hotkey menu (see section 8.9 (page 68)) under GENERAL SETTINGS.

5 The Main Menu

5.1 Introducing the Main Menu

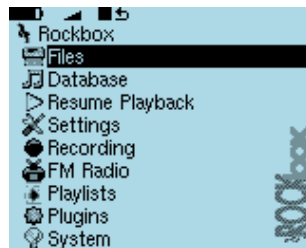


Figure 5.1: The main menu

The MAIN MENU is the screen from which all of the Rockbox functions can be accessed. This is the first screen you will see when starting Rockbox. To return to the MAIN MENU, press the **Menu** button.

All settings are stored on the unit. However, Rockbox does not spin up the disk solely for the purpose of saving settings. Instead, Rockbox will save settings when it spins up the disk the next time, for example when refilling the MP3 buffer or navigating through the FILE BROWSER. Changes to settings may therefore not be saved unless the player is shut down safely (see section 3.1.2 (page 20)).

5.2 Navigating the Main Menu

Key	Action
Scroll Forward	Select the next option in the menu. Inside a setting, increase the value or choose next option.
Scroll Backward	Select the previous option in the menu. Inside a setting, decrease the value or choose previous option.
Select or Next	Select option.
Prev or Long Play	Exit menu or setting, or move to parent menu.

5.3 Recent Bookmarks

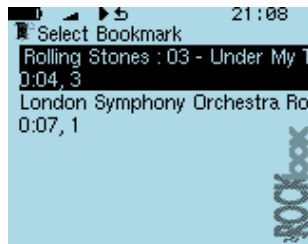



Figure 5.2: The list bookmarks screen

If the `SAVE A LIST OF RECENTLY CREATED BOOKMARKS` option is enabled then you can view a list of several recent bookmarks here and select one to jump straight to that track.

Note: Bookmarking only works when tracks are launched from the file browser, and does not currently work for tracks launched via the database. In addition, they do not currently work with dynamic playlists. 

Key	Action
Scroll Forward	Select the next bookmark.
Scroll Backward	Select the previous bookmark.
Select or Next	Resume from the selected bookmark.
Prev or Long Play	Exit Recent Bookmark menu.
Long Menu	Delete the currently selected bookmark.
Long Select	Enter the context menu for the selected bookmark.

There are two options in the context menu:

`RESUME` will commence playback of the currently selected bookmark entry.

`DELETE` will remove the currently selected bookmark entry from the list.

This entry is not shown in the `MAIN MENU` when the option is off (the default setting). See section 8.6 (page 65) for more details on configuring bookmarking in Rockbox.

5.4 Files

Browse the files on your player (see section 4.1 (page 23)).

5.5 Database

Browse by the meta-data in your audio files (see section [4.2](#) (page [27](#))).

5.6 Now Playing/Resume Playback

Go to the WHILE PLAYING SCREEN and resume if music playback is stopped or paused and there is something to resume (see section [4.3](#) (page [30](#))).

5.7 Settings

The SETTINGS menu allows you to set or adjust many parameters that affect the way your player works. There are many submenus for different parameter areas. Every time you are setting a value of a parameter, and that value is selected from a list of some predefined available values, you can press Long **Select**, and the selection cursor will jump to the default value for the parameter. You can then confirm or cancel the value. This is useful if you have changed the value of the parameter from the default to some other value and would like to restore the default value.

5.7.1 Sound Settings

The SOUND SETTINGS menu offers a selection of sound properties you may change to customise your listening experience. The details of this menu are covered in section [6](#) (page [45](#)).

5.7.2 Playback Settings

The PLAYBACK SETTINGS menu allows you to configure settings related to audio playback. The details of this menu are covered in section [7](#) (page [52](#)).

5.7.3 General Settings

The GENERAL SETTINGS menu allows you to customise the way Rockbox looks and the way it plays music. The details of this menu are covered in section [8](#) (page [59](#)).

5.7.4 Theme Settings

The THEME SETTINGS menu contains options that control the visual appearance of Rockbox. The details of this menu are covered in section [9](#) (page [69](#)).

5.7.5 Manage Settings

The MANAGE SETTINGS option allows the saving and re-loading of user configuration settings, browsing the hard drive for alternate firmwares, and finally resetting your

player back to initial configuration. The details of this menu are covered in section [11.3](#) (page [141](#)).

5.8 Playlist

This menu allows you to work with playlists. Playlists can be created in three ways. Playing a file in a directory causes all the files in it to be placed in a playlist. Playlists can be created manually by either using the `CONTEXT MENU` (see section [4.1.2](#) (page [24](#))) or using the `PLAYLIST` menu. Both automatically and manually created playlists can be edited using this menu.

Create Playlist: Rockbox will create a playlist with all tracks in the current directory and all sub-directories. The playlist will be created one directory level “up” from where you currently are.

View Current Playlist: Displays the contents of the playlist currently stored in memory.

Save Current Playlist: Saves the current dynamic playlist, excluding queued tracks, to the specified file. If no path is provided then playlist is saved to the current directory.

Playlist Catalog: The `PLAYLIST CATALOG` provides a simple interface to maintain several playlists (see section [4.4](#) (page [34](#))).

5.9 Plugins

With this option you can load and run various plugins that have been written for Rockbox. There are a wide variety of these supplied with Rockbox, including several games, some impressive demos and a number of utilities. A detailed description of the different plugins is to be found in section [10](#) (page [71](#)).

5.10 System

Time and Date: Time related menu options. Pressing Long **Select** will voice the current time if voice support is enabled

Set Time/Date: Set current time and date.

Sleep Timer: The `SLEEP TIMER` powers off your player after playing for a given time. It can be set from `OFF` to 5 hours in 5 minute steps. The `SLEEP TIMER` is reset on boot. Using this option disables the `WAKE UP ALARM`.

Time Format: Choose 12 or 24 hour clock.

5.10.1 Wake-Up Alarm

This option will make the player start up at the specified time. Use **Scroll Forward** and **Scroll Backward** to adjust the minutes setting, **Prev** and **Next** to adjust the hours. **Select** confirms the alarm, and **Menu** cancels setting an alarm. If the player is turned on again before the alarm occurs, the alarm will be cancelled.

Rockbox Info: Displays some basic system information. This is, from top to bottom, the amount of memory Rockbox has available for storing music (the buffer). The battery status. Hard disk size and the amount of free space on the disk.

Credits: Display the list of contributors.

Debug (Keep Out!): This sub menu is intended to be used *only* by Rockbox developers. It shows hardware, disk, battery status and other technical information.

Warning: It is not recommended that users access this menu unless instructed to do so in the course of fixing a problem with Rockbox. If you think you have messed up your settings by use of this menu please try to reset *all* settings before asking for help.



5.11 Quick Screen

Although the QUICK SCREEN is accessible from nearly everywhere, not just the MAIN MENU, it is worth mentioning here. It allows rapid access to your four favourite settings. The default settings are SHUFFLE (section 7 (page 52)), REPEAT (section 7 (page 52)) and the SHOW FILES (section 8.2 (page 60)) options, but almost all configurable options in Rockbox can be placed on this screen. To change the options, navigate through the menus to the setting you want to add and press Long **Select**. In the menu which appears you will be given options to place the setting on the QUICK SCREEN.

Press Long **Menu** to access it and **Select** to exit. The direction buttons will modify the individual setting values as indicated by the arrow icons. Please note that the settings at opposite sides of the screen cycle through the available options in opposite directions. Therefore if you select the same setting at e.g. the top and bottom of the quickscreen, then pressing up and down will cycle through this setting in opposite directions.

6 Sound Settings

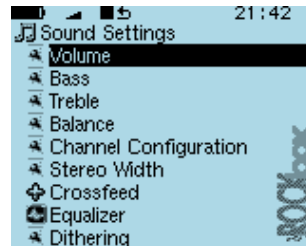


Figure 6.1: The sound settings screen

The sound settings menu offers a selection of sound settings you may change to customise your listening experience.

6.1 Volume

This setting adjusts the volume of your music. Like most professional audio gear and many consumer audio products, Rockbox uses a decibel scale where 0 dB is a reference that indicates the maximum volume that the player can produce without possible distortion (clipping). All values lower than this reference will be negative and yield a progressively softer volume. The volume can be adjusted from a minimum of -73 dB to a maximum of +6 dB.

6.2 Bass

This setting emphasises or suppresses the lower (bass) frequencies in the sound. A value of 0 dB means that bass sounds are unaltered (flat response).

6.3 Treble

This setting emphasises or suppresses the higher (treble) frequencies in the sound. A value of 0 dB means that treble sounds are unaltered (flat response).

6.4 Balance

This setting controls the balance between the left and right channels. The default, 0, means that the left and right outputs are equal in volume. Negative numbers increase the volume of the left channel relative to the right, positive numbers increase the volume of the right channel relative to the left.

6.5 Channels

A stereo audio signal consists of two channels, left and right. The CHANNELS setting determines if these channels are to be combined in any way, and if so, in what manner they will be combined. Available options are:

Setting	Description
Stereo	Leave the audio signal unmodified.
Mono	Combine both channels and send the resulting signal to both stereo channels, resulting in a monophonic output.
Custom	Allows you to manually specify a stereo width with the STEREO WIDTH setting described later in this chapter.
Mono Left	Plays the left channel in both stereo channels.
Mono Right	Plays the right channel in both stereo channels.
Karaoke	Removes all sound that is common to both channels. Since most music is recorded with vocals being equally present in both channels to make the singer sound centrally placed, this often (but not always) has the effect of removing the voice track from a song. This setting also very often has other undesirable effects on the sound.

6.6 Stereo Width

Stereo width allows you to manually specify the effect that is applied when the CHANNELS setting is set to “custom”. All values below 100% will progressively mix the contents of one channel into the other. This has the effect of gradually centering the stereo image, until you have monophonic sound at 0%. Values above 100% will progressively remove components in one channel that is also present in the other. This has the effect of widening the stereo field. A value of 100% will leave the stereo field unaltered.

6.7 Crossfeed

Crossfeed attempts to make the experience of listening to music on headphones more similar to listening to music with stereo speakers. When you listen to music through speakers, each ear will hear sound originating from both speakers. However, the sound

from the left speaker reaches your right ear slightly later than it does your left ear, and vice versa.

The human ear and brain together are very good at interpreting the time differences between direct sounds and reflected sounds and using that information to identify the direction that the sound is coming from. On the other hand, when listening to headphones, each ear hears only the stereo channel corresponding to it. The left ear hears only the left channel and the right ear hears only the right channel. The result is that sound from headphones does not provide the same spatial cues to your ear and brain as speakers, and might for that reason sound unnatural to some listeners.

The crossfeed function uses an algorithm to feed a delayed and filtered portion of the signal from the right channel into the left channel and vice versa in order to simulate the spatial cues that the ear and brain receive when listening to a set of loudspeakers placed in front of the listener. The result is a more natural stereo image that can be especially appreciated in older rock and jazz records, where one instrument is often hard-panned to just one of the speakers. Many people will find such records tiring to listen to using earphones and no crossfeed effect.

Crossfeed has the following settings:

Crossfeed. Selects whether the crossfeed effect is to be enabled or not.

Direct Gain. How much the level of the audio that travels the direct path from a speaker to the corresponding ear is supposed to be decreased.

Cross Gain. How much the level of the audio that travels the cross path from a speaker to the opposite ear is to be decreased.

High-Frequency Attenuation. How much the upper frequencies of the cross path audio will be dampened. Note that the total level of the higher frequencies will be a combination of both this setting and the CROSS GAIN setting.

High-Frequency Cutoff. Decides at which frequency the cross path audio will start to be cut by the amount described by the HIGH-FREQUENCY ATTENUATION setting.

Most users will find the default settings to yield satisfactory results, but for the more adventurous user the settings can be fine-tuned to provide a virtual speaker placement suited to ones preference. Beware that the crossfeed function is capable of making the audio distort if you choose settings which result in a too high output level.

6.8 Equalizer

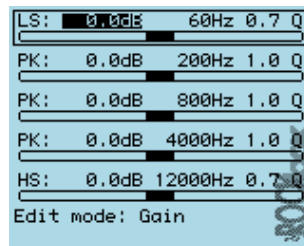


Figure 6.2: The graphical equalizer

Rockbox features a parametric equalizer (EQ). As the name suggests, a parametric EQ lets you control several different parameters for each band of the EQ. In some ways the EQ is similar to the BASS and TREBLE settings described earlier, but the EQ allows you to control the sound much more carefully.

Rockbox’s parametric EQ is composed of five different bands:

Band 0: Low shelf filter. The low shelf filter boosts or lowers all frequencies below a certain frequency limit, much like what a “bass” control found on ordinary stereo systems does. Adjust the “cutoff” frequency parameter to decide where the shelving starts to take effect. For example, a cutoff frequency of 50 Hz will adjust only very low frequencies. A cutoff frequency of 200 Hz, on the other hand, will adjust a much wider range of bass frequencies. The “gain” parameter controls how much the loudness of the band is adjusted. Positive numbers make the EQ band louder, while negative numbers make that EQ band quieter. The “Q” parameter should always be set to 0.7 for the shelving filters. Higher values will add a small boost around the cutoff frequency that is almost always undesirable.

Bands 1-3: Peaking filters. Peaking EQ filters boost or lower a frequency range centered at the centre frequency chosen. Graphic equalizers in home stereos are usually peaking filters. The peaking filters in Rockbox’s EQ lets you adjust three different parameters for EQ bands 1 through 3. The “centre” parameter controls the centre frequency of the frequency range that is affected as described above. The “gain” parameter controls how much each band is adjusted, and works as for the low shelf filter. Finally, the “Q” parameter controls how wide or narrow the affected frequency range is. Higher Q values will affect a narrower band of frequencies, while lower Q values will affect a wider band of frequencies.

Band 4: High shelf filter. A high shelf filter boosts or lowers all frequencies above a certain frequency limit, much like what a “treble” control found on ordinary stereo systems does. The high shelf filter is adjusted the same way as the low shelf filter,

except that it works on the high end of the frequency spectrum rather than the low end.

As a general guide, EQ band 0 should be used for low frequencies, EQ bands 1 through 3 should be used for mids, and EQ band 4 should be used for highs.

Enable EQ. This option controls whether the EQ is on or off.

Graphical EQ. This option brings up a graphic EQ screen, which allows adjustment of each of the three parameters described above (gain, centre frequency, and Q) for each of the five EQ bands.

Key	Action
Scroll Forward	Raises the highlighted parameter.
Scroll Backward	Lowers the highlighted parameter.
Prev	Moves to the previous EQ band.
Next	Moves to the next EQ band.
Select	Toggles the cursor among the three parameters (gain, centre frequency, Q) for the selected EQ band.
Menu	Exits the graphic EQ screen.

Pre-cut. If too much gain is added through the graphical EQ, your music may distort. The PRECUT setting allows you to adjust the overall gain of the EQ.

If your music distorts when using the EQ, trying changing this setting to a negative value.

Simple EQ. This option provides an easier alternative for those who are daunted by all of the parameters that can be adjusted using the graphical EQ. With the SIMPLE EQ, the only parameter that can be adjusted is the gain.

Advanced EQ. This sub menu provides options for adjusting the same parameters as the GRAPHICAL EQ. The only difference is that the parameters are adjusted through textual menus rather than through a graphic interface.

Save EQ Preset. This option saves the current EQ configuration in a .cfg file.

Browse EQ Presets. This menu displays a list of EQ presets, as well as any EQ configurations saved using the SAVE EQ PRESET option. Users unfamiliar with the operation of a parametric EQ may wish to use the presets instead of trying to configure the EQ, or use the presets for designing their own custom EQ settings.

6.9 Dithering

This setting controls the dithering and noise shaping functionality of Rockbox.

Most of Rockbox' audio file decoders work at a higher bit depth than the 16 bits used for output on the player's audio connectors. The simplest way to convert from one bit depth to another is simply discarding all the surplus bits. This is the default behaviour, and adds distortion to the signal that will vary in character along with the desired sound.

Dithering adds low-level noise to the signal prior to throwing away the surplus bits, which gives the resulting signal a uniform noise floor which is independent of the signal. Most people find this noise preferable to the time-varying noise heard when not performing dithering.

After dithering, noise shaping is performed. This basically just pushes the dithering noise to the parts of the frequency spectrum humans cannot hear so easily. In Rockbox' case, some of the noise is pushed up to above 10 kHz.

This setting will be put to its best use when listening to dynamic music with frequently occurring quiet parts, classical music being a typical example. It is worth noting that the effects of dithering and noise shaping are very subtle, and not easily noticeable.

Rockbox uses highpass triangular distribution noise as the dithering noise source, and a third order noise shaper.

6.10 Timestretch

Enabling `TIMESTRETCH` allows you to change the playback speed without it affecting the pitch of the recording. After enabling this feature and rebooting, you can access this via the `PITCH SCREEN`. This function is intended for speech playback and may significantly dilute your listening experience with more complex audio.

6.11 Compressor

The `COMPRESSOR` reduces, or compresses, the dynamic range of the audio signal. This makes the quieter and louder sections closer to the same volume level by progressively reducing the gain of louder signals. When subsequently amplified, this has the effect of making the quieter sections louder while keeping the louder sections from clipping. This allows listening to the quiet sections of dynamic material in noisy environments while preventing sudden loud sections from being overbearing.

There are several settings associated with the compressor. The first, and most important, is the `THRESHOLD`. The threshold is the audio input level at which the compressor begins to act. Any level louder than the threshold will be compressed to some extent. The maximum amount of compression, or the quietest level at which the compressor will operate, is -24 dB. The default of `Off` disables the compressor.

The `MAKEUP GAIN` setting has two options: `Off` and `Auto`. `Off` means that the compressed audio will not be amplified after compression. The default of `Auto` will amplify the signal so that the loudest possible signal after compression will be just

under the clipping limit. This is desirable because the compressed signal without makeup gain is quieter than the input signal. Makeup Gain in Auto restores the signal to the maximum possible level and brings the quieter audio up with it. This is what makes it possible to hear the quieter audio in noisy environments.

The RATIO setting determines how aggressively the compressor reduces gain above the threshold. For example, the 2:1 setting means that for each two decibels of input signal above the threshold, the compressor will only allow the output to appear as one decibel. The higher the ratio, the harder the signal is compressed. The ratio setting of Limit means essentially a ratio of infinity to one. In this case, the output signal is not allowed to exceed the threshold at all.

The KNEE setting determines how abrupt the transition is from a non-compressed signal to a compressed signal. Hard Knee means that the transition occurs precisely at the threshold. The Soft Knee setting smoothes the transition from plus or minus three decibels around the threshold.

The RELEASE TIME setting sets the recovery time after the signal is compressed. Once the compressor determines that compression is necessary, the input signal is reduced appropriately, but the gain isn't allowed to immediately return to normal levels. This is necessary to reduce artifacts such as "pumping." Instead, the gain is allowed to return to normal at the chosen rate. Release Time is the time for the gain to recover by 10 dB.

7 Playback Settings

The `PLAYBACK SETTINGS` menu allows you to configure settings related to audio playback.

7.1 Shuffle

Turning shuffle on will cause Rockbox to randomly re-order the playlist. Thus, to shuffle all of the audio files on the player, you first need to create a playlist containing all of them. For more information on creating playlists refer to section 4.4 (page 34).


Options: YES/NO.

7.2 Repeat

Configures settings related to repeating of directories or playlists.

Options: OFF / ALL / ONE / SHUFFLE / A-B:

Off. The current playlist will not repeat when it is finished.

Note: If you have the `AUTO-CHANGE DIRECTORY` option set to YES, Rockbox will move on to the next directory on your hard drive. If the `AUTO-CHANGE DIRECTORY` option is set to NO, playback will stop when the current directory or playlist is finished. 

All. The current playlist will repeat when it is finished.

One. Repeat one track over and over.

Shuffle. When the current playlist has finished playing, it will be shuffled and then repeated.

A-B. Repeats between two user defined points within a track, typically used by musicians when attempting to learn a piece of music. This option is more complicated to use than the others as the player must first be placed into A-B repeat mode and then the start and end points defined.

To set the Start Point (A) press **Select**. The following press of **Select** will set the End Point (B), and a third successive **Select** will reset the markers.

7.3 Play Selected First

This setting controls what happens when you select a file for playback while shuffle mode is on. If the `PLAY SELECTED FIRST` setting is `YES`, the file you selected will be played first. If this setting is `NO`, a random file in the directory will be played first.

7.4 Fast-Forward/Rewind

These settings control the speed and acceleration during fast forward and rewind. The setting `FF/RW MIN STEP` controls the initial speed and `FF/RW ACCEL` controls the acceleration.

7.5 Anti-Skip Buffer

This setting controls how early Rockbox starts refilling the music buffer from the hard drive when playing. A longer Anti-Skip Buffer helps prevent skips in music playback if Rockbox has trouble reading from the disk. This can happen if the player is knocked, shaken or jugged heavily while Rockbox is trying to read the hard drive.

The anti-skip buffer can be set to various values between 5 seconds and 10 minutes.

Note: Having a large anti-skip buffer tends to use more power, and may reduce your battery life. It is recommended to always use the lowest possible setting that allows correct and continuous playback.



7.6 Fade on Stop/Pause

Enables and disables a fade effect when you pause or stop playing a song. If the `Fade on Stop/Pause` option is set to `YES`, your music will fade out when you stop or pause playback, and fade in when you resume playback.

7.7 Party Mode

Enables unstoppable music playback. When new songs are selected, they are queued at the end of the current dynamic playlist instead of being played immediately. Pausing and stopping playback is disabled as well as skipping songs and launching plugins.

7.8 Crossfade

This section controls the behavior of the crossfader. The crossfader, when enabled, smoothly fades one track into the next. This can occur in two situations: an automatic track change or a manual track skip. An automatic track change occurs at the end of

the track, moving to the next track in the playlist without user intervention. A manual track skip goes to the next track immediately when the appropriate button is pressed.

Options for crossfade settings are:

Enable Crossfade. If set to OFF, crossfade is disabled and all track changes are gapless. If set to AUTOMATIC TRACK CHANGE ONLY, crossfade occurs for automatic track changes, but not for manual track skips. The next setting, MANUAL TRACK SKIP ONLY, is the opposite: tracks will only crossfade when manually skipped. If set to SHUFFLE, crossfade is enabled for all track changes, automatic or manual, when the shuffle feature is set to YES, but disabled otherwise. If set to SHUFFLE OR MANUAL TRACK SKIP then crossfade will be active either when shuffle is set to YES or the track is manually skipped. If set to ALWAYS, tracks will always crossfade into one another.


Fade In Delay. The “fade in delay” is the length of time between when the crossfade process begins and when the new track begins to fade in.

Fade In Duration. The length of time, in seconds, that it takes your music to fade in once the FADE IN DELAY has ended.

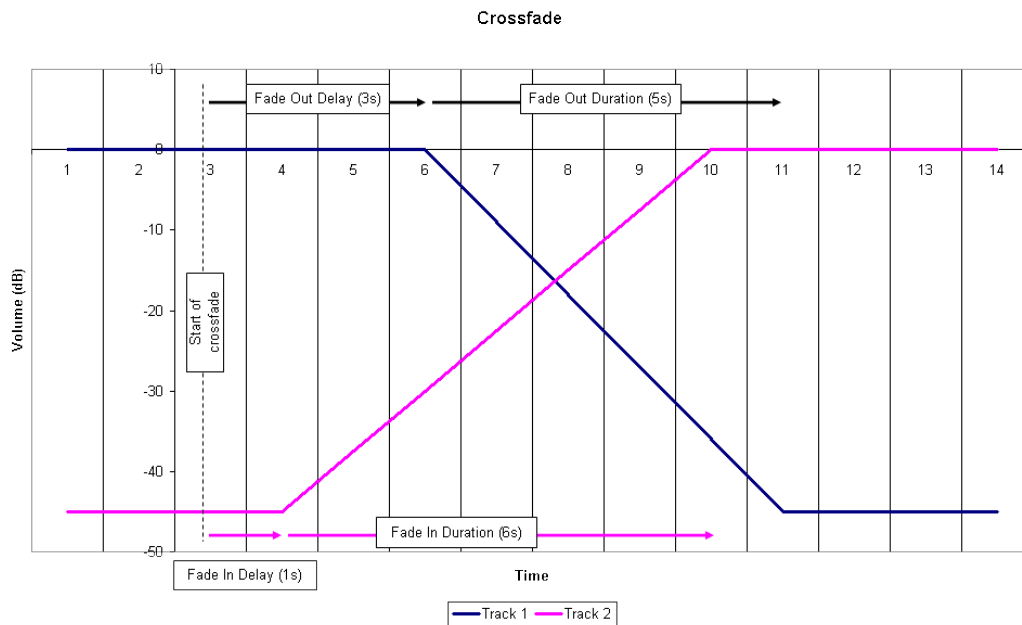
Fade Out Delay. The “fade out delay” is the length of time between when the crossfade process begins and when the old track begins to fade out.

Fade Out Duration. The length of time, in seconds, that it takes your music to fade out once the FADE OUT DELAY has ended.

Fade Out Mode. If set to CROSSFADE, one song will fade out and the next song will simultaneously fade in. If set to MIX, the ending song will not fade out at all, and will continue to play as normal until its end with the starting song fading in from under it. MIX mode is not used for manual track skips, even if it is selected here.

Note: The rules above apply except in the instance where FADE OUT DELAY plus FADE OUT DURATION is less than FADE IN DELAY (which would create a gap in the audio). In this case, the FADE IN DELAY is reduced to eliminate the gap. 

The graphic below illustrates how the different settings work in practice.



7.9 Replaygain

This allows you to control the replaygain function. The purpose of replaygain is to adjust the volume of the music played so that all songs (or albums, depending on your settings) have the same apparent volume. This prevents sudden changes in volume when changing between songs recorded at different volume levels. For replaygain to work, the songs must have been processed by a program that adds replaygain information to the ID3 tags (or Vorbis tags).

Note: APEv2 tags are not currently supported.



Options for replaygain are:

Replaygain Type. Choose the type of replaygain to apply:

- Album Gain.** Maintain a constant volume level between albums, but keep any intentional volume variations between songs in an album. (If album gain value is not available, uses track gain information).
- Track Gain.** Maintain a constant volume level between tracks. If track gain value is not available, no replaygain is applied.
- Track Gain If Shuffling.** Maintains a constant volume between tracks if SHUFFLE is set to YES. Reverts to album mode if SHUFFLE is set to NO.
- Off.** Do not process replaygain information, i.e. turn off the replaygain function.

Prevent Clipping. Avoid clipping of a song's waveform. If a song would clip during playback, the volume is lowered for that song. Replaygain information is needed for this to work.


Pre-amp. This allows you to adjust the volume when replaygain is applied. Replaygain often lowers the volume, sometimes quite much, so here you can compensate for that. Please note that a (large) positive pre-amp setting can cause clipping, unless prevent clipping is enabled. The pre-amp can be set to any decibel (dB) value between -12 dB and +12 dB, in increments of 0.5 dB.


7.10 Track Skip Beep

Controls the volume of the beep that is heard when skipping forward or backward between tracks. The beep is disabled when set to OFF.

7.11 Auto-Change Directory

Control what Rockbox does when it reaches the end of a directory. If AUTO-CHANGE DIRECTORY is set to YES, Rockbox will continue to the next directory. If AUTO-CHANGE DIRECTORY is set to NO, playback will stop at the end of the current playlist. Using the RANDOM feature requires you to first generate a folder list via the Random Folder Advance Configuration plugin (see section 10.4.12 (page 131)).

Note: You must have the REPEAT option set to NO for AUTO-CHANGE DIRECTORY to function properly. 

Note: This feature only works when songs have been played from the file browser. Using it with the database may cause unexpected behaviour. 

7.12 Pause on Headphone Unplug

Enables and disables automatic pausing of playback when the headphones are disconnected from the player's headphone socket.

Pause on Headphone Unplug. Options for automatic pause:

Off. Disables automatic pause.

Pause. Pauses the player when the headphones are removed.

Pause and Resume. Pauses when the headphones are removed, and resumes playback when they are reconnected.

Duration to Rewind. Number of seconds (between 0 and 15) to rewind playback when the headphones are removed.

Disable Auto-Resume If Phones Not Present. This option will disable the automatic resumption of playback at startup if the headphones are not connected to the player.

Note: This requires `RESUME ON STARTUP` to be enabled.



7.13 Last.fm Log

Enables logging of your played tracks for submittal to <http://www.last.fm>. This service was formerly known as *Audioscrobbler*. When you enable this option, you'll have to reboot to start the logging. The log-file is called `.scrobbler.log`, and is to be found in the root directory of your player.

Note: See [LastFMLog](#) for a further description, and for tools you can use to submit your Last.fm log.



7.14 Cuesheet Support

Enables reading of cuesheet files for played tracks. If a cuesheet is found for a track, track markers are displayed on the progressbar and it is possible to skip between the tracks within the cuesheet. Also the information found in the cuesheet file will replace the information from the ID3 tags. When you enable this option, you'll have to reboot for it to come into effect.

7.15 Skip Length

Designed to speed up navigation when listening to long audio tracks, `SKIP LENGTH` changes the behaviour of the **Prev** and **Next** buttons so that they skip by a given time instead of skipping to a new track. The `SKIP TO OUTRO` option changes the behaviour so that the buttons skip to just before the end of the track, so that the last few seconds are played before the next track.

7.16 Prevent Track Skipping

If this option is enabled, the ability to manually skip tracks is disabled in order to avoid accidental track skips. It does not prevent changing tracks if a track ends, which can be achieved by combining this option with `REPEAT` set to `ONE`

7.17 Rewind Before Resume

When resuming a track or a bookmark, a short rewind can be done before the playback is started. This can be useful when listening to speech material, to help remember what

was being said just before playback was stopped. The size of the rewind can be set to various values between 0 (off) and 60 seconds.

Note: The rewind is not done when resuming a paused track.



Note: The actual rewind distance may differ a little from the requested value, depending on the file in question.



8 General Settings

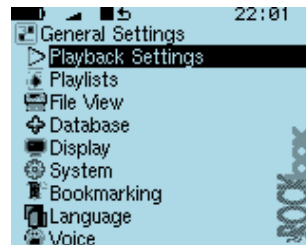


Figure 8.1: The general settings screen

8.1 Playlist

The PLAYLIST sub menu allows you to configure settings related to playlists.

Recursively Insert Directories. If set to ON, then when a directory is inserted or queued into a dynamic playlist, all subdirectories will also be inserted. If set to ASK, Rockbox will prompt the user about whether to include sub-directories.

Warn When Erasing Dynamic Playlist. If set to YES, Rockbox will provide a warning if the user attempts to take an action that will cause Rockbox to erase the current dynamic playlist.

8.2 File View

The File View menu deals with options relating to how the File Browser displays files.

Sort Case Sensitive. If this option is set to YES, all files that start with upper case letters will be listed first, followed by all files that begin with lower case letters. If this option is set to NO, then case will be ignored when sorting files.

Sort Directories. This option controls how Rockbox sorts directories. The default is to sort them alphabetically. BY DATE sorts them with the oldest directory first. BY NEWEST DATE sorts them with the newest directory first.

Sort Files. This option controls how Rockbox sorts files. All of the options for SORT DIRECTORIES are available in this option. In addition, there is a BY TYPE option which sorts files alphabetically by their type (such as .mp3) then alphabetically within each type.

Interpret numbers when sorting. AS WHOLE NUMBERS enables a sorting algorithm which is similar to the default sorting of, for example, Windows Explorer, Mac OS X's Finder or Nautilus, with regards to numbers at the beginning or within filenames. It combines consecutive digits to a number used for sorting, taking leading zeros into account.

AS DIGITS disables this algorithm, and causes every digit to be compared separately. The following table demonstrates the two sortings.

As whole numbers	As digits
03 Jackson.mp3	03 Jackson.mp3
1 Ring Of Fire.mp3	1 Ring Of Fire.mp3
2 I Walk The Line.mp3	10 A Thing Called Love.mp3
10 A Thing Called Love.mp3	2 I Walk The Line.mp3
Episode 1.ogg	Episode 1.ogg
Episode 57.ogg	Episode 233.ogg
Episode 233.ogg	Episode 57.ogg

Show Files. This option controls which files are displayed in the File Browser.

All. The FILE BROWSER displays all files and directories. Extensions are shown. No files or directories are hidden.

Supported. The FILE BROWSER displays all directories and files supported by Rockbox (see section A.1 (page 145)). Files and directories starting with *.* (*dot*) or with the *hidden* flag set are hidden.

Music. The FILE BROWSER displays only directories, playlists and the supported *audio* file formats. Extensions are stripped. Files and directories starting with *.* or with the “hidden” flag set are hidden.

Playlists. The FILE BROWSER displays only directories and playlists, for simplified navigation.

Show Filename Extensions. This option controls how file extensions are shown in the File Browser.

Off. The file extensions are never shown.

On. The file extensions are always shown.

Only unknown types. Only the extensions of unknown filetypes are shown.

Only when viewing all types. Only show file extensions when SHOW FILES is set to ALL.

Follow Playlist. This option determines what directory the FILE BROWSER displays first. If FOLLOW PLAYLIST is set to YES, when you enter the FILE BROWSER from the WPS, you will find yourself in the same directory as the currently playing file. If FOLLOW PLAYLIST is set to NO, when you enter the FILE BROWSER from the

WPS, you will find yourself in the directory you were in when you last left the FILE BROWSER.

Show Path. If this setting is set to FULL PATH the full path to the current directory will be displayed on the first line in the FILE BROWSER. If set to CURRENT DIRECTORY ONLY only the name of the current directory will be displayed.

This has a similar effect on the Database browser. If set to CURRENT DIRECTORY ONLY or FULL PATH, then the title of each menu will be displayed on the first line in the DATABASE BROWSER.

8.3 Database

This sub menu allows you to configure the database. See section 4.2 (page 27) for more information about using the database.

8.4 Display

LCD Settings. This sub menu contains settings that relate to the display of the player.

Backlight. The amount of time the backlight shines after a key press. If set to OFF, the backlight will not light when a button is pressed. If set to ON, the backlight will never shut off. If set to a time (1 to 90 seconds), the backlight will stay lit for that amount of time after a button press.

Backlight (While Plugged In). This setting is equivalent to the BACKLIGHT setting except it applies when the player is plugged into the charger.

Backlight on Hold. This setting controls the behavior of the backlight when the Hold switch is toggled. If set to NORMAL the backlight will behave as usual. If set to OFF the backlight will be turned off immediately when the Hold switch is engaged and if set to ON the backlight will be turned on and stay on while the Hold switch is engaged.

Caption Backlight. This option turns on the backlight a number of seconds before the start of a new track, and keeps it on for the same number of seconds after the beginning so that the display can be read to see song information. The amount of time is determined by the value of the backlight timeout setting, but is no less than 5 seconds.

First Keypress Enables Backlight Only. With this option enabled the first keypress while the backlight is turned off will only turn the backlight on without having any other effect. When disabled the first keypress will *also* perform its appropriate action.

Contrast. Changes the contrast of your LCD display.

Warning: Setting the contrast too dark or too light can make it hard to find this menu option again!



LCD Mode. This setting lets you invert the colours of the display.

- Upside Down.** Displays the screen so that the top of the display is nearest the buttons. This is sometimes useful when carrying the player in a pocket for easy access to the headphone socket.
- Scrolling.** This feature controls how text will scroll in Rockbox. You can configure the following parameters:
- Scroll Speed.** Sets how many times per second the automatic horizontal scrolling text will move a step.
 - Scroll Start Delay.** Controls how many milliseconds Rockbox should wait before a new text begins automatically scrolling.
 - Scroll Step Size.** Defines the number of pixels the text should move for each step, as used by the Scroll Speed setting.
 - Bidirectional Scroll Limit.** Rockbox has two different automatic horizontal scrolling methods: 1) always scrolling the text to the left until the line has ended and then beginning again at the start, and 2) moving to the left until you can read the end of the line and then scrolling right until you see the beginning again. Rockbox chooses which method it should use depending of how much it has to scroll to the left. This setting lets you tell Rockbox where that limit is, expressed in percentage of the line length.
 - Screen Scrolls Out of View.** Screens can be manually scrolled horizontally by pressing `Long Next/Prev`. Setting this option to YES will keep the list entries at their fixed positions and allow them to be scrolled out of view, whereas NO will only scroll those entries which surpass the right margin.
 - Screen Scroll Step Size.** Defines the number of pixels the horizontal manual screen scroll should move for each step.
 - Paged Scrolling.** When set to YES scrolling vertically on pages that surpass the screen size will page up/down instead of simply changing lines. This can be useful on slow displays.
- Peak Meter.** The peak meter can be configured with a number of parameters.
- Peak Release.** This determines how fast the bar shrinks when the music becomes softer. Lower values make the peak meter look smoother. Expressed in scale units per 10 ms.
 - Peak Hold Time.** Specifies the time after which the peak indicator will reset. For example, if you set this value to 5 s, the peak indicator displays the loudest volume value that occurred within the last 5 seconds. Larger values are useful if you want to find the peak level of a song, which might be of interest when copying music from the player via the analogue output to some other recording device.
 - Clip Hold Time.** The number of seconds that the clipping indicator will be visible after clipping is detected.
 - Scale.** Select whether the peak meter displays linear or logarithmic values. The human ear perceives loudness on a logarithmic scale. If the Scale setting is

set to LOGARITHMIC (dB) scale, the volume values are scaled logarithmically. The volume meters of digital audio devices usually are scaled this way. On the other hand, if you are interested in the power level that is applied to your headphones you should choose LINEAR display. This setting cannot be displayed in units like volts or watts because such units depend on your headphones.

Minimum and maximum range. These two options define the full value range that the peak meter displays. Recommended values for the LOGARITHMIC (dB) setting are -40 dB for minimum and 0 dB for maximum. Recommended values for LINEAR display are 0 and 100%. Note that -40 dB is approximately 1% in linear value, but if you change the minimum setting in linear mode slightly and then change to the dB scale, there will be a large change. You can use these values for ‘zooming’ into the peak meter.

Default Codepage. A codepage describes the way extended characters that are not available within the ASCII character set are encoded. ID3v1 tags do not have a codepage encoding contained so Rockbox needs to know what encoding has been used when generating these tags. This should be “ISO-8859-1” but to support languages outside Western Europe most applications use the setting of your operating system instead. If your operating system uses a different codepage and you are getting garbled extended characters you should adjust this settings. In most cases sticking to “ISO-8859-1” would be sufficient.

8.5 System

8.5.1 Start Screen

Set the screen that Rockbox will start in. The default is the main menu but the following options are available:

Previous Screen. Start Rockbox in the same screen as when it was shut off.

Main Menu. Show the main menu.

Files. Display the file browser, starting in the root directory of your player.

Database. Show the default database view.

Resume Playback. Go to the WPS and resume playback from where it was before turning off (if there is a playlist to resume).

Settings. Display the main settings menu.

Recent Bookmarks. Show the list of recent bookmarks as described in section 8.6 (page 65). Bookmarking needs to be enabled.

8.5.2 Battery

Options relating to the battery in the player.

Battery Capacity. This setting can be used to tell Rockbox what capacity (in mAh) the battery being used has. The default is 630 mAh, which is the capacity value for the standard battery shipped with the player. Rockbox uses this value for runtime estimation, not battery percentage calculation. Changing this setting has no effect whatsoever on actual battery life. This setting only affects the accuracy of the runtime estimation as shown on screen. This value is fairly meaningless in the Ipod family at present, and work is on-going into finding a better way to determine battery life.

8.5.3 Disk

Options relating to the hard disk.

Disk Spindown. Rockbox has a timer that makes it spin down the hard disk after it is idle for a certain amount of time. This setting controls the amount of time between the last user activity and the time that the disk spins down. This idle time is only affected by user activity, like navigating through the FILE BROWSER. When the hard disk spins up to fill the audio buffer, it automatically spins down afterwards.

Directory Cache. Rockbox has the ability to cache the contents of your drive in RAM. The DIRECTORY CACHE takes a small amount of memory away from Rockbox that would otherwise be used to buffer music, but it speeds up navigation in the file browser by eliminating the slight pause between the time a navigation button is pressed and the time Rockbox responds. Turning this setting on activates the directory cache, and turning it off deactivates the directory cache.

Note: The first time you enable the directory cache, Rockbox will request a reboot of the player and upon restarting take a few minutes to scan the drive. After this, the directory cache will work in the background.



8.5.4 Idle Poweroff

Rockbox can be configured to turn off power after the unit has been idle for a defined number of minutes. The player is idle when playback is stopped or paused. It is not idle while the USB or charger is connected. Settings are either OFF or 1 to 10 minutes in 1 minute steps. Then 15, 30, 45 or 60 minutes are available.

8.5.5 Limits

This sub menu relates to limits in the Rockbox operating system.

Max Entries in File Browser. This setting controls the limit on the number of files that you can put in any particular directory in the file browser. You can configure the size to be between 50 and 10,000 files in steps of 50. The default is 400. Higher values will shorten the music buffer, so you should increase this setting *only* if you have directories with a large number of files.

Max Playlist Size. This setting controls the maximum size of a playlist. The playlist size can be between 1,000 and 32,000 files, in steps of 1,000 (default is 10,000). Higher values will shorten the music buffer, so you should increase this setting *only* if you have very large playlists.


8.5.6 Accessory Power Supply

This option turns the accessory power supply ON and OFF. The Apple accessory protocol has been partially implemented in Rockbox, and thus there is a reasonable chance that your favourite accessory will work. The accessory may require power from the player to function, and if so you should turn this option ON. If it is not required, then turning this setting OFF will save battery and therefore result in better runtime.

8.6 Bookmarking

Bookmarks allow you to save your current position within a track so that you can return to it at a later time. Bookmarks also store rate, pitch and speed information from the PITCH SCREEN (see section 4.3.3 (page 34)). Bookmarks are saved on a per directory basis or for individual (saved) playlists. You can store multiple bookmarks, even for the same track. When there's already a bookmark for a directory or playlist, new bookmarks are added before existing ones.

Bookmarks are stored next to the directory or playlist they reference, in a file with the same name as the directory or playlist and a “.bmark” extension. To load a bookmark, select the bookmark file and then select the bookmark to load. There are other ways to load a bookmarks mentioned below.

Note: Bookmarking only works when tracks are launched from the file browser, and does not work for tracks launched via the database. In addition, they do not work with dynamic playlists. 

Bookmark on Stop. This option controls whether Rockbox creates a bookmark playback is stopped.

No. Do not create bookmarks.


Yes. Always create bookmarks.

Ask. Ask if a bookmark should be created.

Yes – Recent Only. Always create a bookmark, but only in the recent bookmarks list.

Ask – Recent Only. Ask if a bookmark should be created, but only add it to the recent bookmarks list.

When either YES – RECENT ONLY or ASK – RECENT ONLY is selected, bookmarks are only created if the MAINTAIN A LIST OF RECENT BOOKMARKS is enabled.

Note: The RESUME function remembers your position in the most recently accessed track regardless of how the BOOKMARK ON STOP option is set. 

Load Last Bookmark. This option controls if Rockbox should automatically load a bookmark for a file, when that file is played.

No Always start from the beginning of the track or playlist.

Yes Automatically return to the position of the last bookmark. Start from the beginning if there are no bookmarks.

Ask Ask if playback should start from the beginning of the track or from one of the bookmarks.

Maintain a list of Recent Bookmarks. If this option is enabled, a list of the most recently created bookmarks may be accessed through the RECENT BOOKMARKS option in the MAIN MENU. This list contains up to ten entries.

No Do not keep a list of recently used bookmarks. This also removes the RECENT BOOKMARKS from the MAIN MENU.

Yes Keep a list of recently used bookmarks. Each new bookmark is added to the list of recent bookmarks.

Unique Only Add each new bookmark to the list of recently used bookmarks, but only keep one bookmark from the current directory or playlist; any previous entries are removed.

The following keys can be used to navigate in any bookmark list.

Key	Action
Scroll Forward	Selects the next bookmark.
Scroll Backward	Selects the previous bookmark.
Select or Next	Resumes from the selected bookmark.
Prev or Long Play	Exits Recent Bookmark menu
Long Menu	Deletes the currently selected bookmark
Long Select	Enters the context menu for the selected bookmark.

There are two options in the context menu:

- RESUME will commence playback of the currently selected bookmark entry.
- DELETE will remove the currently selected bookmark entry from the list.

8.7 Language

This setting controls the language of the Rockbox user interface. Selecting a language will activate it. The language files must be in the `/.rockbox/langs/` directory. See section 11.1.3 (page 134) for further details about languages.

8.8 Voice

Voice Menus. This option controls the voicing of menus/settings as they are selected by the cursor. In order for this to work, a voice file must be present in the `/.rockbox/langs/` directory on the player. Voice files are large and are not shipped with Rockbox by default. The voice file is the name of the language for which it is made, followed by the extension `.voice`. So for English, the file name would be `english.voice`. This option is on by default, but will do nothing unless the appropriate voice file is installed in the correct place on the player. The Voice Menus have several limitations:

- Setting the Sound Option CHANNELS to KARAOKE may disable voice menus.
- Plugins and the wake up alarm do not support voice features.

Voice Directories. This option controls voicing of directory names. A voice file must be present for this to work. Several options are available.

Spell. Speak the directory name by spelling it out letter by letter. Support is provided only for the most common letters, numbers and punctuation.

Numbers. Each directory is assigned a number based upon its position in the file list. They are then announced as “Directory 1”, “Directory 2” etc.

Off. No attempt will be made to speak directory names.

You can use pre-generated `.talk` clips to have directory names spoken properly, but you must enable this explicitly (see below).

Use Directory .talk Clips. This option turns on the use of `.talk` clips for directories.

On. Use special pre-recorded files (`_dirname.talk`) in each directory. These must be generated in advance, and are typically produced synthetically using a text-to-speech engine on a PC.

Off. No checking is made for directory `.talk` clips; they are not used even if present. This can reduce disk activity.

Use of a `.talk` clip takes precedence over other directory name voicing. Otherwise (e.g. if a `.talk` clip is not available), voicing uses the method set under VOICE DIRECTORIES above.

Voice Filenames. This option controls voicing of filenames. Again, a voice file must be present for this to work. The options provided are SPELL, NUMBERS, and OFF which function the same as for VOICE DIRECTORIES. You can use pre-generated

.talk clips to have filenames spoken properly, but you must enable this explicitly (see below).

Use File .talk Clips. This option turns on the use of .talk clips for files.

On. Use special pre-recorded files for each file. This functions the same as for directories except that the .talk clip file must have the same name as the described file with an extra .talk extension (e.g. Punkadiddle.mp3 would require a file called Punkadiddle.mp3.talk).

Off. No checking is made for file .talk clips; they are not used even if present. This can reduce disk activity.

Use of a .talk clip takes precedence over other filename voicing. Otherwise (e.g. if a .talk clip is not available), voicing uses the method set under VOICE FILENAMES above.

Say File Type. This option turns on voicing of file types when VOICE FILENAMES is set to SPELL or NUMBERS. When VOICE DIRECTORIES is set to SPELL, “Directory” will be voiced after each spelled out directory.

Announce Battery Level. When this option is enabled the battery level is announced when it falls under 50%, 30% and 15%.

See [VoiceHowto](#) for more details on configuring speech support in Rockbox.

8.9 Hotkey

WPS Hotkey.

File Browser Hotkey. These options set the hotkey function for their respective screens (see section 4.5 (page 38)). The default for the WPS screen is VIEW PLAYLIST. The File Browser default is OFF.

9 Theme Settings

The **THEME SETTINGS** menu offers options that you can change to customize the visual appearance of Rockbox.

Browse Theme Files. This option will display all the currently installed themes on the player, press **Select** or **Next** to load the chosen theme and apply it.

A theme is a configuration file, stored in a specific directory, that typically changes the WPS , font used and on some platforms additional information such as background image and text colours.

There are a number of themes that ship with Rockbox. If none of these suit your needs, many more can be downloaded from <http://themes.rockbox.org/index.php?target=ipod3g>.

Note: Themes do not have to be purely visual. It is quite possible to create a theme that switches between audio configurations for use in the car, with headphones and when connected to an external amplifier. See section 11.2.2 (page 136) for more details.



Font. Browse the installed fonts on your player. Selecting one will activate it. See section 11.1.2 (page 134) for further details about fonts.

While Playing Screen. Opens the **FILE BROWSER** in the `/.rockbox/wps` directory and displays all `.wps` files. Selecting one will activate it, **Prev** or **Long Play** will exit back to the menu. For further information about the WPS see section 4.3 (page 30). For information about editing a `.wps` file see section 11.2 (page 135).

Show Icons. Rockbox has the ability to display an icon to the left of the file in the **FILE BROWSER**. For details of these icons, see section A.1 (page 145). These icons can also be customised. See the [IconSets](#) and [CustomIcons](#) Wiki pages for details.

Clear Backdrop. Rockbox allows you to select bitmap pictures to use as backdrops, see section 11.1.4 (page 134) for further information. This option allows you to clear the backdrops that you set.

Status/Scrollbar. Settings related to on screen status display and the scrollbar.

Scroll Bar. Allows you to choose where the vertical scroll bar should appear.

Scroll Bar Width. Allows you to choose the width of the scroll bar (in pixels). Default value is 6.

Status Bar. Allows you to choose where to display the statusbar.

Volume Display. Controls whether the volume is displayed as a graphic or a numeric value on the Status Bar. If you select a numeric display, volume is displayed in decibels. See section 6.1 (page 45) for more on the volume setting.

Battery Display. Controls whether the battery charge status is displayed as a graphic or numerical percentage value on the Status Bar.

Line Selector Type. This option allows you to select which type of line selector to use.

Pointer. A small arrow to the left of the menu text.

Bar (inverse). A bar with inverted foreground and background colour.

10 Plugins

Plugins are programs that Rockbox can load and run. Only one plugin can be loaded at a time. Plugins have exclusive control over the user interface. This means you cannot switch back and forth between a plugin and Rockbox. When a plugin is loaded, you need to exit it to return to the Rockbox interface. Most plugins will not interfere with music playback but some of them will stop playback while running. Plugins have the file extension `.rock`. Most of them can be started from `BROWSE PLUGINS` in the `MAIN MENU`.

Viewer plugins get started automatically by opening an associated file (i.e. text files, chip8 games), or from the `OPEN WITH` option on the `CONTEXT MENU`.

10.1 Games

See also the Chip-8 emulator in section 10.3.3 (page 111) .

10.1.1 Blackjack

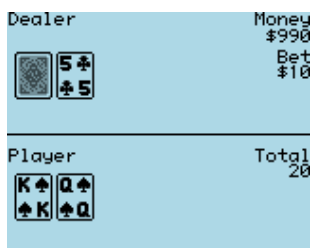


Figure 10.1: Blackjack

Blackjack, a game played in casinos around the world, is now available in the palm of your hand! The rules are simple: try to get as close to 21 without going over or simply beat out the dealer for the best hand. Although this may not seem difficult, blackjack is a game renowned for the strategy involved. This version includes the ability to split, buy insurance, and double down.

For the full set of rules to the game, and other fascinating information visit <http://www.blackjackinfo.com/blackjack-rules.php>

Key	Action
Prev / Next / Scroll Forward / Scroll Backward	Enter betting amount
Select	Hit (Draw new card) / Select
Next	Stay (End hand)
Prev	Double down
Menu	Pause game and go to menu / Cancel

10.1.2 BrickMania



Figure 10.2: BrickMania

BrickMania is a clone of the classic game Breakout. The aim of the game is to destroy all the bricks by hitting them with the ball once or more. Sometimes a special item falls down when you destroy a brick. For a special item to take effect, you must catch it with the paddle. Look out for the bad ones.

Special items

Displayed	Name	Description
N	Normal	Returns paddle to normal.
D	Die	Ball dies; lose a life.
L	Life	Gain a life.
F	Fire	Allows you to shoot bricks with paddle.
G	Glue	Ball sticks to paddle each time it hits.
B	Ball	Immediately fires another ball.
FL	Flip	Flip left / right movement.

Key	Action
Prev / Next Scroll Backward / Scroll Forward	Moves the paddle
Select	Release the ball / Fire
Menu	Open menu / Quit

10.1.3 Bubbles

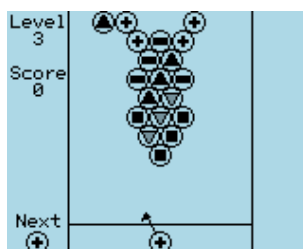


Figure 10.3: Bubbles

The goal of the game is to beat each level as quickly as possible by clearing the board of all bubbles. Bubbles are removed from the board when a cluster of three or more of the same type is formed. The game is over when any bubbles on the board extend below the bottom line. To make things more difficult, the entire board is shifted down every time a certain number of shots have been fired. Points are awarded depending on how quickly the level was completed.

Key	Action
Menu	Pause game
Scroll Forward / Scroll Backward	Aim the bubble
Select	Fire bubble
Menu+ Select	Exit to menu

10.1.4 Chessbox



Figure 10.4: Chessbox

Chessbox is a one-person chess game with computer artificial intelligence. The chess engine is a port of GNU Chess 2 by John Stanback.

It also works as a PGN file viewer. Instead of executing the game from the plugin menu, look for any file with `.pgn` extension in the file browser and execute it. Chessbox will show the list of matches included in the file and allow you to select the one you want to watch. After that, you can scroll back and forth through the moves of the game. If the menu is invoked while in the viewer, the user is allowed to select a new match from the same file or quit the game.

“Force play” while the computer is thinking will cause it to make its move immediately. If done while it’s your turn, the computer will move for you and flip the board so that you are playing from the other side. If you want, you can force play an entire game and watch the artificial intelligence fight against itself.

When you quit the game the current state will be saved and restored when you resume the game. The menu also allows the user to reload the last game saved, save the current position and start a new game without having to quit the game.

Keys

Key	Action
Menu, Play, Prev, Next	Move the cursor
Select	Pick up / Drop piece
Select+Next	Change level
Select+Play	Force play
Select+Menu	Show the menu

10.1.5 Chopper

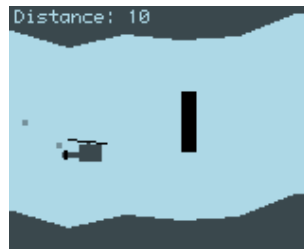


Figure 10.5: Chopper

Navigate a cavernous maze without banging into walls, the ceiling, or the floor. How long can you fly your chopper?

Key	Action
Select	Make chopper fly
Menu	Enter menu

10.1.6 Dice

Dice is a simple dice rolling simulator. Select number and type of dice to roll in a menu and start by choosing “Roll Dice”. The result is shown as individual numbers as well as the total of the rolled dice.

Key	Action
Select	Roll dice again
Menu+ Select	Quit

10.1.7 Doom



Figure 10.6: Doom

This is the famous Doom game.

Getting started

For the game to run you need `.wad` game files located in `/.rockbox/doom/` on your player. Create the directory and save the following files there:

rockdoom.wad. The Rockbox `.wad`, based on `prboom.wad` from `prboom-2.2.6`

Your wad files. Copy all Doom wads you wish to play into that directory.

The needed files can be found at [PluginDoom](#)

To play addon wads create the `addons` directory within the doom directory. Place `wad` files in this directory. Currently doom only supports a maximum number of 10 addons.

A free alternative for Doom 2 is FreeDoom (<http://freedoom.sourceforge.net>). This can be used in place of `doom2.wad`, or it may be used as an addon in Doom, by placing it in the `addons` directory.

Menus

Rockdoom Menu. The Rockdoom menu is shown when Doom is first launched. This is the only time it can be accessed (before starting the game). To re-adjust Rockdoom options, you will need to quit your current game and restart the plugin.

Main Menu. The Doom plugin has a main menu, which is brought up before a game is started. It has the following entries:

Game. Select which (official) wad to launch

Addon. Select which unofficial addon wad to launch (From `/.rockbox/doom/addons` directory)

Demos. Select which demo file to play on game start

Options. Configure low-level Doom options

Play Game. Launch the wad/addon/Demo chosen

Options Menu. This menu has the following options:

- Sound.* Enable or Disable sound in Doom
- Set Keys.* Change the game key configuration
- Time Demo.* Run a timed demo, to test game speed on a player (Only runs on Doom Shareware)
- Player Bobbing.* Enable or Disable player up/Down movement
- Translucency.* Enable or Disable sprite translucency (Fireballs, Plasma...)
- Fake Contrast.* Enable or Disable modified game lighting
- Always Run.* Make the player always run
- Headsup Display.* Show the player status when in fullscreen
- Statusbar Always Red.* Disable colour response statusbar

InGame Main Menu. This menu can only be accessed from within a running game, and is displayed by flipping your **Hold** switch a couple of times

- New Game.* Start a new game
- Options.* In game options
- Load Game.* Load a saved game
- Save Game.* Save the current game
- Quit.* Quit the game

InGame Options Menu. This menu has the following options:

- End Game.* Ends the current game
- Messages.* Enable or Disable in game messages
- Screen Size.* Shrink or Enlarge the displayed portion of the game
- Gamma.* Change the brightness (Gamma) of the game
- Sound Volume.* Change the sound, music and system volume

Note: In game music is not currently supported



Keys

Key	Action
Menu	Move Forward
Prev	Turn Left
Next	Turn Right
Play	Shoot
Menu	Open
Hold switch	InGame Menu
Select	Enter
Select	Change Weapon

Playing the game

After installation of the wad files is complete you can start the game. [more description is needed](#)

10.1.8 Flipit

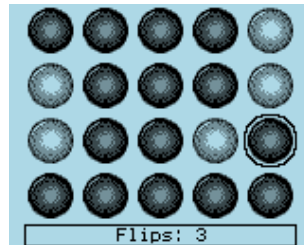


Figure 10.7: Flipit

Flipping the colour of the token under the cursor also flips the tokens above, below, left and right of the cursor. The aim is to end up with a screen containing tokens of only one colour.

Key	Action
Menu / Play / Prev / Next	Move the cursor
Select	Flip
Select+Prev	Shuffle
Select+Play	Solve
Select+Next	Solve step by step
Select+Menu	Quit the game

10.1.9 Goban

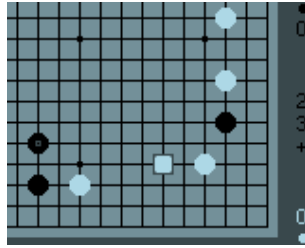



Figure 10.8: Goban

Goban is a a plugin for playing, viewing and recording games of Go (also known as Weiqi, Baduk, Igo and Goe). It uses standard Smart Game Format (SGF) files for saving and loading games. You can find a short introduction to Go at <http://senseis.xmp.net/?WhatsGo> and more information about SGF files can be read at <http://senseis.xmp.net/?SmartGameFormat> or the SGF specification at <http://www.red-bean.com/sgf/>.

This plugin can load all modern SGF files (file format 3 or 4) with few problems. It attempts to preserve SGF properties which it doesn't understand, and most common SGF properties are handled fully. It is possible to view (and edit if you like) Kogo's Joseki Dictionary (<http://waterfire.us/joseki.htm>) with this plugin, although the load and save times can be on the order of a minute or two on particularly slow devices. Large SGF files may stop audio playback for the duration of the plugin's run in order to free up more memory and some very large SGF files will not even load on devices with little available memory.

Note: The plugin does *NOT* support SGF files with multiple games in one file. These are rare, but if you have one don't even try it (the file will most likely be corrupted if you save over it). You have been warned. 

The file `/sgf/gbn_def.sgf` is used by the plugin to store any unsaved changes in the most recently loaded game. This means that if you forget to save your changes, you should load `/sgf/gbn_def.sgf` immediately to offload the changes to another file. If you load another file first then your changes will be lost permanently. The `/sgf/gbn_def.sgf` file is also the file loaded if another is not selected.

The information panel which displays the current move number may also contain these markers:

Mark	Meaning
+	There are nodes after the current node in the SGF tree.
*	There are sibling variations which can be navigated to using the <i>Next Variation</i> menu option of the <i>Context Menu</i> .
C	There is a comment at the current node. It can be viewed/edited using the <i>Add/Edit Comment</i> menu option of the <i>Context Menu</i> .

Controls

Key	Action
Menu	Move cursor up
Play	Move cursor down
Prev	Move cursor left
Next	Move cursor right
Select	Play a move (or use a tool if play-mode has been changed).
Scroll Backward	Retreat one node in the game tree
Scroll Forward	Advance one node in the game tree
Long Select	Main Menu

Menus

Main Menu. The main menu for game setup and access to other menus.

New. Create a new game with your choice of board size and handicaps.

Save. Save the current state of the game. It will be saved to `/sgf/gbn_def.sgf` unless otherwise set.

Save As. Save to a specified file.

Game Info. View and modify the metadata of the current game.

Playback Control. Control the playback of the current playlist and modify the volume of your player.

Zoom Level. Zoom in or out on the board. If you set the zoom level, it will be saved and used again the next time you open this plugin.

Options. Open the Options Menu.

Context Menu. Open the Context Menu which allows you to set play modes and other tools.

Quit. Leave the plugin. Any unsaved changes are saved to `/sgf/gbn_def.sgf`.

Game Info. The menu for modifying game info (metadata) of the current game. This information will be saved to the SGF file and can be viewed in almost all SGF readers.

- Basic Info.** Shows a quick view of the basic game metadata, if any has been set (otherwise does nothing). This option does not allow editing.
- Time Limit.** The time limit of the current game.
- Overtime.** The overtime settings of the current game.
- Result.** The result of the current game. This text must follow the format specified at <http://www.red-bean.com/sgf/properties.html#RE> to be read by other SGF readers. Some examples are *B+R* (Black wins by resignation), *B+5.5* (Black wins by 5.5 points), *W+T* (White wins on Time).
- Handicap.** The handicap of the current game.
- Komi.** The komi of the current game (compensation to the white player for black having the first move).
- Ruleset.** The name of the ruleset in use for this game. The *NZ* and *GOE* rulesets include suicide as a legal move (for multi-stone suicide only); the rest do not.
- Black Player.** The name of the black player.
- Black Rank.** Black's rank, in dan or kyu.
- Black Team.** The name of black's team, if any.
- White Player.** The name of the white player.
- White Rank.** White's rank, in dan or kyu.
- White Team.** The name of white's team, if any.
- Date.** The date that this game took place. This text must follow the format specified at <http://www.red-bean.com/sgf/properties.html#DT> to be read by other SGF readers.
- Event.** The name of the event which this game was a part of, if any.
- Place.** The place that this game took place.
- Round.** If part of a tournament, the round number for this game.
- Done.** Return to the previous menu.
- Options.** Customize the behavior of the plugin in certain ways.
- Show Child Variations?** Enable this to mark child variations on the board if there are more than one. Note: variations which don't start with a move are not visible in this way.
 - Disable Idle Poweroff?** Enable this if you do not want the player to turn off after a certain period of inactivity (depends on your global Rockbox settings).
 - Idle Autosave Time.** Set the amount of idle time to wait before automatically saving any unsaved changes. These autosaves go to the file `/sgf/gbn_def.sgf` regardless of if you have loaded a game or used `SAVE AS` to save the game before or not. Set to `OFF` to disable this functionality completely.
 - Automatically Show Comments?** If this is enabled and you navigate to a node containing game comments, they will automatically be displayed.
- Context Menu.** The menu for choosing different play modes and tools, adding or editing comments, adding pass moves, or switching between sibling variations.

Play Mode. Play moves normally on the board. If there are child moves from the current node, this mode will let you follow variations by simply playing the first move in the sequence. Unless it is following a variation, this mode will not allow you to play illegal moves. This is the default mode before another is set after loading a game or creating a new one.

Add Black Mode. Add black stones to the board as desired. These stones are not moves and do not perform captures or count as ko threats.

Add White Mode. Add white stones to the board as desired. These stones are not moves and do not perform captures or count as ko threats.

Erase Stone Mode. Remove stones from the board as desired. These removed stones are not counted as captured, they are simply removed.

Pass. Play a single pass move. This does not change the mode of play.

Next Variation. If the game is at the first move in a variation, this will navigate to the next variation after the current one. This is the only way to reach variations which start with adding or removing stones, as you cannot follow them by “playing” the same move.

Force Play Mode. The same as Play Mode except that this mode will allow you to play illegal moves such as retaking a ko immediately without a ko threat, suicide on rulesets which don’t allow it (including single stone suicide), and playing a move where there is already a stone.

Mark Mode. Add generic marks to the board, or remove them.

Circle Mode. Add circle marks to the board, or remove them.

Square Mode. Add square marks to the board, or remove them.

Triangle Mode. Add triangle marks to the board, or remove them.

Label Mode. Add one character labels to the board. Each label starts at the letter ‘a’ and each subsequent application of a label will increment the letter. To remove a label, click on it until it cycles through the allowed letters and disappears.

Add/Edit Comment. Add or edit a comment at the current node.

Done. Go back to the previous screen.

10.1.10 Invadrox



Figure 10.9: Invadrox

Invadrox is a clone of the classic arcade game Space Invaders. Kill those pesky aliens before they get to you. Remember, they increase speed, drop down and reverse direction after every pass!

Key	Action
Prev	Move left
Next	Move right
Select	Fire
Menu	Quit

10.1.11 Jackpot

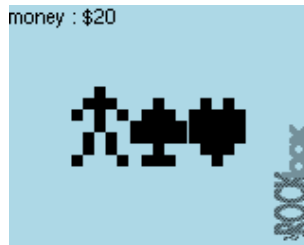


Figure 10.10: Jackpot

This is a jackpot slot machine game. At the beginning of the game you have 20\$. Payouts are given when three matching symbols come up.

Key	Action
Select	Play
Menu+ Select	Exit the game

10.1.12 Jewels

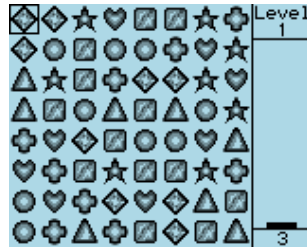


Figure 10.11: Jewels

Jewels is a simple yet addicting game which involves swapping pairs of jewels in order to form connected segments of three or more of the same type.

The goal of the game is to score as many points as possible before running out of available moves. Higher points are awarded to larger combos. The game advances to the next level after every one hundred points and randomly clears several jewels.

In puzzle mode the aim of the game is to connect the puzzles, by skilful swapping pairs of jewels.

Key	Action
Prev/Next/ Scroll	Move the cursor around the jewels
Backward/Scroll Forward	
Select	Select a jewel
Menu	Menu

10.1.13 MazezaM



Figure 10.12: MazezaM

The goal of this puzzle game is to escape a dungeon consisting of ten “mazedams”. These are rooms containing rows of blocks which can be shifted left or right. You can move the rows only by pushing them and if you move the rows carelessly, you will get stuck. You can have another go by selecting “retry level” from the menu, but this will cost you a life. You start the game with three lives. Luckily, there are checkpoints at levels four and eight.

Key	Action
Scroll Backward, Scroll Forward, Prev, Next	Move Character
Menu	Menu

10.1.14 Minesweeper

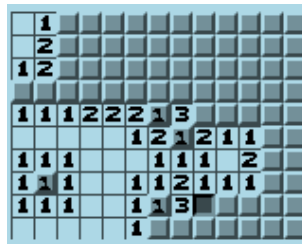


Figure 10.13: Minesweeper plugin

The classic game of minesweeper. The aim of the game is to uncover all of the squares on the board. If a mine is uncovered then the game is over. If a mine is not uncovered, then the number of mines adjacent to the current square is revealed. The aim is to use the information you are given to work out where the mines are and avoid them. When the player is certain that they know the location of a mine, it can be tagged to avoid accidentally “stepping” on it.

Key	Action
Menu / Play / Prev / Next	Move the cursor across the minefield
Scroll Forward / Scroll Backward	Scroll through the entire minefield
Select	Toggle flag on / off
Long Select	Reveal the contents of the current square
Select+Play	Display the current game status
Select+Menu	Exit the game

10.1.15 Pegbox

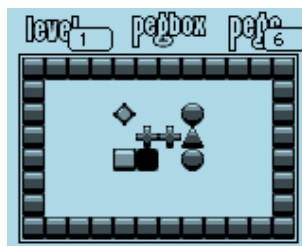


Figure 10.14: pegbox

To beat each level, you must destroy all of the pegs. If two like pegs are pushed into each other they disappear except for triangles which form a solid block and crosses which allow you to choose a replacement block.

Key	Action
In game	
Menu, Play, Prev, Next	to move around
Select+ Next	to choose peg
Select+ Prev	to restart level
Select+ Menu	to go up a level
Select+ Play	to quit

10.1.16 Pong

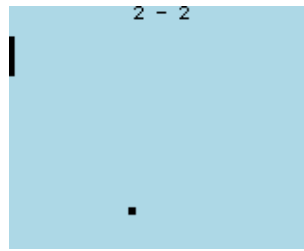


Figure 10.15: Pong

Pong is a simple two player “tennis game”. Whenever a player misses the ball the other scores.

Key	Action
Menu	Left player up
Prev	Left player down
Next	Right player up
Play	Right player down
Select	Quit

10.1.17 Reversi

This is a simple implementation of the Reversi game. The objective of the game is to have a majority of own coloured pieces showing at the end of the game. The game rules can be found in the internet.

You can choose to play manually (you place both the white and dark pieces) or to play against a (not very smart) robot.

10.1.18 Robotfindskitten

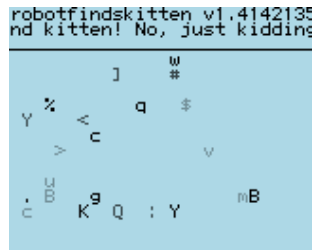


Figure 10.16: Robotfindskitten

In this game, you are robot (#). Your job is to find kitten. This task is complicated by the existence of various things which are not kitten. Robot must touch items to determine if they are kitten or not. The game ends when robotfindskitten.

Key	Action
Menu, Play, Prev, Next	Move robot
Menu+ Select	Quit

10.1.19 Rockblox



Figure 10.17: Rockblox

Rockblox is a Rockbox version of the classic falling blocks game from Russia. The aim of the game is to make the falling blocks of different shapes form full rows. Whenever a row is completed, it will be cleared away, and you gain points. For every ten lines completed, the game level increases, making the blocks fall faster. If the pile of blocks reaches the ceiling, the game is over.

Key	Action
Select+Play	Restart game
Prev	Move left
Next	Move right
Play	Move down
Scroll Backward	Rotate anticlockwise
Scroll Forward / Menu	Rotate clockwise
Select	Drop
Hold switch	Pause
Menu+Select	Quit

10.1.20 Rockblox1d

Rockblox1d is a game for people who find rockblox too hard. In this version the second dimension is missing so the user only has to move the bricks down. No horizontal moving anymore and no need to rotate the brick!

Key	Action
Select	Move down faster
Menu+Select	Quit

10.1.21 Rocklife

This an implementation of J. H. Conway's Game of Life (see http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life for a detailed description).

Rockbox can open files with a configuration description (`.cells` files). Just "play" such file and the game configuration stored in it will be loaded into this plugin.

A `.cells` file is a text file. A capital 'O' marks a live cell, a dot marks a dead cell, all other characters are ignored. Everything on a line starting with an exclamation sign (and including it) is a comment and is ignored.

Key	Action
Select	Play/pause
Play	Change growth mode
Next	Next generation
Prev	Status (only when paused)
Menu+ Select	Exit

10.1.22 Sliding Puzzle



Figure 10.18: Sliding puzzle

The classic sliding puzzle game. Rearrange the pieces so that you can see the whole picture, or switch to number tiles if you like it a little easier. Includes one picture puzzle, but you can switch the puzzle picture to be the album art of the currently playing music track, if one exists (see section B.18 (page 156)). You can also use the sliding puzzle plugin as a viewer for supported image types, to turn your own pictures into a puzzle.

Key controls:

Key	Action
Prev / Next / Menu / Play	Move Tile
Select+Prev	Shuffle
Select+Next	Switch between pictures (default puzzle, album art, and your own image if launched via Open With), and numbered tiles
Select+Menu	Stop the game

10.1.23 Snake



Figure 10.19: Snake

This is the popular snake game. The aim is to grow your snake as large as possible by eating the dots that appear on the screen. The game will end when the snake touches either the borders of the screen or itself.

Key	Action
Menu/Play	Change levels (1 is slowest, 9 is fastest)
Select	Toggle Play/Pause

10.1.24 Snake 2

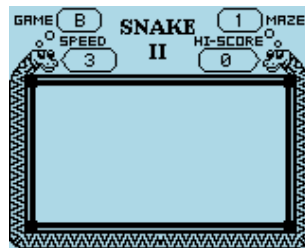


Figure 10.20: Snake 2 – The Snake Strikes Back

Another version of the Snake game. Move the snake around, and eat the apples that pop up on the screen. Each time an apple is eaten, the snake gets longer. The game ends when the snake hits a wall, or runs into itself.

Key	Action
In menu	
Scroll Forward / Scroll Backward	Set game speed
Next / Prev	Select starting maze
Play	Select game type (A or B)
Select	Start the game
In game	
Menu / Play / Prev / Next	Steer the snake
Select	Pause and resume the game
Select+Menu	Quit

In game A, the maze stays the same, in game B after an increasing number of apples eaten the maze is replaced by a new one.

10.1.25 Sokoban

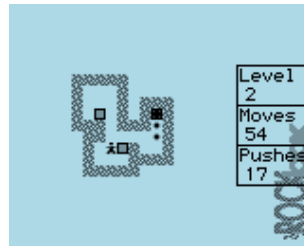


Figure 10.21: Sokoban

The object of the game is to push boxes into their correct position in a crowded warehouse with a minimal number of pushes and moves. The boxes can only be pushed, never pulled, and only one can be pushed at a time.

Sokoban may be used as a viewer for viewing saved solutions and playing external level sets with the `.sok` extension. Level sets should be in the standard Sokoban text format or RLE (Run Length Encoded). For more information about the level format, see http://sokobano.de/wiki/index.php?title=Level_format

Key	Action
In game	
Menu, Play, Prev, Next	Move the “sokoban” up, down, left, or right
Select+Menu	Menu
Select+Prev	Back to previous level
Select+Next	Go to next level
Select	Undo last movement
Select+Play	Redo previously undone move
Solution playback	
Select	Pause/resume
Menu/Play	Increase/decrease playback speed
Prev/Next	Go backward/forward (while paused)
Select+Menu	Quit

Some places where you can find level sets:

- <http://www.sourcecode.se/sokoban/levels.php>
- <http://sokobano.de/en/levels.php>

Note that some level sets may contain levels that are too large for this version of Sokoban and are unplayable as a result.

10.1.26 Solitaire

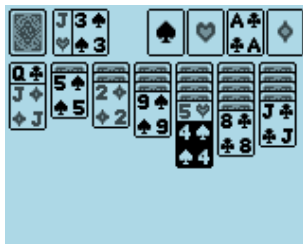


Figure 10.22: Klondike solitaire

This is the classic Klondike solitaire game for Rockbox. This is probably the best-known solitaire in the world. Many people do not even realize that other games exist. Though the name may not be familiar, the game itself certainly is. This is due in no small part to Microsoft's inclusion of the the game in every version of Windows. Though popular, the odds of winning are rather low, perhaps one in thirty hands.

For the full set of rules to the game, and other interesting information visit <http://www.solitairecentral.com/rules/klondike.html>

Key	Action
Scroll Forward / Scroll Backward / Prev / Next	Move Cursor around.
Select	Select cards, move cards, reveal hidden cards...
Menu	If a card was selected – unselect it, else Draw 3 new cards from the remains stack
Play	Put the card from the top of the remains stack on top of the cursor
Long Menu	Put the card under the cursor on one of the 4 final colour stacks.
Long Next	Put the card on top of the remains stack on one of the final colour stacks.
Menu + Select	Show menu

10.1.27 Spacerocks



Figure 10.23: Spacerocks

Spacerocks is a clone of the old arcade game Asteroids. The goal of the game is to blow up the asteroids and avoid being hit by them. Once in a while, a UFO will appear – shoot this for extra points.

Key	Action
Select	Shoot
Menu	Thrust
Scroll Backward/ Scroll Forward	Turn left/right
Play	Teleport
Select+Play	Pause game
Select+Menu	Quit

10.1.28 Star



Figure 10.24: Star game

This is a puzzle game. It is actually a rewrite of Star, a game written by CDK designed for the hp48 calculator.

Rules: Take all of the “o”s to go to the next level. You can switch control between the filled circle, which can take “o”s, and the filled square, which is used as a mobile wall to allow your filled circle to get to places on the screen it could not otherwise reach. The block cannot take “o”s.

Key	Action
Prev	Move Left
Next	Move Right
Menu	Move Up
Play	Move Down
Select	Switch between circle and square
Select+Prev	Previous level
Select+Play	Reset level
Select+Next	Next level
Select+Menu	Exit the game

10.1.29 Sudoku

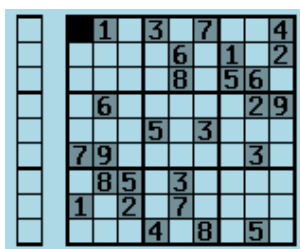


Figure 10.25: Sudoku

Sudoku in Rockbox can act as both a plugin and a viewer. When starting Sudoku from the BROWSE PLUGINS menu, a random game will be generated automatically, and an estimate of its difficulty (very easy, easy, medium, hard or fiendish) will be displayed on the screen. New games can be generated from the GENERATE menu option. When “playing” an existing Sudoku game file from Rockbox’ file browser the plugin is invoked as viewer. The selected Sudoku will get loaded and you can start solving it. The sudoku games need to be stored as text files with the extension `.ss` as single file per game.

You can create and save your own grids under the NEW menu option. Enter the menu (as described in the key table below) when you have finished and enter the full path to save to including the `.ss` extension (e.g. `/sudoku/new.ss`).

The scratchpad

When you play Sudoku on paper most people like to mark numbers in cells that are possible candidates for the cells. This can be done with the scratchpad, shown as separate column. Change the number under the cursor to the number you want to put on the scratchpad and press the scratchpad button, the number will then be added. If the number was already on the scratchpad it will get removed again. The column is stored separately for every cell on the board. The stored values can be displayed inline as small dots by enabling the SHOW MARKINGS settings.

Note: The scratchpad is *not* saved when saving the game.



Key	Action
Scroll Forward / Scroll Backward	Move the cursor
Select	Change cursor move direction
Prev / Next	Change number under the cursor
Long Prev / Next	Constantly changing the number under the cursor
Menu	Open Menu
Play	Add/Remove number to scratchpad
Menu → Quit	Quit

Some places where you can find `.ss` files:

- Simple Sudoku (Advanced Puzzle Packs 1 and 2 located near the bottom of that page): <http://www.angusj.com/sudoku/>
- Kjell's Sudoku generator/solver: <http://kjell.haxx.se/sudoku/>

10.1.30 Wormlet

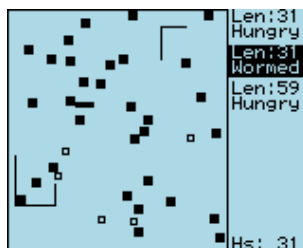


Figure 10.26: Wormlet game

Wormlet is a multi-worm game on a multi-threaded multi-functional Rockbox console. You navigate a hungry little worm. Help your worm to find food and to avoid poisoned argh-tiles. The goal is to turn your tiny worm into a big worm for as long as possible.

Game controls:

Key	Action
Prev	Turn left
Next	Turn right
Menu	Turn Up
Play	Turn Down

The game

Use the control keys of your worm to navigate around obstacles and find food. Worms do not stop moving except when dead. Dead worms are no fun. Be careful as your worm will try to eat anything that you steer it across. It won't distinguish whether it is edible or not.

Food. The small square hollow pieces are food. Move the worm over a food tile to eat it. After eating the worm grows. Each time a piece of food has been eaten a new piece of food will pop up somewhere. Unfortunately for each new piece of food that appears two new "argh" pieces will appear, too.

Argh. An "argh" is a black square poisoned piece - slightly bigger than food - that makes a worm say "Argh!" when run into. A worm that eats an "argh" is dead. Thus eating an "argh" must be avoided under any circumstances. "Arghs" have the annoying tendency to accumulate.

Worms. Thou shall not eat worms. Neither other worms nor thyself. Eating worms is blasphemous cannibalism, not healthy and causes instant death. And it doesn't help anyway: the other worm isn't hurt by the bite. It will go on creeping happily and eat all the food you left on the table.

Walls. Don't crash into the walls. Walls are not edible. Crashing a worm against a wall causes it a headache it doesn't survive.

Game over. The game is over when all worms are dead. The longest worm wins the game.

Pause the game. Press `⏸` to pause the game. Press it again to resume the game.

Stop the game. There are two ways to stop a running game.

- If you want to quit Wormlet entirely simply hit `⏹`. The game will stop immediately and you will return to the game menu.

- If you want to stop the game and still see the screen hit . This freezes the game. If you hit button again a new game starts with the same configuration. To return to the games menu you can hit . A stopped game can not be resumed.

The scoreboard

On the right side of the game field is the score board. For each worm it displays its status and its length. The top most entry displays the state of worm 1, the second worm 2 and the third worm 3. When a worm dies its entry on the score board turns black.

Len: Here the current length of the worm is displayed. When a worm is eating food it grows by one pixel for each step it moves.

Hungry: That's the normal state of a worm. Worms are always hungry and want to eat. It is good to have a hungry worm since it means that your worm is alive. But it is better to get your worm growing.

Growing: When a worm has eaten a piece of food it starts growing. For each step it moves over food it can grow by one pixel. One piece of food lasts for 7 steps. After your worm has moved 7 steps the food is used up. If another piece of food is eaten while growing it will increase the size of the worm for another 7 steps.

Crashed: This indicates that a worm has crashed against a wall.

Argh: If the score board entry displays "Argh!" it means the worm is dead because it tried to eat an "argh". Until we can make the worm say "Argh!" it is your job to say "Argh!" aloud.

Wormed: The worm tried to eat another worm or even itself. That's why it is dead now. Making traps for other players with a worm is a good way to get them out of the game.

Hints

- Initially you will be busy with controlling your worm. Try to avoid other worms and crawl far away from them. Wait until they curl up themselves and collect the food afterwards. Don't worry if the other worms grow longer than yours - you can catch up after they've died.
- When you are more experienced watch the tactics of other worms. Those worms controlled by artificial stupidity head straight for the nearest piece of food. Let the other worm have its next piece of food and head for the food it would probably want next. Try to put yourself between the opponent and that food. From now on you can 'control' the other worm by blocking it. You could trap it by making a 1 pixel wide U-turn. You also could move from food to food and make sure you keep between your opponent and the food. So you can always reach it before your opponent.

10.1.31 Xobox

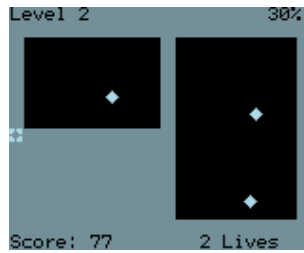


Figure 10.27: Xobox

Xobox is a simple clone of the well known arcade game Qix. The aim of the game is to section off parts of the arena with your trail in order to remove that section from the game. Be careful not to get in the way of enemy balls because, if they hit you or your trail, you lose a life. To finish a level you have to section off more than 75%.

Key	Action
Menu, Play, Prev, Next	Move around the arena
Select	Pause
Select + Menu	Open menu

10.2 Demos

10.2.1 Bounce

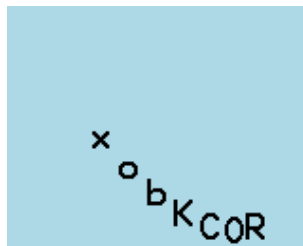


Figure 10.28: Bounce

This demo is of the word “Rockbox” bouncing across the screen. There is also an analogue clock in the background. In SCROLL MODE the bouncing text is replaced by a different one scrolling from right to left.

Key	Action
Scroll Backward / Scroll Forward	Moves to next/previous option
Next / Prev	Increases/decreases option value
Select	Toggles Scroll mode
Menu	Exits bounce demo

Available options are:

Xdist/Ydist. The distance to X axis and Y axis respectively

Xadd/Yadd. How fast the code moves on the sine curve on each axis

Xsane/Ysane. Changes the appearance of the bouncing.

10.2.2 Credits

The credits plugin scrolls the entire list of the names of all the Rockbox contributors after displaying the Rockbox logo and version. This plugin is called when selecting **VERSION** from the **SYSTEM** section of the Rockbox main menu. Exit at any time by pressing **Prev** or Long **Play**.

10.2.3 Cube

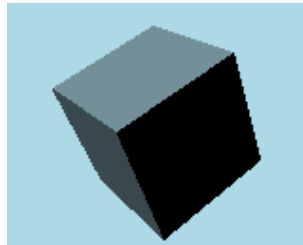


Figure 10.29: Cube

This is a rotating cube screen saver in 3D.

Key	Action
Select+Play	Display at maximum frame rate
Play	Pause
Select+Menu	Cycle draw mode
Next / Prev	Select axis to adjust
Scroll Forward / Scroll Backward	Change speed/angle (speed can not be changed while paused)
Menu	Quit

10.2.4 Demystify

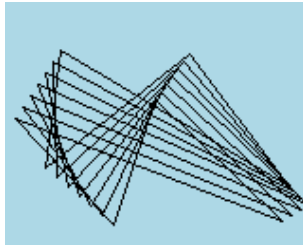


Figure 10.30: Demystify

Demystify is a screen saver like demo.

Key	Action
Scroll Backward / Scroll Forward	Increase / decrease speed
Menu / Play	Add / remove polygon
Menu+ Select	Quit

10.2.5 Fire

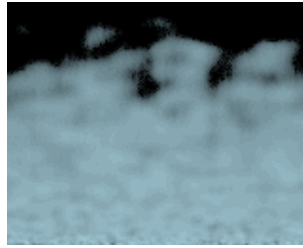


Figure 10.31: Fire

Fire is a demo displaying a fire effect.

Key	Action
Scroll Forward / Scroll Backward	Increase / decrease number of flames
Prev	Toggle flame type
Next	Toggle moving flames
Menu+ Select	Quit

10.2.6 Fractals

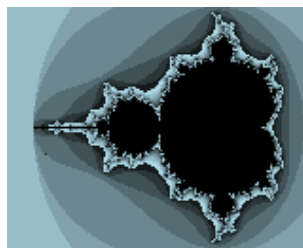


Figure 10.32: Mandelbrot

This demonstration draws fractal images from the Mandelbrot set.

Key	Action
Direction keys	Move about the image
Scroll Forward	Zoom in
Scroll Backward	Zoom out
Select+Prev	Decrease iteration depth (less detail)
Select+Next	Increase iteration depth (more detail)
Select+Play	Reset and return to the default image
Select+Menu	Quit

10.2.7 Logo

Demo showing the Rockbox logo bouncing around the screen.

Key	Action
Next / Prev	Increase / decrease speed on the x-axis
Scroll Forward / Scroll Backward	Increase / decrease speed on the y-axis
Menu	Quit

10.2.8 Mosaique

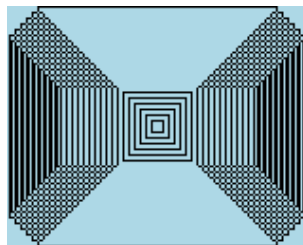


Figure 10.33: Mosaique

This simple graphics demo draws a mosaic picture on the screen of the player. Press **Menu** to quit.

10.2.9 Oscilloscope

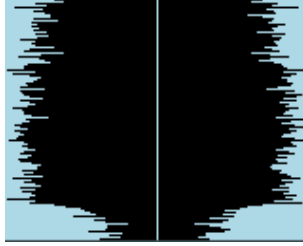


Figure 10.34: Oscilloscope

This demo shows the shape of the sound samples that make up the music being played. At faster speed rates, the player is less responsive to user input and music may start to skip.

Keys

Key	Action
Select+Play	Toggle filled / curve / plot
Select+Next	Toggle whether to scroll or not
Select+Prev	Toggle drawing orientation
Play	Pause the demo
Scroll Forward / Scroll Backward	Increase / decrease volume
Next / Prev	Increase / decrease speed
Select+Menu	Exit demo

10.2.10 PictureFlow



Figure 10.35: PictureFlow

PictureFlow provides a visualisation of your albums with their associated cover art. It is possible to start playback of the selected album from PictureFlow. Playback will start from the selected track. The PictureFlow plugin will continue to run while your tracks are played.

Requirements

PictureFlow uses both the album art (see section B.18 (page 156)) and database (see section 4.2 (page 27)) features of Rockbox. It is therefore important that these are working correctly before attempting to use PictureFlow. In addition, there are some other points of which to be aware:

- PictureFlow will accept album art larger than the dimensions of the screen, but the larger the dimensions, the longer they will take to scale.

Keys

Key	Action
Scroll Backward / Scroll Forward	Scroll through albums / track list
Select	Enter track list / Play album from selected track
Prev	Exit track list
Menu	Enter menu
Long Menu	Exit PictureFlow

Main Menu

Go to WPS. Leave PictureFlow and enter the while playing screen.

Playback Control. Control music playback from within the plugin.

Settings. Enter the settings menu.

Return. Exit menu.

Quit. Exit PictureFlow plugin.

Settings Menu

Show FPS. Displays frames per second on screen.

Spacing. The distance between the front edges of the side slides, i.e. changes the degree of overlap of the side slides. A larger number means less overlap. Scales with zoom.

Centre margin. The distance, in screen pixels, with zoom at 100, between the centre and side slides. Scales with zoom.

Number of slides. Sets the number of slides at each side, including the centre slide. Therefore if set to 4, there will be 3 slides on the left, the centre slide, and then 3 slides on the right.

Zoom. Changes the distance at which slides are rendered from the “camera”.

Show album title. Allows setting the album title to be shown above or below the cover art, or not at all.

Resize Covers. Set whether to automatically resize the covers or to leave them at their original size.

Rebuild cache. Rebuild the PictureFlow cache. This is needed in order for PictureFlow to pick up new albums, and may occasionally be needed if albums are removed.

10.2.11 Plasma

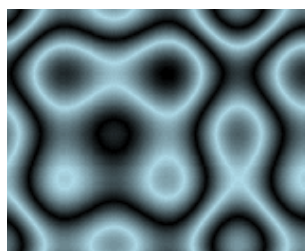


Figure 10.36: Plasma

Plasma is a demo displaying a 80’s style retro plasma effect.

Key	Action
Scroll Forward / Scroll Backward	Adjust frequency
Menu	Quit

10.2.12 Snow

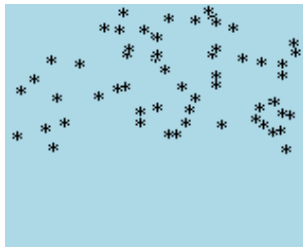


Figure 10.37: Have you ever seen snow falling?

This demo replicates snow falling on your screen. If you love winter, you will love this demo. Or maybe not. Press **Menu** to quit.

10.2.13 Starfield

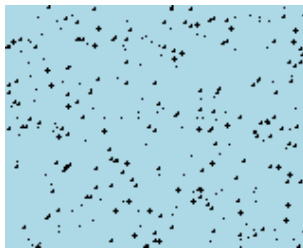


Figure 10.38: Starfield

Starfield simulation (like the classic screensaver).

Key	Action
Next / Prev	Increase / decrease number of stars
Scroll Forward / Scroll Backward	Increase / decrease speed
Menu	Quit

10.2.14 VU meter

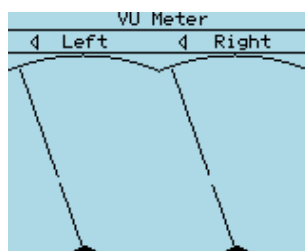


Figure 10.39: VU-Meter

This is a VU meter, which displays the volume of the left and right audio channels. There are 3 types of meter selectable. The analogue meter is a classic needle style. The digital meter is modelled after LED volume displays, and the mini-meter option allows for the display of small meters in addition to the main display (as above). From the settings menu the decay time for the meter (its memory), the meter type and the meter scale can be changed.

Key	Action
Menu	Save settings and quit
Play	Help
Select	Settings
Scroll Forward	Raise Volume
Scroll Backward	Lower Volume

10.3 Viewers

Viewers are plugins which are associated with specific file extensions. They cannot be run directly but are started by “playing” the associated file. Viewers are stored in the `/.rockbox/rocks/viewers/` directory.

Note: Some viewer plugins can only be used by selecting the OPEN WITH... option from the CONTEXT MENU (see section 4.1.2 (page 24)).



Viewer Plugin	Associated filetype(s)	Context Menu only
BMP Viewer	.bmp	
Shortcuts	.link	
Chip-8 Emulator	.ch8	
Frotz	.z1 - .z8	
JPEG Viewer	.jpg, .jpeg	
Lua scripting language	.lua	
Midiplay	.mid, .midi	
MPEG Player	.mpg, .mpeg, .mpv, .m2v	
Rockboy	.gb, .gbc	
Search	.m3u, .m3u8	x
Sort	.*	x
Text Viewer	.txt, .nfo, .*	
VBRfix	.mp3	x
ZXBox	.tap, .tax, .sna, .z80	

10.3.1 Shortcuts

The Shortcuts Plugin allows you to jump to places within the file browser without having to navigate there manually. The plugin works with `.link` files. A `.link` file is just a text file with every line containing the name of the file or the directory you want to quickly jump to. All names should be full absolute names, i.e. they should start with a `/`. Directory names should also end with a `/`.

How to create `.link` files

You can use your favourite text editor to create a `.link` file on the PC and then copy the file to the player. Or you can use the context menu on either a file or a directory in the file browser tree, and use the “Add to shortcuts” menu option. This will append a line with the full name of the file or the directory to the `shortcuts.link` file in the root directory of the player. (The file will be created if it does not exist yet.) You can later rename the automatically created `shortcuts.link` file or move it to another directory if you wish. Subsequent calls of the context menu will create it again.

How to use `.link` files, i.e. jump to desired places

To use a `.link` file just “play” it from the file browser. This will show you a list with the entries in the file. Selecting one of them will then exit the plugin and leave you within the directory selected, or with the file selected in the file browser. You can then play the file or do with it whatever you want. The file will not be “played” automatically.

If the `.link` file contains only one entry no list will be shown, you will directly jump to that location. The file `shortcuts.link` in the root directory is an exception. After “playing” it, the list will be shown even if the file contains just one entry.

If the list you are seeing is from `shortcuts.link` in the root directory, you can delete the selected entry by pressing **Menu**. Deleting entries from other `.link` files is not possible.

Advanced Usage

Placing the line “`#Display last path segments=n`” (where `n` is a number) in the beginning of a `.link` file will leave just the last `n` segments of the entries when they are shown. For example, if `n` is chosen to be 1, then the entry `/MyMusic/collection/song.mp3` will be shown as `song.mp3`. This allows you to hide common path prefixes.

You can also provide a custom display name for each entry individually. To do so, append a tabulator character after the entry’s path followed by your custom name. That name will then be used for showing the entry. For example:

EXAMPLE

```
/MyMusic/collection/song.mp3<TAB>My favourite song!
```

10.3.2 BMP viewer

This plugin opens `.bmp` files from the FILE BROWSER to display them using Rockbox’s greyscale library.

Note: When an audio file is playing the size of the image is limited as the decoding process needs to share memory with audio tracks. To be able to view a bigger file you may need to stop playback.



Key	Action
Menu / Play / Prev / Next	Move around in zoomed in image
Scroll Forward	Zoom in
Scroll Backward	Zoom out
Select+Next	Next bmp in directory
Select+Prev	Previous bmp in directory
Select+Menu	Show menu / Abort
Select+Play	Quit the viewer

The menu has the following entries.

Return. Returns you to the image

Toggle Slideshow Mode. Enables or disables the slideshow mode.

Change Slideshow Timeout. You can set the timeout for the slideshow between 1 second and 20 seconds.

Show Playback Menu. From the playback menu you can control the playback of the currently loaded playlist and change the volume of your player.

Quit. Quits the viewer and returns to the FILE BROWSER.

10.3.3 Chip-8 Emulator

Chip8 is a kind of assembly language for a long-gone architecture. This plugin runs games written using the chip8 instructions. To start a game open a `.ch8` file in the FILE BROWSER

There are lots of tiny Chip8 games (usually only about 256 bytes to a couple of KB) which were made popular by the HP48 calculator's emulator for them. The original Chip8 had 64×32 pixel graphics, and the new superchip emulator supports 128×64 graphics.

The only problem is that they are based on a 4×4 keyboard, but since most games do not use all of the buttons, this can easily be worked around.

To do this, one may put a `.c8k` file with the same name as the original program which contains new key mappings (for `BLINKY.ch8`, one writes a `BLINKY.c8k` file). That `.c8k` file contains 16 characters describing the mapping from the Chip8 keyboard to the default key mapping (that way, several Chip8 keys can be pressed using only one Rockbox key). For example, a file containing the single line:

```
_____ CODE _____
0122458469ABCDEF
```

would correspond to the following non-default mappings:

$3 \rightarrow 2, 6 \rightarrow 8, 7 \rightarrow 4, 8 \rightarrow 6.$

The default keymappings are:

Chip8	Off	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Key	Menu			Scroll Backward		Prev	Play	Next		Scroll Forward							

Some places where can you can find `.ch8` files:

- The PluginChip8 page on www.rockbox.org has several attached: [PluginChip8](#)
- Check out the HP48 chip games section: <http://www.hpcalc.org/hp48/games/chip/>
- PC emulator by the guy who wrote the HP48 emulator: <http://www.pdc.kth.se/~lfo/chip8/CHIP8.htm>
- Links to other chip8 emulators: <http://www.zophar.net/chip8.html>

10.3.4 Frotz

Frotz is a Z-Machine interpreter for playing Infocom's interactive fiction games, and newer games using the same format. To start a game open a .z1 - .z8 file in the FILE BROWSER. Most modern games are in the .z5 or .z8 format but the older formats used by Infocom are supported.

Z-Machine games are text based and most depend heavily on typed commands. The virtual keyboard is used for text entry, both for typing entire lines and for typing single characters when the game requires single character input.

Sounds, pictures, colour and Unicode are not currently supported, but the interpreter informs the game of this and almost all games will adapt so that they are still playable. This port of Frotz attempts to be compliant with the Z-Machine Specification version 1.0.


Some places where you can find Z-Machine games, and information about interactive fiction:

- The Interactive Fiction Archive, where many free modern works can be downloaded: <http://www.ifarchive.org/>
- The specific folder on the if-archive containing Z-Machine games: <http://www.ifarchive.org/indexes/if-archiveXgamesXzcode.html>
- The Infocom homepage, with information about how to get the classic commercial Infocom games: <http://www.csd.uwo.ca/Infocom/>
- The Frotz homepage (for the original Unix port): <http://frotz.sourceforge.net/>
- A Beginner's Guide to Playing Interactive Fiction: <http://www.microheaven.com/IFGuide/>

Key	Action
Menu	Display keyboard to enter text
Select	Press enter
Menu+ Select	Open Frotz menu (not available at MORE prompts)
Play+ Select	Quit

10.3.5 JPEG viewer

This plugin opens `.jpeg` files from the FILE BROWSER to display them using Rockbox's greyscale library.

Note: When an audio file is playing the size of the image is limited as the decoding process needs to share memory with audio tracks. To be able to view a bigger file you may need to stop playback. 

Key	Action
Menu / Play / Prev / Next	Move around in zoomed in image
Scroll Forward	Zoom in
Scroll Backward	Zoom out
Select+Next	Next jpeg in directory
Select+Prev	Previous jpeg in directory
Select+Menu	Show menu / Abort
Select+Play	Quit the viewer

The menu has the following entries.


Return. Returns you to the image

Toggle Slideshow Mode. Enables or disables the slideshow mode.

Change Slideshow Timeout. You can set the timeout for the slideshow between 1 second and 20 seconds.

Show Playback Menu. From the playback menu you can control the playback of the currently loaded playlist and change the volume of your player.

Quit. Quits the viewer and returns to the FILE BROWSER.

Note: Progressive scan and other unusual JPEG files are not supported, and will result in various “unsupported xx” messages. Processing could also fail if the image is too big to decode which will be explained by a respective message. 

10.3.6 Lua scripting language

To quote from the Lua website (<http://www.lua.org>), Lua is a “powerful, fast, lightweight, embeddable scripting language”. Select a `.lua` file in the FILE BROWSER to run it. For more information on programming in Lua, please see <http://www.lua.org/manual/5.1/> and <http://www.lua.org/pil/>.

There are a few exceptions/additions to the Lua support in Rockbox:


No floating point support. The number type in Lua is usually float, however in the Rockbox implementation it is integer.

Non-supported libraries. The coroutine, debug and math libraries are not supported.

Partially-supported libraries. The os and package libraries are only partially supported.


Additional libraries. The bitlib library is integrated to support bitwise operators. See <http://luaforge.net/projects/bitlib> and <http://lua-users.org/wiki/BitwiseOperators>.

Documentation of the API is still a work in progress, and the API itself is not finalised. For the latest information, see [PluginLua](#).

Note: Please note that if a script does not provide a way to exit, then the only way to exit will be to reset the player. 

10.3.7 Midiplay

To get MIDI file playback, a patchset is required. This file contains the instruments required to synthesize the music. A sample patchset is available through the wiki at [PluginMidiPlay](#), and needs to be extracted to the `.rockbox` directory in the root of your player. There should now be a `/.rockbox/patchset/` directory, with the patchset directory containing several `.pat` files and two `.cfg` files. Just select a MIDI file with either the `.mid` or `.midi` extension in the file browser to start playback.

Note: Currently playing MIDI files is still in its early stages and you might experience “Buffer miss!” with many files, except simple ones. 

Key	Action
Scroll Forward/ Scroll Backward	Volume up/ Volume down
Next/ Prev	Skip 3 seconds forward/ backward
Play	Pause/Resume playback
Select+Menu	Stop playback and quit

10.3.8 MPEG Player

The Mpeg Player is a video player plugin capable of playing back MPEG-1 and MPEG-2 video streams with MPEG audio multiplexed into `.mpg` files.

To play a video file, you just select it in the Rockbox FILE BROWSER. If your file does not have the `.mpg` extension but is encoded in the supported format, you will need to use the OPEN WITH... context menu option and choose MPEGPLAYER.

Key	Action
Play	Pause / Resume
Long Play	Stop
Scroll Forward / Scroll Backward	Adjust volume up / down
Prev / Next	Rewind / Fast Forward
Menu	Open the MPEG Player menu

When a video file is selected, the start Menu will be displayed, unless it is disabled via the option “start menu” (see below). In the latter case the video will start playing immediately - unless a resume point is found, in which case the resume menu is presented.

Start Menu

Play from beginning Resume information is discarded and the video plays from the start.

Resume time (min): x.x Resume video playback at stored resume time x.x (start of the video if no resume time is found).

Set start time (min) A preview screen is presented consisting of a thumbnail preview and a progress bar where the user can select a start time by ‘seeking’ through the video. The video playback is started by pressing the select button.

Quit mpegplayer Exit the plugin.

Resume Menu

Yes (min): x.x Resume video playback at stored resume time x.x.

No Play video from the beginning.

Main Menu

Display Options Opens “Display Options” submenu – see below.

Start Menu (default: on) Enable/disable the start menu.

Clear all resumes: x Discard all x resume points.

Quit mpegplayer Exit the plugin.

Display Options Menu

Dithering (default: off) Prevent banding effects in gradients by blending of colours. (only available on Sansa e200, Sansa c200 and Gigabeat F/X)

Show FPS (default: off) This option displays (once a second - if your video is full-screen this means it will get overwritten by the video and appear to flash once per second) the average number of frames decoded per second, the total number of frames skipped (see the Skip Frames option), the current time (in 100 Hz ticks) and the time the current frame is due to be displayed.

Limit FPS (default: on) With this option disabled, mpegplayer will display the video as fast as it can. Useful for benchmarking.

Skip frames (default: on) This option causes mpegplayer to attempt to maintain real-time playback by skipping the display of frames - but these frames are still decoded. Disabling this option can cause loss of A/V sync.

See this page in the Rockbox wiki for information on how to encode your videos to the supported format. [PluginMpegplayer](#)

10.3.9 Search

This plugin can be used on playlists. It searches through the playlist that it opened on looking for any occurrences of the string entered by the user. The results of this search are saved to a new playlist, **search_results.m3u**, within the same directory as the original playlist.

10.3.10 Sort

This plugin takes a file and sorts it in ascending alphabetical order. Case is ignored. This is useful for ordering playlists generated by the CREATE PLAYLIST menu option (see section 5.8 (page 43)).

10.3.11 Text Viewer

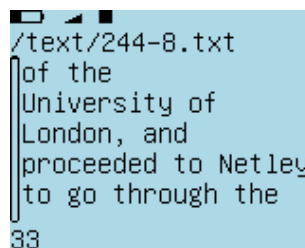


Figure 10.40: Text Viewer

This is a Viewer for text files with word wrap. Just open a **.txt** or **.nfo** file to display it. The text viewer features controls to handle various styles of text formatting and has top-of-file and bottom-of-file buttons. You can view files without a **.txt** or **.nfo**

extension by using *Open with* from the *Context Menu* (see section 4.1.2 (page 24)). You can also bookmark pages.

Default keys

Key	Action
Scroll Backward	Scroll-up
Scroll Forward	Scroll-down
Prev	Top of file (Narrow mode) / One screen left (Wide mode)
Next	Bottom of file (Narrow mode) / One screen right (Wide mode)
Play	Toggle autoscroll
Select	Set/Reset bookmarks
Menu	Enter menu
Select+Menu	Exit text viewer

Menu

Return Return to the file being viewed.

Viewer Options Change settings for the current file.

Encoding Set the codepage in the text viewer. Available settings: ISO-8859-1 (Latin 1), ISO-8859-7 (Greek), ISO-8859-8 (Hebrew), CP1251 (Cyrillic), ISO-8859-11 (Thai), CP1256 (Arabic), ISO-8859-9 (Turkish), ISO-8859-2 (Latin Extended), CP1250 (Central European), SJIS (Japanese), GB-2312 (Simple Chinese), KSX-1001 (Korean), BIG5 (Traditional Chinese), UTF-8 (Unicode), This setting only applies to the plugin and is independent from the DEFAULT CODEPAGE setting (see section 8.4 (page 63)).

Word Wrap Toggle word wrap mode.

On Break lines at the maximum column limit.

Off (Chop Words) Break lines at white space or hyphen.

Line Mode Change how lines are displayed.

Normal Break lines at newline characters.

Join Join lines together.

Expand Add a blank line at newlines. Useful for making paragraphs clearer in some book style text files.

Reflow Lines Justify the text.

Wide View Set the viewmode.

No (Narrow) Set the maximum column width to the screen width.

Yes Set the maximum column width to 114 pixels. (Currently, WIDE and JOIN cannot be selected together.)

Alignment Set the text alignment.

Right Set the text alignment to the right. (Useful for displaying right-to-left languages, such as Arabic or Hebrew)

Left Set the text alignment to the left.

Show Scrollbar Toggle the scrollbar for the current mode. If the file fits on one screen, there is no scrollbar and toggling this setting has no effect.

Off Turn the scrollbar off.

On Turn the scrollbar on.

Overlap Pages Set whether the last line from the previous screen is retained when scrolling pages.

No Set page-down/page-up to one full screen.

Yes Set page-down/page-up to retain one line from the previous screen.


Show Header Select whether to show the status bar and the current file path.

None Do not display the status bar or the current file path.

File Path Display only the current file path.

Status bar Display only the status bar.

Both Display both the status bar and the current file path.

Note: If the status bar position is not set to the top of the screen then STATUS BAR and BOTH are not available. 


Show Footer Select whether to show the status bar and the page number.

None Do not display the status bar or the page number.

Page Num Display only the page number.

Status bar Display only the status bar.

Both Display both the status bar and the page number.

Note: If the status bar position is not set to the bottom of the screen then STATUS BAR and BOTH are not available. 

Font Select the font to be used by the Text Viewer.

Scroll Mode Change the function of the “Scroll-up” and “Scroll-down” buttons.

Scroll by Page

Scroll by Line

Auto-scroll Speed Control the speed of auto-scrolling in number of lines per second. Available options are 1 to 10 lines per second. As an example, 4 will scroll the text at four lines per second.

Show Playback Menu Display the playback menu to allow control of the currently playing music without leaving the plugin.

Select Bookmark Select a saved bookmark. In the screenshot below, the “*” denotes the current page.

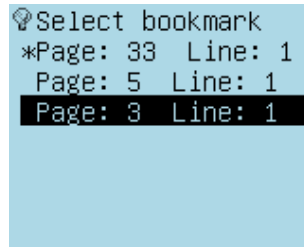


Figure 10.41: The select bookmark menu

Global Settings Set the default settings for the text viewer. The setting items are the same as VIEWER OPTIONS. The global settings are stored in `.rockbox/rocks/viewers/viewer.dat`.

Quit Exits the plugin. The text viewer automatically stores its settings, the current position and bookmarks in `.rockbox/rocks/viewers/viewer_file.dat`.

Bookmarks

To add a bookmark, press **Select**. The bookmark will be displayed as shown below. To delete the bookmark press the same button again.

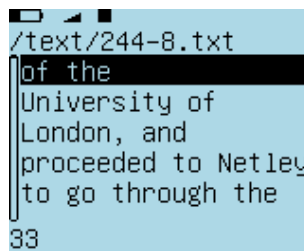


Figure 10.42: A bookmark

10.3.12 Theme Remove

This plugin offers a way to remove a theme. Open the CONTEXT MENU (see section 4.1.2 (page 24)) upon a `theme.cfg` file and select OPEN WITH... → THEME_REMOVE. Some files are not removed regardless of the REMOVE OPTIONS such as `rockbox_default.wps` and the font file currently in use.

Theme Remove menu

Remove Theme. Selecting this will delete the files specified in the REMOVE OPTIONS.

After a theme has been successfully removed, a log message is displayed listing which items have been deleted and which are being kept. Exit this screen by pressing

any key. A file called `theme_remove_log.txt` is created in the root directory of your player listing all the changes.

Remove Options. This menu specifies which items are removed if REMOVE THEME is selected in the menu.

One of the following options can be chosen for each setting.

Ask for Removal. Selecting this option brings up a dialogue with two options: press **Play** to confirm deletion or any other key to cancel.

Remove if not Used. Selecting this option will remove the file automatically, if it is not used by another theme in the theme directory and not currently used.

Never Remove. Selecting this option will always skip deleting the file.

Always Remove. Selecting this option will remove the file with no regard to whether it's used by another theme or not.

Font. Specifies how the `.fnt` file belonging to a theme `.cfg` file is handled. If this option is set to REMOVE IF NOT USED, the fonts came from rockbox-fonts.zip will not be removed as themes may depend on those fonts.

WPS. Specifies how the `.wps` file belonging to a theme `.cfg` file is handled.

Statusbar Skin. Specifies how the `.sbs` file belonging to a theme `.cfg` file is handled.

Backdrop. Specifies how the backdrop `.bmp` file belonging to a theme `.cfg` file is handled.

Iconset. Specifies how the iconset `.bmp` file belonging to a theme `.cfg` file is handled.

Viewers Iconset. Specifies how the viewers iconset `.bmp` file belonging to a theme `.cfg` file is handled.

Create Log File. Setting this to NO prevents the log file from being created.

Quit. Exits this plugin.

10.3.13 VBRfix

This function scans a VBR (Variable Bitrate) MP3 file and updates/creates the Xing VBR header. The Xing header contains information about the VBR stream used to calculate average bit rate, time information and to more accurately fwd/rew in the stream. This function is especially useful when the playback of a file skips, fwd/rew does not work correctly or the time display is incorrect. To use this plugin, open the CONTEXT MENU (see section 4.1.2 (page 24)) upon a `.mp3` file and select OPEN WITH... → VBRFIX.

Note: VBRfix can only run when music is turned off (since it uses the same memory as the player) and can take a while to complete if run on big files.



10.3.14 ZXBox

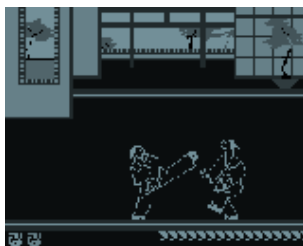


Figure 10.43: ZXBox

ZXBox is a port of the “Spectemu” ZX Spectrum 48k emulator for Rockbox ([project’s homepage](#)). To start a game open a tape file or snapshot saved as `.tap`, `.tzx`, `.z80` or `.sna` in the file browser.

Note: As ZXBox is a 48k emulator only loading of 48k z80 snapshots is possible.



Default keys

The emulator is set up for 5 different buttons: Up, Down, Left, Right and Jump/Fire. Each one of these can be mapped to one key of the Spectrum Keyboard or they can be used like a “Kempston” joystick. Per default the buttons, including an additional but fixed menu button, are assigned as follows:

Key	Action
Menu/Play/ Prev/Next	Directional movement
Select	Jump/Fire
Hold switch	Open ZXBox menu

ZXBox menu

Vkeyboard. This is a virtual keyboard representing the Spectrum keyboard. Controls are the same as in standard Rockbox, but you just press one key instead of entering a phrase.

Play/Pause Tape. Toggles playing of the tape (if it is loaded).

Save Quick Snapshot. Saves snapshot into `/.rockbox/zxboxq.z80`.

Load Quick Snapshot. Loads snapshot from `/.rockbox/zxboxq.z80`.

Save Snapshot. Saves a snapshot of the current state. You would enter the full path and desired name - for example `/games/zx/snapshots/chuckie.sna`. The snapshot format will be chosen after the extension you specified, per default `.z80` will be taken in case you leave it open.

Toggle Fast Mode. Toggles fastest possible emulation speed (no sound, maximum frameskip etc.). This is Useful when loading tapes with some specific loaders.

Options. Map Keys To Kempston. Controls whether the player's buttons should simulate a "Kempston" joystick or some assigned keys of the Spectrum keyboard.

Display Speed. Toggle displaying the emulation speed (in percent).

Invert Colours. Inverts the Spectrum colour palette, sometimes helps visibility.

Frameskip Sets the number of frames to skip before displaying one. With zero frameskip ZXBox tries to display 50 frames per second.

Sound. Turns sound on or off.

Volume. Controls volume of sound output.

Predefined Keymap Select one of the predefined keymaps. For example `2w90z` means: map ZXBox's **Up** to 2, **Down** to w, **Left** to 9, **Right** to 0 and **Jump/Fire** to z. This example keymap is used in the "Chuckie Egg" game.

Custom Keymap This menu allows you to map one of the Spectrum keys accessible through the plugin's virtual keyboard to each one of the buttons.

Quit. Quits the emulator..

Hacking graphics

Due to ZXBox's simple (but fast) scaling to the screen by dropping lines and columns some games can become unplayable. It is possible to hack graphics to make them better visible with the help of an utility such as the "Spectrum Graphics Editor". Useful tools can be found at the "World of Spectrum" site (<http://www.worldofspectrum.org/utilities.html>).

10.4 Applications

10.4.1 Alarm Clock

This plugin is an alarm clock, which resumes a paused song at a given time.

Key configuration

Key	Action
Prev / Next	Switch between hours/minutes selection
Scroll Backward / Scroll Forward or Menu / Play	Increase/Decrease hours/minutes
Select	Set the alarm
Menu+ Select	Exit

Setting an alarm

First select a track and play it, then pause the track and launch the “alarmclock” plugin. Enter a 24h-time (e.g. 13:58) and set the alarm. Music playback will resume when the set time is reached.

10.4.2 Battery Benchmark

The BATTERY BENCHMARK plugin enables you to test your battery’s performance whilst using your player normally. Results can be submitted to the [BatteryRuntime](#) wiki page.

How it works

Once loaded, BATTERY BENCHMARK runs in the background recording various information about your battery to memory. A new point is written to memory every minute. Every time the disk is accessed for any reason (such as refilling the audio buffer, opening a directory or entering USB mode etc.) then the information in memory is written to disk. Once the memory becomes full (after many hours), then the data are written to disk anyway. This is done so that the data are not biased by excessive additional disk accesses. The file is written to the root directory of your player and is called `battery_bench.txt`. The plugin will continue to log info until:

- Another plugin is loaded.
- The player is shut down.
- The battery is empty.

Benchmarks can be resumed if you accidentally load a plugin, or turn off your player, so long as the log file `battery_bench.txt` is not deleted.

Information explained

At the top of the `battery_bench.txt` file is various information on how to use the plugin, followed by the data themselves.

Time This column reports the total time of operation of the player. It is not the time that you started the plug-in. If you have your player on for 5 minutes and then start the plugin, it will start measuring from 5 minutes.

Seconds The same as **Time**, except measured in seconds.

Level The percent level of the battery estimated by Rockbox, and not the actual battery level. The actual battery level can be seen from the **Voltage** column

Time Left This shows the time remaining until the battery is empty, again as estimated by Rockbox.

Voltage The battery voltage in mV at the moment the measurement was taken.

C This stands for Charger. An “A” in that column shows if the power adapter was attached to the unit at the time of the measurement.

U USB powered. Only for targets that support this. A “U” will indicate if the unit was using the USB port for power at the time of the measurement.

Usage

The log file can be used to tell you how long the battery lasted (with some limitations, see below), but it is most useful for graphing discharge curves in order to improve Rockbox’s estimation of battery level and time remaining. The battery log (`battery_bench.txt`) is in CSV format (comma separated variables) and thus can be easily imported into a spreadsheet or similar program.

Limitations

As BATTERY BENCHMARK needs to write the data held in memory to disk in order to save them, it is possible that should Rockbox shut down due to low battery then there will not be enough power remaining to write the data to disk. Therefore all measurements since the previous save will be lost.

10.4.3 Calculator

/				45
MR	M+	2nd	CE	C
7	8	9	/	sqr
4	5	6	*	x^2
1	2	3	-	1/x
0	+/-	.	+	=

Figure 10.44: Calculator

This is a simple scientific calculator for use on the player. It works like a standard calculator. Pressing the “1st” and “2nd” buttons will toggle between other available math functions.

Key	Action
Prev / Next / Scroll Forward / Scroll Backward	Move around the keypad
Select	Select a button
Play	Calculate
Menu	Quit

10.4.4 Calendar

Mon	Tue	Wed	Thu	Fri	Sat	Sun
				01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
May 2009						

Figure 10.45: Calendar

This is a small and simple calendar application with memo saving function. Dots indicate dates with memos. The available memo types are: one off, yearly, monthly, and weekly memos.

You can select what day is first day of week by the setting `FIRST DAY OF WEEK` in the menu.

Key	Action
Prev / Next / Scroll Forward / Scroll Backward	Move the selector
Select	Show memos for the selected day
Play / Menu	Previous / Next month
Menu + Select	Quit

10.4.5 Chess Clock

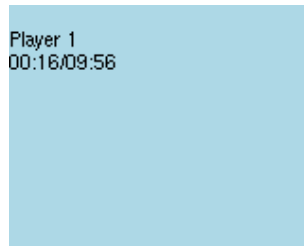


Figure 10.46: Chess Clock

The chess clock plugin is designed to simulate a chess clock, but it can be used in any kind of game with up to ten players.

Setup

Key	Action
Scroll Backward / Scroll Forward	Increase / decrease displayed Value
Select	Move to next screen
Menu	Move to previous screen

- First enter the number of players (1–10)

- Then set the total game time in mm:ss
- Then the maximum round time is entered. For example, this could be used to play Scrabble for a maximum of 15 minutes each, with each round taking no longer than one minute.
- Done. Player 1 starts in paused mode.

While playing

The number of the current player is displayed on the top line. The time below is the time remaining for that round (and possibly also the total time left if different).

Keys are as follows:

Key	Action
Play	Exit plugin
Prev	Restart round for the current player
Select	Pause the time (press again to continue)
Scroll Backward	Switch to next player
Scroll Forward	Switch to previous player
Menu	Open menu (Select to select.)

From the menu it is possible to delete a player, modify the round time for the current player or set the total time for the game. When the round time is up for a player the message “ROUND UP!” is shown (press NEXT to continue). When the total time is up for a player the message “TIME UP!” is shown. The player will then be removed from the timer.

10.4.6 Clock



Figure 10.47: Clock

This is a fully featured analogue and digital clock plugin.

Key configuration

Key	Action
Prev / Next	Cycle through modes
Menu / Play	Cycle through skins
Menu+ Select	Main Menu
Select	Start / Stop Counter
Long Select	Reset Counter

Clock Menu

View Clock Exits the menu and returns to the current clock mode display.

Mode Selector Opens a menu from which you can select a clock mode to view.

Counter Settings Opens a menu from which you can adjust settings pertaining to the counter.

Mode Settings Opens a menu from which you can adjust settings pertaining to the current clock mode (analog, digital, binary).

General Settings Reset Settings Reset all settings to their default values.

Save Settings Save all settings to disk.

Show Counter Toggle Counter display.

Save Choose whether to disable automatic saving, saving to disk on exit, or saving to disk every settings change.

Backlight Choose whether to disable the backlight, use the user's timeout setting, or keep the backlight on.

Idle Poweroff Toggle Idle Poweroff.

Note: This setting is not saved to disk.



Help Opens a brief help screen with key mappings and functionality.

Credits Displays a credits roll.

Analog mode

Small, round, analog clock is displayed in the middle of the LCD. Time readout, if enabled, is displayed at the upper left. If Time readout is in 12-hour ("12h") mode, AM or PM will be displayed at the upper right. The Date readout, if enabled, is displayed at the lower left. The Counter, if enabled, is displayed at the lower right. The second hand, if enabled, is displayed along with the hour and minute hands. Digit display, if enabled, places "12", "3", "6", and "9" around the face of the clock in their respective positions.

Digital mode

An imitation of an LCD, this mode shows a Clock comprised of digital “segments”. The Date readout, if enabled, is displayed at the bottom, center. The Second readout, if in “Text” mode, is displayed at the top, center; if in “Bar” mode, is displayed as a progress bar at the top of the LCD; if in “Invert” mode, will invert the LCD left-to-right as the seconds pass (a fully-inverted LCD means the entire minute has passed). The Counter, if displayed, is shown at the upper left. The Blinking Colon, if enabled, blinks the colon once every second. 12-hour mode, if enabled, will display the time in a 12-hour format.

LCD mode

Based on the Digital Mode, the LCD mode is another imitation of an LCD. The settings available in this mode are exactly the same as Digital Mode, but they are independent of Digital Mode. For example, you can have the Date Readout enabled in Digital Mode and disabled in LCD Mode.

Fullscreen

A Fullscreen clock is displayed. Show Border, if enabled, will draw a small box at every hour position (1 to 12 inclusive). Invert Seconds, if enabled, will invert the LCD as the seconds pass. Second Hand, if enabled, will draw a second hand among the hour and minute hands.

Binary mode

This mode shows a Binary clock. The hour is displayed on the top line, the minute is displayed on the middle line, and the seconds are on the last line. Circle mode, if enabled, draws empty and full circles, instead of zeros and ones. For help on reading binary, please visit: http://en.wikipedia.org/wiki/Binary_numeral_system

Plain mode

This mode shows a “plain” clock in large text that takes up nearly the whole LCD.

10.4.7 Disk Tidy

Disk Tidy deletes junk files left behind by Windows, Linux or OS X after a USB connection. Select the OS’s files you want to delete in the ‘Files to Clean’ menu and select ‘Start Cleaning’ to begin to process. The settings are stored in `.rockbox/rocks/apps/disktidy.config`, in a plain text file that is user-modifiable to allow more entries to be added.

Available Options

All selects all Linux, OS X, and Windows files.

None deselects all file options.

Linux selects Linux files. Default files are `.dolphinview`, `.d3lphinview`, and `.Trash-*/`.

Windows selects Windows files. Default files are `Thumbs.db`, `RECYCLE.BIN`, `Desktop.ini`, `/Recycled` and `/System Volume Information`.

Mac selects OS X files. Default files are `.*`, `.DS_Store` and `/.Trashes`.

Other selects additional files added in by the user.

Key	Action
Prev or Long Play	Exit / Abort

10.4.8 Keybox

Keybox is an encrypted password storage using the “Tiny Encryption Algorithm” with a key derived using md5.

Using Keybox

To get started, start up the plugin and select ENTER KEYBOX. The first time you enter Keybox you will be prompted for a master password and for confirmation of the master password. The master password is the password that you must use to access your stored passwords.

Once inside, enter the context menu by pressing Long **Select**. From the context menu you can create new entries, delete entries and edit entries. Each entry has a “title”, a “user name” and a “password”.

Selecting RESET KEYBOX from the main menu will delete the current list of passwords and a new, empty list will be created the next time you select ENTER KEYBOX after prompting for a new master password. Entries are automatically saved when the plugin is exited.

10.4.9 Lamp

Lamp is a simple plugin to use your player as a lamp (flashlight, torch). You get an empty screen with maximum brightness.

Key	Action
Long Play	Quit

10.4.10 md5sum

Open a file, a directory or just launch it from the plugin menu to create an md5sum of the file, the directory's contents or the whole filesystem. If the file's extension is `.md5` or `.md5sum`, it will check the md5 sums in the file instead. If the file's extension is `.md5list` it will compute md5 sums for all the files listed.

10.4.11 Metronome

This plugin can be used as a metronome to keep time during music practice. Adjust the tempo through the interface or by tapping it out on the appropriate button.

Key	Action
Play+ Select	Exit plugin
Menu+ Select	Start / Stop
Select	Tap tempo
Prev / Next	Adjust tempo
Scroll Forward / Scroll Backward	Adjust volume

10.4.12 Random Folder Advance Configuration

This plugin is used to configure the folders which will be considered when the Auto-Change Directory feature is set to `RANDOM`.

Menu

Generate Folder List Generates a list of all folders found on the player. You can filter the directories which are scanned by creating a file called `/.rockbox/folder_advance_dir.txt`. Only the directories in this file and any contained directories will be scanned. You can have up to 10 directories ignored by the scan by placing a minus sign before them in the list (i.e. `-/CDs` will cause everything in the `/CDs` directory to be ignored.). If you just want `/CDs` to be ignored but want to include the folders within it you need to have both `-/CDs` and `CDs` as entries.

Edit Folder List Enter the folder list editor

Export List To Textfile Exports the list to `/.rockbox/folder_advance_list.txt`

Import List From Textfile Imports the list from `/.rockbox/folder_advance_list.txt`

Play Shuffled Starts playback with the selected directories in random order. Tracks within a directory will be played in normal order. The plugin will exit after starting playback.

Quit

Folder List Editor Keys

Key	Action
Select or Next	Delete selected folder
Long Select	Bring up the context menu which allows you to remove the selected folder or it's entire folder tree
Prev or Long Play	Exit

10.4.13 Stats

```
Files: 989
Music: 113
Dirs: 50
Max files in Dir: 106
```

Figure 10.48: The stats-plugin

The stats-plugin simply counts the number of files, music files and directories on your player. Press **Menu** to abort counting and exit the plugin. Press it again to quit after counting has finished.

10.4.14 Stopwatch

```
0:00:08.42
4 0:00:06.84 [0:00:02.28]
3 0:00:04.56 [0:00:01.56]
2 0:00:03.00 [0:00:03.00]
1 0:00:00.00
```

Figure 10.49: Stopwatch

A simple stopwatch program with support for saving times.

Key	Action
Menu	Quit Plugin
Select	Start / stop
Prev	Reset timer (only when timer is stopped)
Next	Take lap time
Scroll Forward / Scroll Backward	Scroll through lap times

10.4.15 Text Editor

This plugin allows you to view and edit simple text documents on your DAP. You can view files by using `OPEN WITH` from the `CONTEXT MENU` (see section 4.1.2 (page 24)).

Usage

If you start the Text Editor from the plugin browser you will be greeted with a blank screen. When started from the `OPEN WITH` menu item your file should be shown on the screen. You can now edit the file. The Text Editor is line based. This means you can edit one line at a time using the `VIRTUAL KEYBOARD` (see section 4.1.3 (page 26)).

- Move the selection bar to the line you want to edit.
- Edit the highlighted text line or insert a new one using the Item Menu.
- When finished editing exit the Text Editor. You'll be shown a list of save options.

Note: When you have not changed the file the Text Editor will quit immediately.



Key	Action
Select or Next	Edit Line / Select Character
Prev or Long Play	Exit / Abort Editing
Menu	Show Item Menu
Long Select	Delete Line

11 Advanced Topics


11.1 Customising the User Interface

11.1.1 Getting Extras

Rockbox supports custom fonts. A collection of fonts is available for download in the font package at <http://www.rockbox.org/daily.shtml>.


11.1.2 Loading Fonts

Rockbox can load fonts dynamically. Simply copy the `.fnt` file to the player and “play” it in the FILE BROWSER. If you want a font to be loaded automatically every time you start up, it must be located in the `/.rockbox/fonts` directory and the filename must be at most 24 characters long. You can browse the fonts in `/.rockbox/fonts` under SETTINGS → THEME SETTINGS → FONT in the MAIN MENU.

Note: Advanced Users Only: Any BDF font should be usable with Rockbox. To convert from `.bdf` to `.fnt`, use the `convbdf` tool. This tool can be found in the `tools` directory of the Rockbox source code. See [☞ CreateFonts#ConvBdf](#) for more details. Or just run `convbdf` without any parameters to see the possible options. 

11.1.3 Loading Languages

Rockbox can load language files at runtime. Simply copy the `.lng` file (*do not use the .lang file*) to the player and “play” it in the Rockbox directory browser or select SETTINGS → GENERAL SETTINGS → LANGUAGE from the MAIN MENU.

Note: If you want a language to be loaded automatically every time you start up, it must be located in the `/.rockbox/langs` directory and the filename must be a maximum of 24 characters long. 

If your language is not yet supported and you want to write your own language file find the instructions on the Rockbox website: [☞ LangFiles](#)

11.1.4 Loading Backdrops

Rockbox supports showing an image as a backdrop in the FILE BROWSER and the menus. The backdrop image must be a `.bmp` file of the exact same dimensions as the display

in your player (160×128×2 with the last number giving the colour depth in bits). To use an image as a backdrop browse to it in the FILE BROWSER and open the CONTEXT MENU (see section 4.1.2 (page 24)) on it and select the option SET AS BACKDROP. If you want rockbox to remember your backdrop the next time you start your player the backdrop must be placed in the `/.rockbox/backdrops` directory.

11.1.5 UI Viewport

By default, the UI is drawn on the whole screen. This can be changed so that the UI is confined to a specific area of the screen, by use of a UI viewport. This is done by adding the following line to the `.cfg` file for a theme:

```
ui viewport: X,Y,[width],[height],[font],[fgshade],[bgshade]
```

Only the first two parameters *have* to be specified, the others can be omitted using '-' as a placeholder. The syntax is very similar to WPS viewports (see section 11.2.2 (page 136)). Briefly:

- 'fgshade' and 'bgshade' are numbers in the range 0 (= black) to 3 (= white).
- 'font' is a number: 0 is the built-in system font, 1 is the user-selected font.

EXAMPLE

```
ui viewport: 15,20,100,150,-,-,-
```

This displays the menu starting at 15px from the left of the screen and 20px from the top of the screen. It is 100px wide and 150px high. The font and the foreground/background shades are defined in the theme `.cfg` file or in the THEME SETTINGS menu.

11.2 Configuring the Theme

11.2.1 Themeing – General Info

There are various different aspects of the Rockbox interface that can be themed – the WPS or WHILE PLAYING SCREEN, the FMS or FM SCREEN (if the player has a tuner), and the SBS or BASE SKIN. The WPS is the name used to describe the information displayed on the player's screen whilst an audio track is being played, the FMS is the screen shown while listening to the radio, and the SBS lets you specify a base skin that is shown in the menus and browsers, as well as the WPS and FMS. The SBS also allows you to control certain aspects of the appearance of the menus/browsers. There are a number of themes included in Rockbox, and you can load one of these at any time by selecting it in SETTINGS → THEME SETTINGS → BROWSE THEME FILES. It is also possible to set individual items of a theme from within the SETTINGS → THEME SETTINGS menu.

11.2.2 Themes – Create Your Own

The theme files are simple text files, and can be created (or edited) in your favourite text editor. To make sure non-English characters display correctly in your WPS you must save the .wps file with UTF-8 character encoding. This can be done in most editors, for example Notepad in Windows 2000 or XP (but not in 9x/ME) can do this.

Files Locations: Each different “themeable” aspect requires its own file – WPS files have the extension `.wps`, FM screen files have the extension `.fms`, and SBS files have the extension `.sbs`. The main theme file has the extension `.cfg`. All files should have the same name.

The theme `.cfg` file should be placed in the `/.rockbox/themes` directory, while the `.wps`, `.fms` and `.sbs` files should be placed in the `/.rockbox/wps` directory. Any images used by the theme should be placed in a subdirectory of `/.rockbox/wps` with the same name as the theme, e.g. if the theme files are named `mytheme.wps`, `mytheme.sbs` etc., then the images should be placed in `/.rockbox/wps/mytheme`.

All full list of the available tags are given in appendix section B (page 149); some of the more powerful concepts in theme design are discussed below.

- All characters not preceded by `%` are displayed as typed.
- Lines beginning with `#` are comments and will be ignored.

Note: Keep in mind that your player resolution is $160 \times 128 \times 2$ (with the last number giving the colour depth in bits) when designing your own WPS, or if you use a WPS designed for another target. 


Viewports

By default, a viewport filling the whole screen contains all the elements defined in the `.wps` file. The elements in this viewport are displayed with the same background/foreground shades and the text is rendered in the same font as in the main menu. To change this behaviour a custom viewport can be defined. A viewport is a rectangular window on the screen with its own foreground/background shades. This window also has variable dimensions. To define a viewport a line starting `%V|...` has to be present in the `.wps` file. The full syntax will be explained later in this section. All elements placed before the line defining a viewport are displayed in the default viewport. Elements defined after a viewport declaration are drawn within that viewport. Loading images (see Appendix section B.17 (page 155)) should be done within the default viewport. A viewport ends either with the end of the file, or with the next viewport declaration line. Viewports sharing the same coordinates and dimensions cannot be displayed at the same time. Viewports cannot be layered *transparently* over one another. Subsequent viewports will be drawn over any other viewports already drawn onto that area of the screen.

Viewport Declaration Syntax

`%V|x|y|[width]|[height]|[font]|[fgshade]|[bgshade]|`

- ‘fgshade’ and ‘bgshade’ are numbers in the range 0 (= black) to 3 (= white).
- ‘font’ is a number: 0 is the built-in system font, 1 is the user-selected font.
- Only the coordinates *have* to be specified. Leaving the other definitions blank will set them to their default values.

Note: The correct number of ‘|’s (vertical bars) with hyphens in blank fields are still needed in any case. 

EXAMPLE

```
%V|12|20|-|-|1|-|-|
%sThis viewport is displayed permanently. It starts 12px from the left and
%s20px from the top of the screen, and fills the rest of the screen from
%sthat point. The lines will scroll if this text does not fit in the viewport.
%sThe user font is used, as are the default foreground/background shades.
```

Viewport definition	Default value
width/height	remaining part of screen
font	user defined
shade	black foreground on white background

Conditional Viewports

Any viewport can be displayed either permanently or conditionally. Defining a viewport as `%V|...` will display it permanently.

- `%Vl'identifier'|...|` This tag preloads a viewport for later display. ‘identifier’ is a single lowercase letter (a-z) and the ‘...’ parameters use the same logic as the `%V` tag explained above.
- `%Vd'identifier'` Display the ‘identifier’ viewport.

Viewports can share identifiers so that you can display multiple viewports with one `%Vd` line.

EXAMPLE

```
;%C<%Vda|%Vdb>
%Vl|a|10|10|50|50|-|-|-|
%Cl|0|0|50|50|
%C
%Vl|a|0|70|70|14|11|-|-|
```

```

%s%acThere you have it: Album art.
%V1|b|20|14|50|14|1|2|-|
%t1%acWarning:;%t.1
%V1|b|20|30|50|50|1|-|-|
%sNo album art found
%scheck your filenames.

```

This example checks for album art. Album art will be displayed in viewport ‘a’, if it is found. Otherwise a flashing warning will be displayed in viewport ‘b’.

Note: The tag to display conditional viewports must come before the tag to preload the viewport in the .wps file.



11.2.3 Info Viewport (SBS only)

As mentioned above, it is possible to set a UI viewport via the theme .cfg file. It is also possible to set the UI viewport through the SBS file, and to conditionally select different UI viewports.

- `%Vi|'label'|...|` This viewport is used as Custom UI Viewport in the case that the theme doesn't have a ui viewport set in the theme .cfg file. Having this is strongly recommended since it makes you able to use the SBS with other themes. If label is set this viewport can be selectively used as the Info Viewport using the `%VI` tag. The ‘...’ parameters use the same logic as the `%V` tag explained above.
- `%VI'label'` Set the Info Viewport to use the viewport called label, as declared with the previous tag.

Conditional Tags

If/else: Syntax: `/?xx<true|false>`

If the tag specified by “xx” has a value, the text between the “<” and the “|” is displayed (the true part), else the text between the “|” and the “>” is displayed (the false part). The else part is optional, so the “|” does not have to be specified if no else part is desired. The conditionals nest, so the text in the if and else part can contain all % commands, including conditionals.

Enumerations: Syntax: `/?xx<alt1|alt2|alt3|...|else>`

For tags with multiple values, like Play status, the conditional can hold a list of alternatives, one for each value the tag can have. Example enumeration:

EXAMPLE

```

%?mp<Stop|%Play|Pause|Ffwd|Rew>

```

The last else part is optional, and will be displayed if the tag has no value. The WPS parser will always display the last part if the tag has no value, or if the list of alternatives is too short.

Next Song Info

You can display information about the next song – the song that is about to play after the one currently playing (unless you change the plan).

If you use the upper-case versions of the three tags: **F**, **I** and **D**, they will instead refer to the next song instead of the current one. Example: **%Ig** is the genre name used in the next song and **%Ff** is the mp3 frequency.

Note: The next song information *will not* be available at all times, but will most likely be available at the end of a song. We suggest you use the conditional display tag a lot when displaying information about the next song!



Alternating Sublines

It is possible to group items on each line into 2 or more groups or “sublines”. Each subline will be displayed in succession on the line for a specified time, alternating continuously through each defined subline.

Items on a line are broken into sublines with the semicolon ‘;’ character. The display time for each subline defaults to 2 seconds unless modified by using the ‘%t’ tag to specify an alternate time (in seconds and optional tenths of a second) for the subline to be displayed.

Subline related special characters and tags:

; Split items on a line into separate sublines

%t Set the subline display time. The ‘%t’ is followed by either integer seconds (**%t5**), or seconds and tenths of a second (**%t3.5**).

Each alternating subline can still be optionally scrolled while it is being displayed, and scrollable formats can be displayed on the same line with non-scrollable formats (such as track elapsed time) as long as they are separated into different sublines. Example subline definition:

EXAMPLE

```
%s%t4%ia;%s%it;%t3%pc %pr : Display id3 artist for 4 seconds,
                             Display id3 title for 2 seconds,
                             Display current and remaining track time
                             for 3 seconds,
                             repeat...
```

Conditionals can be used with sublines to display a different set and/or number of sublines on the line depending on the evaluation of the conditional. Example subline with conditionals:

EXAMPLE

```
;%?it<%t8%s%it|%s%fn>;;%?ia<%t3%s%ia|%t0>
```

The format above will do two different things depending if ID3 tags are present. If the ID3 artist and title are present:

- Display id3 title for 8 seconds,
- Display id3 artist for 3 seconds,
- repeat...

If the ID3 artist and title are not present:

- Display the filename continuously.

Note that by using a subtitle display time of 0 in one branch of a conditional, a subtitle can be skipped (not displayed) when that condition is met.

Using Images

You can have as many as 52 images in your WPS. There are various ways of displaying images:

1. Load and always show the image, using the `%x` tag
2. Preload the image with `%x1` and show it with `%xd`. This way you can have your images displayed conditionally.
3. Load an image and show as backdrop using the `%X` tag. The image must be of the same exact dimensions as your display.

Example on background image use:

EXAMPLE

```
%X|background.bmp|
```

The image with filename `background.bmp` is loaded and used in the WPS.

Example on bitmap preloading and use:

EXAMPLE

```
%x|a|static_icon.bmp|50|50|
%x1|b|rep_off.bmp|16|64|
%x1|c|rep_all.bmp|16|64|
%x1|d|rep_one.bmp|16|64|
%x1|e|rep_shuffle.bmp|16|64|
%?mm<%xdb|%xdc|%xdd|%xde>
```

Four images at the same x and y position are preloaded in the example. Which image to display is determined by the `%mm` tag (the repeat mode).

Example File

EXAMPLE

```
%s%?in<%in - >%?it<%it|%fn> %?ia<[%ia%?id<, %id>]>
%pb%pc/%pt
```

That is, “tracknum – title [artist, album]”, where most fields are only displayed if available. Could also be rendered as “filename” or “tracknum – title [artist]”.

11.3 Managing Rockbox Settings**11.3.1 Introduction to .cfg Files**

Rockbox allows users to store and load multiple settings through the use of configuration files. A configuration file is simply a text file with the extension `.cfg`.

A configuration file may reside anywhere on the disk. Multiple configuration files are permitted. So, for example, you could have a `car.cfg` file for the settings that you use while playing your jukebox in your car, and a `headphones.cfg` file to store the settings that you use while listening to your player through headphones.

See section 11.3.2 (page 141) below for an explanation of the format for configuration files. See section 11.3.3 (page 142) for an explanation of how to create, edit and load configuration files.

11.3.2 Specifications for .cfg Files

The Rockbox configuration file is a plain text file, so once you use the SAVE .CFG FILE option to create the file, you can edit the file on your computer using any text editor program. See Appendix section C (page 161) for available settings. Configuration files use the following formatting rules:


1. Each setting must be on a separate line.
2. Each line has the format “setting: value”.
3. Values must be within the ranges specified in this manual for each setting.
4. Lines starting with `#` are ignored. This lets you write comments into your configuration files.

Example of a configuration file:

EXAMPLE

```
volume: 70
bass: 11
treble: 12
balance: 0
time format: 12hour
volume display: numeric
```

```
show files: supported
wps: /.rockbox/car.wps
lang: /.rockbox/afrikaans.lng
```

Note: As you can see from the example, configuration files do not need to contain all of the Rockbox options. You can create configuration files that change only certain settings. So, for example, suppose you typically use the player at one volume in the car, and another when using headphones. Further, suppose you like to use an inverse LCD when you are in the car, and a regular LCD setting when you are using headphones. You could create configuration files that control only the volume and LCD settings. Create a few different files with different settings, give each file a different name (such as `car.cfg`, `headphones.cfg`, etc.), and you can then use the BROWSE .CFG FILES option to quickly change settings. 

A special case configuration file can be used to force a particular setting or settings every time Rockbox starts up (e.g. to set the volume to a safe level). Format a new configuration file as above with the required setting(s) and save it into the `/.rockbox` directory with the filename `fixed.cfg`.

11.3.3 The Manage Settings menu

The MANAGE SETTINGS menu can be found in the MAIN MENU. The MANAGE SETTINGS menu allows you to save and load `.cfg` files.

Browse .cfg Files Opens the FILE BROWSER in the `/.rockbox` directory and displays all `.cfg` (configuration) files. Selecting a `.cfg` file will cause Rockbox to load the settings contained in that file. Pressing **Prev** will exit back to the MANAGE SETTINGS menu. See the WRITE .CFG FILES option on the MANAGE SETTINGS menu for details of how to save and edit a configuration file.

Reset Settings This wipes the saved settings in the player and resets all settings to their default values.

Save .cfg File This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the user settings that are described throughout this manual.

Hint: Use the SAVE .CFG FILE feature (MAIN MENU → MANAGE SETTINGS) to save the current settings, then use a text editor to customize the settings file. See Appendix section C (page 161) for the full reference of available options.

Save Sound Settings This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the sound related settings.

Save Theme Settings This option writes a `.cfg` file to your player's disk. The configuration file has the `.cfg` extension and is used to store all of the theme related settings.

11.4 Firmware Loading

11.4.1 Using ROLO (Rockbox Loader)

Rockbox is able to load and start another firmware file without rebooting. You just “play” a file with the extension `.ipod`. This can be used to test new firmware versions without deleting your current version.

11.5 Optimising battery runtime

Rockbox offers a lot of settings that have high impact on the battery runtime of your player. The largest power savings can be achieved through disabling unneeded hardware components – for some of those there are settings available. Another area of savings is avoiding or reducing CPU boosting through disabling computing intense features (e.g. sound processing) or using effective audio codecs. The following provides a short overview of the most relevant settings and rules of thumb.

11.5.1 Display backlight

The active backlight consumes a lot of power. Therefore choose a setting that disables the backlight after timeout (for setting `BACKLIGHT` see section 8.4 (page 61)). Avoid to have the backlight enabled all the time.

11.5.2 Accessory power supply

As default your player's accessory power supply is always enabled to ensure proper function of connected accessory devices. Disable this power supply, if – or as long as – you do not use any accessory device with your player while running Rockbox (see section 8.5.6 (page 65)).

11.5.3 Anti-Skip Buffer

Having a large anti-skip buffer tends to use more power, and may reduce your battery life. It is recommended to always use the lowest possible setting that allows correct and continuous playback (see section 7.5 (page 53)).

11.5.4 Replaygain

Replaygain is a post processing that equalises the playback volume of audio files to the same perceived loudness. This post processing applies a factor to each single PCM

sample and is therefore consuming additional CPU time. If you want to achieve some (minor) savings in runtime, switch this feature off (see section [7.9](#) (page [55](#))).

11.5.5 Audio format and bitrate

In general the fastest decoding audio format will be the best in terms of battery runtime on your player. An overview of different codec's performance on different players can be found at [☞CodecPerformanceComparison](#).

Your target uses a hard disk which consumes a large amount of power while spinning – up to several hundred mA. The less often the hard disk needs to spin up for buffering and the shorter the buffering duration is, the lower is the power consumption. Therefore the bitrate of the audio files does have an impact on the battery runtime as well. Lower bitrate audio files will result in longer battery runtime.








Please do not re-encode any existing audio files from one lossy format to another based upon the above mentioned. This will reduce the audio quality. If you have the choice, select the best suiting codec when encoding the original source material.

11.5.6 Sound settings

In general all kinds of sound processing will need more CPU time and therefore consume more power. The less sound processing you use, the better it is for the battery runtime (for options see section [6](#) (page [45](#))).

A File formats

A.1 Supported file formats

Icon	File Type	Extension	Action when selected
	Directory	<i>none</i>	Enter the directory
	Audio file	<i>various</i> (see A.2)	Start playing the file and show the WPS
	Bookmark	.bmark	Display all bookmarks for an audio file
	Game of Life	.cells	Show the configuration with the “Rocklife” plugin
	Configuration File	.cfg	Load the settings file
	Chip8 game	.ch8	Play the Chip8 game
	Cuesheet	.cue	View the cuesheet file
	Font	.fnt	Change the user interface font to this one
	Rockbox firmware	.ipod	Load the new firmware with ROLO
	Image	.jpg	View the JPEG image
	Link	.link	Display list of target files and directories; selecting one jumps to the target. See section 10.3.1 (page 109).
	Language File	.lng	Load the language file
	Playlist	.m3u, .m3u8	Load the playlist and start playing the first file
	Video	.mpg, .mpeg, .mpv, .m2v	Play the MPEG1/2 video
	Plugin	.rock	Start the plugin
	Text File	.txt	Display the text file using the text viewer plugin
	Voice file	.voice	Allow Rockbox to speak menus
	While Playing Screen	.wps	Load the new WPS display configuration

A.2 Supported audio formats

A.2.1 Lossy Codecs

Format	Extension	Notes
ATSC A/52	.a52, .ac3	Supports downmixing for playback of 5.1 streams in stereo.
ADX	.adx	
Advanced Audio Coding	.m4a, .m4b, .mp4	
MPEG audio	.mp1, .mpa, .mp2, .mp3	
Musepack	.mpc	Supports SV7 and SV8 in mono/stereo
OGG/Vorbis	.ogg, .oga	Playback of some old “floor 0” files may fail.
Sony Audio	.oma, .aa3	
RealAudio	.rm, .ra, .rmvb	
Speex	.spx	
Dialogic telephony type	.vox	
Windows Media Audio	.wma, .wmv, .asf	

A.2.2 Lossless Codecs

Format	Extension	Notes
Audio Interchange File Format	.aif, .aiff	AIFF supports following formats: linear pcm 8/16/24/32 bit. IEEE float 32/64 bit ITU-T G.711 a-low/ μ -low QuickTime IMA ADPCM
Monkey's Audio	.ape, .mac	Only -c1000 files decode fast enough to be useful.
Sun Audio	.au, .snd	Sun Audio supports following formats: linear pcm 8/16/24/32 bit. IEEE float 32/64 bit ITU-T G.711 a-low/ μ -low
Free Lossless Audio	.flac	
Apple Lossless	.m4a, .mp4	
Shorten	.shn	Seeking not supported.
True Audio	.tta	Decoding is not real time on some targets.
Wave64	.w64	Wave/Wave64 supports following formats:
Waveform audio format	.wav	linear pcm 8/16/24/32 bit. IEEE float 32/64 bit ITU-T G.711 a-low/ μ -low Microsoft ADPCM Intel DVI ADPCM(IMA ADPCM) 2/3/4/5 bit Dialogic OKI ADPCM YAMAHA ADPCM Adobe SWF ADPCM
Wavpack	.wv	

A.2.3 Other Codecs

Format	Extension	Notes
Atari Sound Format	.cmc, .cm3, .cmr, .cms, .dmc, .dlt, .mpt, .mpd	
Synthetic music Mobile Application Format	.mmf	Supports PCM/ADPCM only
MOD	.mod	
NES Sound Format	.nsf, .nsfe	
Atari SAP	.sap	
Sound Interface Device SPC700	.sid	

B Theme Tags

Theming is discussed in detail in section section 11.2 (page 135), what follows is a list of the available tags.

B.1 Status Bar

Tag	Description
%we	Display Status Bar
%wd	Hide Status Bar
%wi	Display the inbuilt Status Bar in the current viewport

These tags override the player setting for the display of the status bar. They must be noted on their own line (which will not be shown in the WPS).

B.2 Information from the track tags

Tag	Description
%ia	Artist
%ic	Composer
%iA	Album Artist
%id	Album Name
%iG	Grouping
%ig	Genre Name
%in	Track Number
%it	Track Title
%iC	Comment
%iv	ID3 version (1.0, 1.1, 2.2, 2.3, 2.4, or empty if not an ID3 tag)
%iy	Year
%ik	Disc Number

Remember that this information is not always available, so use the conditionals to show alternate information in preference to assuming.

These tags, when written with a capital “I” (e.g. %Ia or %Ic), show the information for the next song to be played.

B.3 Viewports

Tag	Description
<code>%V x y [width] [height] [font] [fgshade] [bgshade] </code>	See section 11.2.2
<code>%Vd'identifier'</code>	Display the 'identifier' viewport. E.g. <code>;%?C<%Vda %Vdb></code> will show viewport 'a' if album art is found, and 'b' if it isn't.
<code>%Vi 'label' ... </code>	Declare a Custom UI Viewport. The '...' parameters use the same logic as the %V tag explained above. See section 11.2.2 .
<code>%VI'label'</code>	Set the Info Viewport to use the viewport called label, as declared with the previous tag.

B.4 Power Related Information

Tag	Description
<code>%b1</code>	Numeric battery level in percents Can also be used in a conditional: <code>;%?b1<-1 0 1 2 ... N></code> , where the value -1 is used when the battery level isn't known (it usually is)
<code>%bv</code>	The battery level in volts
<code>%bt</code>	Estimated battery time left
<code>%bp</code>	"p" if the charger is connected (only on targets that can charge batteries)
<code>%bc</code>	"c" if the unit is currently charging the battery (only on targets that have software charge control or monitoring)
<code>%bs</code>	Remaining time of the sleep timer (if it is set)

B.5 Information about the file

Tag	Description
%fb	File Bitrate (in kbps)
%fc	File Codec (e.g. “MP3” or “FLAC”). This tag can also be used in a conditional tag, <code>;%?fc<mp1 mp2 mp3 aiff wav ogg flac mpc a52 wavpack alac aac- shn sid adx nsf speex spc ape wma mod sap unknown></code> . The codec order is as follows: MP1, MP2, MP3, AIFF, WAV, Ogg Vorbis (OGG), FLAC, MPC, AC3, WavPack (WV), ALAC, AAC, Shorten (SHN), SID, ADX, NSF, Speex, SPC, APE, WMA, MOD, SAP.
%ff	File Frequency (in Hz)
%fk	File Frequency (in kHz)
%fm	File Name
%fn	File Name (without extension)
%fp	File Path
%fs	File Size (in Kilobytes)
%fv	“(avg)” if variable bit rate or empty string if constant bit rate
%d1	First directory from the end of the file path
%d2	Second directory from the end of the file path
%d3	Third directory from the end of the file path

Example for the `%dN` commands: If the path is “/Rock/Kent/Isola/11 - 747.mp3”, `%d1` is “Isola”, `%d2` is “Kent” and `%d3` is “Rock”.

These tags, when written with the first letter capitalized (e.g. `%Fn` or `%D2`), produce the information for the next file to be played.

B.6 Playlist/Song Info

Tag	Description
%pb	Progress Bar This will replace the entire line with a progress bar. You can set the position, width and height of the progressbar (in pixels) and load a custom image for it: %pb image.bmp x y width height
%px	Percentage Played In Song
%pc	Current Time In Song
%pe	Total Number of Playlist Entries
%pm	Peak Meter. The entire line is used as volume peak meter.
%pn	Playlist Name (without path or extension)
%pp	Playlist Position
%pr	Remaining Time In Song
%ps	“s” if shuffle mode is enabled
%pt	Total Track Time
%pv	Current volume (in dB). Can also be used in a conditional: %?pv<0 1 2 ... N> 0 is used for mute, the last option is used for values greater than zero. This can also be used like %pb to provide a continuous scale: %pv image.bmp x y width height
%pS	Track is starting. An optional number gives how many seconds the tag remains true for after the start of the track. The default is 10 seconds if no number is specified. %pS7<in the first 7 seconds of track in the rest of the track>
%pE	Track is ending. An optional number gives how many seconds before the end of the track the tag becomes true. The default is 10 seconds if no number is specified. %pE7<in the last 7 seconds of track in the rest of the track>
%Sp	Current Playback Pitch

B.7 Runtime Database

Tag	Description
%rp	Song playcount
%rr	Song rating (0-10). This tag can also be used in a conditional tag: %?rr<0 1 2 3 4 5 6 7 8 9 10>
%ra	Autoscore for the song

B.8 Sound (DSP) settings

Tag	Description
%Sp	Current playback pitch
%xf	Crossfade setting, in the order: Off, Auto Skip, Man Skip, Shuffle, Shuffle and Man Skip, Always
%rg	ReplayGain value in use (x.y dB). If used as a conditional, Replaygain type in use: <code>:%?rg<Off Track Album TrackShuffle AlbumShuffle No tag></code>

B.9 Hold Switch

Tag	Description
%mh	“h” if the hold switch is on

B.10 Virtual LED

Tag	Description
%lh	“h” if the hard disk is accessed

B.11 Repeat Mode

Tag	Description
%mm	Repeat mode, 0-4, in the order: Off, All, One, Shuffle, A-B

Example: `:%?mm<Off|All|One|Shuffle|A-B>`

B.12 Playback Mode

Tag	Description
%mp	Play status, 0-4, in the order: Stop, Play, Pause, Fast Forward, Rewind, Recording, Recording paused, FM Radio playing, FM Radio muted

Example: `:%?mp<Stop|Play|Pause|Ffwd|Rew|Rec|Rec pause|FM|FM pause>`

B.13 Current Screen

Tag	Description
%cs	The current screen, 1-5, in the order: Menus, WPS, Recording screen, FM Radio screen, Current Playlist screen

The tag can also be used as the switch in a conditional tag. For players without some capabilities (e.g. having no FM radio) some values will be never yielded.

Example: You are in the `!?cs<Main menu|WPS|Recording screen|FM Radio screen>`

B.14 List Title (.sbs only)

Tag	Description
<code>%Lt</code>	Title text. Should be used in a conditional so that non-list screens don't show a title when they shouldn't
<code>%Li</code>	Title icon. This uses the same order as custom icons (see CustomIcons in the wiki) except that here 0 is "no icon"

This tag can be used to give custom formatting to list titles. Define a viewport with the font and formatting desired, and then use `!?Lt<%Lt>` to display the title within the viewport. If `%Lt` is present anywhere in the `.sbs`, then the `%Vi` viewport will not show the title.

B.15 Changing Volume

Tag	Description
<code>%mv[t]</code>	"v" if the volume is being changed

The tag produces the letter "v" while the volume is being changed and some amount of time after that, i.e. after the volume button has been released. The optional parameter `t` specifies that amount of time, in seconds. If it is not specified, 1 second is assumed.

The tag can be used as the switch in a conditional tag to display different things depending on whether the volume is being changed. It can produce neat effects when used with conditional viewports.

Example: `!?mv2.5<Volume changing!%pv>`

The example above will display the text "Volume changing" if the volume is being changed and 2.5 seconds after the volume button has been released. After that, it will display the volume value.

B.16 Settings

Tag	Description
<code>%St <setting name></code>	The value of the Rockbox setting with the specified name. See section C (page 161) for the list of the available settings.

Examples:

1. As a simple tag: `%St|skip length|`
2. As a conditional: `;%?St|eq enabled|<Eq is enabled|Eq is disabled>`

B.17 Images

Tag	Description
<code>%X filename.bmp </code>	Load and set a backdrop image for the WPS. This image must be exactly the same size as your LCD.
<code>%x n filename x y </code>	Load and display an image n: image ID (a-z and A-Z) for later referencing in <code>%xd</code> filename: file name relative to <code>/.rockbox/</code> and including <code>“.bmp”</code> x: x coordinate y: y coordinate.
<code>%xl n filename x y [nimages] </code>	Preload an image for later display (useful for when your images are displayed conditionally) n: image ID (a-z and A-Z) for later referencing in <code>%xd</code> filename: file name relative to <code>/.rockbox/</code> and including <code>“.bmp”</code> x: x coordinate y: y coordinate nimages: (optional) number of sub-images (tiled vertically, of the same height) contained in the bitmap. Default is 1.
<code>%xdn i]</code>	Display a preloaded image n: image ID (a-z and A-Z) as it was specified in <code>%x</code> or <code>%xl</code> i: (optional) number of the sub-image to display (a-z for 1-26 and A-Z for 27-52). By default the first (i.e. top most) sub-image will be used.

Examples:

1. Load and display the image `/.rockbox/bg.bmp` with ID `“a”` at 37, 109:
`%x|a|bg.bmp|37|109|`
2. Load a bitmap strip containing 5 volume icon images (all the same size) with image ID `“M”`, and then reference the individual sub-images in a conditional:
`%xl|M|volume.bmp|134|153|5|`
`;%?pv<%xdMa|%xdMb|%xdMc|%xdMd|%xdMe>`

Note:

- The images must be in BMP format
- The image tag must be on its own line
- The ID is case sensitive, giving 52 different ID's
- The size of the LCD screen for each player varies. See table below for appropriate sizes of each device. The x and y coordinates must respect each of the players' limits.

B.18 Album Art

Rockbox allows you to put the album art, or another image related to the music on your player to display it in the PictureFlow plugin or in the theme. For this feature to work, there are a few requirements.

B.18.1 Limitations

Rockbox does not support album art embedded in your files' tags, and will instead look for a picture located on disk. In addition to this, the pictures must be in either BMP or JPEG format. Rockbox does not support RLE-compressed BMP files, nor does it support progressive and multi-scan JPEG files. JPEG files must consist of a single scan with interleaved components, as progressive and multi-scan images require much more memory to decode.

B.18.2 Where to put album art

The pictures can be named a number of different ways, and placed to a number of different locations. You can have pictures specific to the file or the album or use a generic picture. You can place the picture in the same directory as the file, in the parent directory or in a fixed directory named `/.rockbox/albumart/`. The order Rockbox uses when looking for a picture is as follows (a list in braces means that those file extensions are tried in that order):

1. `./filename.{jpeg,jpg,bmp}`
2. `./albumtitle.{jpeg,jpg,bmp}`
3. `./cover.{jpeg,jpg,bmp}`
4. `./folder.jpg`
5. `/.rockbox/albumart/artist-albumtitle.{jpeg,jpg,bmp}`
6. `../albumtitle.{jpeg,jpg,bmp}`

7. ../cover.{jpeg,jpg,bmp}

The following characters will be replaced with an underscore (`_`) when looking for `albumtitle.bmp` or `artist-albumtitle.bmp`: `\ / : < > ? * |`. Doublequotes will be replaced by single quotes. See [AlbumArt](#) in the wiki for programs that will help you automate the process of putting album art on your player.

B.18.3 How to display the album art

Once the album art files are present on your player, they can be displayed as follows.

Tag	Description
<code>%Cl x y [[l c r]maxwidth] [[t c b]maxheight]</code>	Define the settings for albumart <code>x</code> : x coordinate <code>y</code> : y coordinate <code>maxwidth</code> : Maximum height <code>maxheight</code> : Maximum width
<code>%C</code>	Display the album art as configured. This tag can also be used as a conditional.

The picture will be rescaled, preserving aspect ratio to fit the given `maxwidth` and `maxheight`. If the aspect ratio doesn't match the configured values, the picture will be placed according to the flags to the `maxwidth` and `maxheight` parameters:

- `maxwidth`:
 1. Align left
 - c. Align centre (default)
 - r. Align right
- `maxheight`:
 - t. Align top
 - c. Align centre (default)
 - b. Align bottom

Examples:

1. Load albumart at position 20,40 and display it without resizing:
`%Cl|20|40|||`
2. Load albumart at position 0,20 and resize it to be at most 100×100 pixels. If the image isn't square, align it to the bottom-right corner:
`%CL|0|20|r100|b100|`

B.19 Alignment

Tag	Description
<code>%a1</code>	Align the text left
<code>%aL</code>	Align the text left, or to the right if RTL language is in use
<code>%ac</code>	Centre the text
<code>%ar</code>	Align the text right
<code>%aR</code>	Align the text right, or to the left if RTL language is in use

All alignment tags may be present in one line, but they need to be in the order left – centre – right. If the aligned texts overlap, they are merged.

B.20 Conditional Tags

Tag	Description
<code>??xx<true false></code>	If / Else: Evaluate for true or false case
<code>??xx<alt1 alt2 alt3 ... else></code>	Enumerations: Evaluate for first / second / third / ... / last condition

B.21 Subline Tags

Tag	Description
<code>%t<time></code>	Set the subline display cycle time (%t5 or %t3.4 formats)
<code>;</code>	Split items on a line into separate sublines

Allows grouping of several items (sublines) onto one line, with the display cycling round the defined sublines. See section 11.2.3 (page 139) for details.

B.22 Time and Date

Tag	Description
%cd	Day of month from 01 to 31
%ce	Zero padded day of month from 1 to 31
%cf	A conditional for 12/24 hour format. <code>;%cf<24 hour stuff 12 hour stuff></code>
%cH	Zero padded hour from 00 to 23 (24 hour format)
%ck	Hour from 0 to 23 (24 hour format)
%cI	Zero padded hour from 01 to 12 (am/pm format)
%cI	Hour from 1 to 12 (am/pm format)
%cm	Month from 01 to 12
%cM	Minutes
%cS	Seconds
%cy	2-digit year
%cY	4-digit year
%cP	Capital AM/PM
%cp	Lowercase am/pm
%ca	Weekday name
%cb	Month name
%cu	Day of week from 1 to 7, 1 is Monday
%cw	Day of week from 0 to 6, 0 is Sunday
%cc	Check for presence of the clock hardware


The %cc tag returns “c” if the necessary hardware is present and can also be used as a conditional. This can be very useful for designing a WPS that works on multiple targets, some with and some without a clock. By using this tag as a conditional it is possible to display current date and time on those targets that support this (like the 3G), or alternate information on those that do not .

Example: `;%?cc<%cH:%cM|No clock detected>`

B.23 Text Translation

Tag	Description
%Sx <English>	Display the translation of “English” in the current language

- “English” must be a phrase used in the language file.
- It should match the **Source:** line in the language file.

Note: checkwps cannot verify that the string is correct, so please check on either the simulator or on target. 

B.24 Other Tags

Tag	Description
%%	The character ‘%’
%<	The character ‘<’
%	The character ‘ ’
%>	The character ‘>’
%;	The character ‘;’
%s	Indicate that the line should scroll. Can occur anywhere in a line (given that the text is displayed; see conditionals above). You can specify up to ten scrolling lines. Scrolling lines can not contain dynamic content such as timers, peak meters or progress bars.

C Config file options

Setting	Allowed Values	Unit
volume		dB
bass	-6 to +9	dB
treble	-6 to +9	dB
balance	-100 to +100	%
channels	stereo, mono, custom, mono left, mono right, karaoke	N/A
stereo_width	0 to 250	%
shuffle	on, off	N/A
repeat	off, all, one, shuffle, ab	N/A
play selected	on, off	N/A
party mode	on, off	N/A
scan min step	1, 2, 3, 4, 5, 6, 8, 10, 15, 20, 25, 30, 45, 60	s
seek acceleration	very fast, fast, normal, slow, very slow	N/A
antiskip	5s, 15s, 30s, 1min, 2min, 3min, 5min, 10min	N/A
volume fade	on, off	N/A
sort case	on, off	N/A
show files	all, supported, music, playlists	N/A
show filename exts	off, on, unknown, view_all	N/A
follow playlist	on, off	N/A
playlist viewer icons	on, off	N/A
playlist viewer indices	on, off	N/A
playlist viewer track display	track name,full path	N/A
recursive directory insert	on, off, ask	N/A
scroll speed	1 to 25	Hz
scroll delay	0 to 2500	ms
scroll step	devise a way to get ranges from config-*.h	pixels
screen scroll step	devise a way to get ranges from config-*.h	pixels
Screen Scrolls Out Of View	on, off	N/A
bidir limit	0 to 200	% screen
scroll paginated	on, off	N/A

Setting	Allowed Values	Unit
hold_lr_for_scroll_in_list	on, off	N/A
show path in browser	off, current directory, full path	N/A
contrast	0 to 63	N/A
backlight timeout	off, on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 120	s
backlight timeout plugged	off, on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 120	s
backlight filters first keypress	on, off	N/A
backlight on button hold	normal, off, on	N/A
caption backlight	on, off	N/A
brightness	devise a way to get ranges from config-*.h	N/A
disk spindown	3 to 254	s
battery capacity	devise a way to get ranges from config-*.h	mAh
accessory power supply	on, off	N/A
idle poweroff	off, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 30, 45, 60	min
max files in playlist	1000 - 32000	N/A
max files in dir	50 - 10000	N/A
lang	/path/filename.lng	N/A
wps	/path/filename.wps	N/A
autocreate bookmarks	off, on	N/A
autoload bookmarks	off, on	N/A
use most-recent-bookmarks	off, on	N/A
pause on headphone unplug	off, pause, pause and resume	N/A
rewind duration on pause	0 to 15	s
disable autoresume if phones not present	off, on	N/A
Last.fm Logging	off, on	N/A
talk dir	off, number, spell	N/A
talk dir clip	off, on	N/A
talk file	off, number, spell	N/A
talk file clip	off, on	N/A
talk filetype	off, on	N/A
talk menu	off, on	N/A
Announce Battery Level	off, on	N/A
hotkey wps	off, view playlist, show track info, pitchscreen, open with, delete	N/A
hotkey tree	off, open with, delete, insert, insert shuffled	N/A
sort files	alpha, oldest, newest, type	N/A

Setting	Allowed Values	Unit
sort dirs	alpha, oldest, newest	N/A
sort interpret number	digits, numbers	N/A
tagcache_autoupdate	on, off	N/A
warn when erasing dynamic playlist	on, off	N/A
cuesheet support	on, off	N/A
folder navigation	off, on, random	N/A
gather runtime data	off, on	N/A
skip length	outro, track, 1s, 2s, 3s, 5s, 7s, 10s, 15s, 20s, 1min, 90s, 2min, 3min, 5min, 10min, 15min	N/A
prevent track skip	on, off	N/A
start in screen	previous, root, files, dB, wps, menu, bookmarks	N/A
playlist catalog directory	/path/to/dir	N/A
list_accel_start_delay	0 to 10	ms
list_accel_wait	1 to 10	s
replaygain type	track, album, track shuffle, off	N/A
replaygain noclip	on, off	N/A
replaygain preamp	-120 to 120	0.1 dB
crossfade	off, auto track change, man track skip, shuffle, shuffle or man track skip, always	N/A
crossfade fade in delay	0 to 7	s
crossfade fade out delay	0 to 7	s
crossfade fade in duration	0 to 15	s
crossfade fade out duration	0 to 15	s
crossfade fade out mode	crossfade, mix	N/A
crossfeed	on, off	N/A
crossfeed direct gain	0 to 60	0.1 dB
crossfeed cross gain	30 to 120	0.1 dB
crossfeed hf attenuation	60 to 240	0.1 dB
crossfeed hf cutoff	500 to 2000	Hz
eq enabled	on, off	N/A
eq precut	0 to 240	0.1 dB
eq band 0 cutoff	0 to 32768	Hz
eq band 1 cutoff	0 to 32768	Hz
eq band 2 cutoff	0 to 32768	Hz
eq band 3 cutoff	0 to 32768	Hz
eq band 4 cutoff	0 to 32768	Hz
eq band 0 q	0 to 64	N/A
eq band 1 q	0 to 64	N/A

Setting	Allowed Values	Unit
eq band 2 q	0 to 64	N/A
eq band 3 q	0 to 64	N/A
eq band 4 q	0 to 64	N/A
eq band 0 gain	-240 to 240	0.1 dB
eq band 1 gain	-240 to 240	0.1 dB
eq band 2 gain	-240 to 240	0.1 dB
eq band 3 gain	-240 to 240	0.1 dB
eq band 4 gain	-240 to 240	0.1 dB
dithering enabled	on, off	N/A
timestretch enabled	on, off	N/A
compressor threshold	0 to -24	-3 dB
compressor makeup gain	off, auto	N/A
compressor ratio	2:1, 4:1, 6:1, 10:1, limit	N/A
compressor knee	hard knee, soft knee	N/A
compressor release time	100 to 1000	100 ms
beep	off, weak, moderate, strong	N/A
keyclick	off, weak, moderate, strong	N/A
keyclick repeats	on, off	N/A
dircache	on, off	N/A
tagcache_ram	on, off	N/A
peak meter release	1 to 126	?
peak meter hold	off, 200ms, 300ms, 500ms, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 30, 1mi	N/A
peak meter clip hold	on, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 45, 60, 90, 2min, 3min, 5min, 10min, 20min, 45min, 90mi	N/A
peak meter busy	on, off	N/A
peak meter dbfs	on, off	on: dbfs, off: linear
peak meter min	0 to 89 (dB) or 0 to 100 (%)	dB or %
peak meter max	0 to 89 / (dB) or 0 to 100 (%)	dB or %
statusbar	off, top, bottom	N/A
scrollbar	off, left, right	N/A
scrollbar width	3 to LCD width / 10 (devise a way to get ranges from config-*.h)	pixels
volume display	graphic, numeric	N/A
battery display	graphic, numeric	N/A
font	/path/filename.fnt	N/A
kbd	/path/filename.kbd	N/A
invert	on, off	N/A
flip display	on, off	N/A
selector type	pointer, bar (inverse)	N/A

Setting	Allowed Values	Unit
show icons	on, off	N/A
iconset	/path/filename.bmp	N/A
viewers iconset	/path/filename.bmp	N/A
backdrop	/path/filename.bmp	N/A
time format	12hour, 24hour	N/A

D Menu Overview

include an overview of the menu structure here

E User feedback

E.1 Bug reports

If you experience inappropriate performance from any supported feature, please file a bug report on our web page. Do not report missing features as bugs, instead file them as feature ideas (see below).

For open bug reports refer to <http://www.rockbox.org/tracker/index.php?type=2>

E.1.1 Rules for submitting new bug reports

1. Check that the bug has not already been reported
2. Always include the following information in your bug report:
 - Which exact player you have.
 - Which exact Rockbox version you are using (Menu → System → Rockbox Info → Version)
 - A step-by-step description of what you did and what happened
 - Whether the problem is repeatable or a one-time occurrence
 - All relevant data regarding the problem, such as playlists, MP3 files etc. (IMPORTANT!)

E.2 Feature ideas

To suggest an idea for a feature or to read those made by others, see <http://forums.rockbox.org/index.php?board=49.0>. Please keep in mind that this forum is for the discussion of feature ideas - they are not requests and there is no guarantee they will be acted upon.

E.2.1 Rules for submitting a new feature idea

1. Check that the feature has not already been suggested. Duplicates are really boring!
2. Check that the feature has not already been implemented. Download the latest current/daily build and/or search the mail list archive.
3. Check that the feature is possible to implement (see section [E.2.2](#) (page 168)).

E.2.2 Features we will not implement

This is a list of Feature Requests we get repeatedly that we simply cannot do. View it as the opposite of a TODO!

- Interfacing with other USB devices (like cameras) or 2 player games over USB.
The USB system demands that there is a master that talks to a slave. The player can only serve as a slave, as most other USB devices such as cameras can. Thus, without a master no communication between the slaves can take place. If that is not enough, we have no way of actually controlling the communication performed over USB since the USB circuit in the player is strictly made for disk-access and does not allow us to play with it the way we'd need for any good communication to work.
- Support other file systems than FAT32 (like NTFS or ext2 etc.).
No. support for more file systems will just take away valuable ram for unnecessary features. You can partition your player fine, just make sure the first one is FAT32 and then make the other ones whatever file system you want. Just do not expect Rockbox to understand them.
- Add scandisk-like features.
It would be a very slow operation that would drain the batteries and take a lot of useful ram for something that is much better and faster done when connected to a host computer.
- Alphabetical list skipping.
Skipping around the lists by jumping letters (i.e skip all C's and go straight to the first D). This isn't feasible with the current list implementation, if you really want this you can get similar effects using the database (see section 4.2 (page 27)).
- Add support for non standard tag formats.
APE tags in MP3 files has been rejected a few times already. Its not something we want.
- Implementing the ability to playback DRM files.
Firstly, this would be extremely difficult to implement legally - Rockbox is not legal entity as such, and therefore is unable to enter into license agreements with providers of DRM technology. Secondly, Rockbox is open source, which would mean that any DRM technology we incorporated into our codebase would suddenly become visible to the whole world, completely defeating its purpose. Remember, DRM achieves part of it's security through obscurity, and publishing the keys necessary to decrypt DRM'd media would essentially render it useless.

F Credits

People that have contributed to the project, one way or another. Friends!

▶ BJÖRN STENBERG ▶ LINUS NIELSEN FELTZING ▶ ANDY CHOI ▶ ANDREW JAMIESON ▶ PAUL SUADE ▶ JOACHIM SCHIFFER ▶ DANIEL STENBERG ▶ ALAN KORR ▶ GARY CZVITKOVICZ ▶ STUART MARTIN ▶ FELIX ARENDS ▶ ULF RALBERG ▶ DAVID HÄRDEMAN ▶ THOMAS SAEYS ▶ GRANT WIER ▶ JULIEN LABRUYÈRE ▶ NICOLAS SAUZEDE ▶ ROBERT HAK ▶ DAVE CHAPMAN ▶ STEFAN MEYER ▶ ERIC LINENBERG ▶ TOM CVITAN ▶ MAGNUS ÖMAN ▶ JEROME KUPTZ ▶ JULIEN BOISSINOT ▶ NUUTTI KOTIVUORI ▶ HEIKKI HANNIKAINEN ▶ HARDEEP SIDHU ▶ MARKUS BRAUN ▶ JUSTIN HEINER ▶ MAGNUS HOLMGREN ▶ BILL NAPIER ▶ GEORGE STYLES ▶ MATS LIDELL ▶ LEE MARLOW ▶ NATE NYSTROM ▶ NICK ROBINSON ▶ CHAD LOCKWOOD ▶ JOHN PYBUS ▶ UWE FREESE ▶ RANDY WOOD ▶ GREGORY HAERR ▶ PHILIPP PERTERMANN ▶ GILLES ROUX ▶ MARK HILLEBRAND ▶ DAMIEN TENEY ▶ ANDREAS ZWIRTES ▶ KJELL ERICSON ▶ JIM HAGANI ▶ LUDOVIC LANGE ▶ MIKE HOLDEN ▶ SIMON ELÉN ▶ MATTHEW P. O'REILLY ▶ CHRISTIAN SCHÖNBERGER ▶ HENRIK BACKE ▶ CRAIG SATHER ▶ JOSÉ MARIA GARCIA-VALDECASAS BERNAL ▶ STEVIE OH ▶ JÖRG HOHENSOHN ▶ DAVE JONES ▶ THOMAS PAUL DIFFENBACH ▶ ROLAND KLETZING ▶ ITAI SHAKED ▶ KEITH HUBBARD ▶ BENJAMIN METZLER ▶ FREDERIC DANG NGOC ▶ PIERRE DELORE ▶ HUW SMITH ▶ GARRETT DERNER ▶ BARRY MCINTOSH ▶ LESLIE DONALDSON ▶ LEE PILGRIM ▶ ZAKK ROBERTS ▶ FRANCOIS BOUCHER ▶ MATTHIAS WIEN-TAPPER ▶ BRENT COUTTS ▶ JENS ARNOLD ▶ GERALD VANBAREN ▶ CHRISTI SCARBOROUGH ▶ STEVE CUNDARI ▶ MAT HOLTON ▶ JAN GAJDOS ▶ ANTOINE CELLERIER ▶ BRIAN KING ▶ JIRI JURECEK ▶ JACOB ERLBECK ▶ JEAN-PHILIPPE BERNARDY ▶ DAVE HOOPER ▶ JONAS HÄGGQVIST ▶ THOM JOHANSEN ▶ RINAT ZAKIROV ▶ MANUEL DEJONGHE ▶ MARCOEN HIRSCHBERG ▶ MICHIEL VAN DER KOLK ▶ TONY MOTAKIS ▶ ANDY YOUNG ▶ ALEXANDRE BOURGET ▶ RICHARD S. LA CHARITÉ III ▶ CHRISTIAN GMEINER ▶ TOMAS SALFISCHBERGER ▶ MIKA PEKKARINEN ▶ TAPIO KARPPINEN ▶ RICHARD OTTÓ O'BRIEN ▶ LUCA BURELLI ▶ ALESSIO LENZI ▶ DAVID BRYANT ▶ MARTIN ARVER ▶ ALEXANDER SPYRIDAKIS ▶ PEDRO BALTAZAR VASCONCELOS ▶ RAY LAMBERT ▶ DAVE WIARD ▶ PIETER BOS ▶ KONSTANTIN ISAKOV ▶ BRYAN VANDYKE ▶ HRISTO KOVACHEV ▶ SANDER SWEERS ▶ ANTONIUS HELLMAN ▶ RYAN JACKSON ▶ PER HOLMÄNG ▶ FREDERIC DEVERNAY ▶ JOSÉ M. FANDIÑO ▶ GADI COHEN ▶ NAF-TALI GOLDSTEIN ▶ DAVID DENT ▶ FRANK DISCHNER ▶ LIBERMAN SHACHAR ▶ STEPHAN WEZEL ▶ ALYSSA MILBURN ▶ KEVIN FERRARE ▶ ANTON OLEYNIKOV ▶ MARK ARIGO ▶ MAGNUS WESTERLUND ▶ JAKE OWEN ▶ MUSTAPHA SENHAJI ▶ ADAM BOOT ▶ JONATHAN GORDON ▶ TAT TANG ▶ TOSHIHIKO ITOH ▶ DAVID J. SONG ▶ JEONG TAEK IN ▶ ANDERS KAGERIN ▶ PETER D'HOYE ▶ BEN BASHA ▶ BRANDON LOW ▶ NATHAN

HAND ▶ NICK LANHAM ▶ SEBASTIAN HENRIKSEN ▶ MARTIN SCARRATT ▶ KARL KURBJUN ▶ TOMASZ MALESINSKI ▶ ANDREW PILLEY ▶ MATT V.D. WESTHUIZEN ▶ TIM CRIST ▶ JVO STUDER ▶ DAN EVERTON ▶ IMRE HERCEG ▶ SEVEN LE MESLE ▶ CRAIG BACHELOR ▶ NIKOLAJ CHRISTENSEN ▶ MIKAEL MAGNUSSON ▶ DOMINIK WENGER ▶ HENRICO WITVLIET ▶ ANDREW SCOTT ▶ MIGUEL A. ARÉVALO ▶ AARON F. GONZALEZ ▶ ALEKSEY KOZYULIN ▶ JANI KINNUNEN ▶ RUI MARINHO ▶ ALUN THOMAS ▶ NILS WALLMÉNUS ▶ NAOAKI OKAZAKI ▶ WILL DYSON ▶ MATTHIAS MOHR ▶ CHRISTIAN MARG ▶ ELI SHERER ▶ FREDRIK ÖHRN ▶ NICOLAS PENNEQUIN ▶ RALF HERZ ▶ MICHAEL DIFEBBO ▶ DAVID ROTHENBERGER ▶ ROBERT KEEVIL ▶ MARK BRIGHT ▶ DOMINIK RIEBELING ▶ ALEXANDER BONDAR ▶ PETER CAWLEY ▶ RANI HOD ▶ TOM ROSS ▶ ANTON ROMANOV ▶ JEAN-LUC OHL ▶ STEVE BAVIN ▶ MARIANNE ARNOLD ▶ GAETANO VOCCA ▶ FREDERIK VESTRE ▶ WENBIN LEO ▶ TOM EVANS ▶ EWAN DAVIES ▶ FRÉDÉRIC FRANÇOIS ▶ MARC-ANDRÉ MOREAU ▶ IOANNIS KOUTOULAKIS ▶ ALISTAIR MARSHALL ▶ KARL OVE HUFTHAMMER ▶ VÍCTOR ZABALZA ▶ ULRICH PEGELOW ▶ ANDREAS MATTSSON ▶ DANIEL ANKERS ▶ PAUL LOUDEN ▶ RAINER SIN-SCH ▶ PLÁCIDO REVILLA ▶ MICHAEL SEVAKIS ▶ LUKAS SABOTA ▶ EMANUEL ZEPHIR ▶ ALEXANDER LEVIN ▶ BARRY WARDELL ▶ LARS VAN DE KLOMP ▶ PHILIPPE MIOSSEC ▶ JOCHEN KEMNADE ▶ CORRY LAZAROWITZ ▶ TOM MEYER ▶ LAURENT BAUM ▶ JAMES TEH ▶ LIAM NATTRASS ▶ CHRISTIAN HACK ▶ WADE BROWN ▶ VADIM CHEKAN ▶ CHRISTOPHER BORCSOK ▶ VICTOR CARDENAS ▶ ANDREW MELVILLE ▶ PENGXUAN LIU ▶ ANDREW CUPPER ▶ THILO-ALEXANDER GINKEL ▶ ADAM GASHLIN ▶ ROBERT KUKLA ▶ DAVID QUESADA ▶ JARED STAFFORD ▶ MARTIN HENSEL ▶ STÉPHANE DOYON ▶ AUSTIN APPEL ▶ ANDRE SMITH ▶ TRAVIS HYYPPA ▶ IAN WEBBER ▶ PAVEL GNELITSA ▶ LUTZ BÖHNE ▶ WILL ROBERTSON ▶ ROBERT CARBONEAU ▶ YE WEI ▶ BRYAN CHILDS ▶ MIKE SCHMITT ▶ CHRIS TAYLOR ▶ TOBIAS LANGHOFF ▶ STEVE GOTTHARDT ▶ GREG WHITE ▶ MATTIEU FAVRÉAUX ▶ MALCOLM TYRRELL ▶ PIOTR JAFISZOW ▶ GARY ALLEN ▶ JOHN BOUANTOUN ▶ TOMASZ MON ▶ JAKUB MATOUŠEK ▶ ALBERT VELI ▶ CHRIS DOHAN ▶ TAKASHI OBARA ▶ RENE PEINTHOR ▶ ROAN HORNING ▶ BEN KEROACK ▶ SEAN MORRISEY ▶ SHAY GREEN ▶ NICK VANDERWEIT ▶ SIMON MENZEL ▶ TIMO HORSTSCHÄFER ▶ JACCO KONING ▶ CHRIS HAM ▶ JOSE RAMON GARCIA ▶ SIMON DESCARPENTRIES ▶ DOUGLAS VALENTINE ▶ JACOB GARDNER ▶ PASCAL BRIEHL ▶ DENIS STANISHEVSKIY ▶ EDDY COMAN ▶ LUKE BLANEY ▶ MARK REICHE ▶ MICHAL JEVIK ▶ PHILIPPE LATULIPPE ▶ MAURICIO PECCORINI ▶ NATHAN HEP-TING ▶ AKIO IDEHARA ▶ DAGNI MCPHEE ▶ ALEX GERCHANOVSKY ▶ GERHARD DIRSCHL ▶ IVAN ZUPAN ▶ ALEXANDER PAPST ▶ CHRISTOPH REITER ▶ RHINO BANGA ▶ PAUL JONES ▶ MICHAEL GIACOMELLI ▶ ALEX WENGER ▶ ANDREE BUSCHMANN ▶ JOHNATHON MIHALOP ▶ RENE ALLKIVI ▶ TOBIAS SCHLADT ▶ JOHN ZHOU ▶ CHARLES VOELGER ▶ GERRITT GONZALES ▶ DIETER PELLKOEFER ▶ EVGENIY KACHALIN ▶ LENNY KOEPEL ▶ HARRY TU ▶ PAWEŁ WYSOCKI ▶ XINLU HUANG ▶ DANIEL DALTON ▶ BORIS GJENERO ▶ SYLVAIN FOURMANOIT ▶ ALEX PARKER ▶ MARIO LANG ▶ JUSTIN FOELL ▶ IGOR KUZMIN ▶ ADILSON VICENTE XAVIER ▶ JESSE LOCKWOOD ▶ JONATHAN BACKER ▶ SOFIAN BABAI ▶ COSTAS CALAMVOKIS ▶ CATALIN PATULEA ▶ PETER HARLEY ▶ MAX KELLEY ▶ ALEXANDER EICKHOFF ▶ PINITNUN SHANASABANG ▶ KEN FAZ-ZONE ▶ DAVID BISHOP ▶ HEIN-PIETER VAN BRAAM ▶ PRZEMYSŁAW HOŁUBOWSKI

▶ STEPAN MOSKOVCHENKO ▶ JOHN S. GWYNNE ▶ BRIAN J. MOREY ▶ STIJN HISKEN ▶ BERTRIK SIKKEN ▶ KARIM BOUCHER ▶ JAMES ESPINOZA ▶ FRANZ RÜHMLAND ▶ JORDAN ANDERSON ▶ MAURUS CUELENAERE ▶ CHRIS ALLEGRETTA ▶ ALASTAIR S ▶ MARTIN CRKOVSKÝ ▶ ARIYA HIDAYAT ▶ JONAS HURRELMANN ▶ LEE KANG HYUK ▶ CLEMENS WERTHER ▶ ROBERT MENES ▶ HENRI VALTA ▶ MELBA SITJAR ▶ MEHMET Ş. ÇATALBAŞ ▶ SCOTT TINMAN ▶ ALEXANDER KUZMENKOV ▶ THOMAS MARTITZ ▶ PRAKARN SAHASOONTORNVUTE ▶ GEORGE TAMPLARU ▶ APOORVA MAHAJAN ▶ VUONG MINH HIEP ▶ MATEUSZ KUBICA ▶ FRANK GEVAERTS ▶ CHELO SACRISTÁN ▶ SASCHA WOLF ▶ NICKOLAY JORDANOV ▶ JOHANNES VOGGENTHALER ▶ MARC GUAY ▶ ALEX VANDERPOL ▶ JERRY LANGE ▶ YOHANN MISQUITTA ▶ KEITH PERRI ▶ MARK FAWCUS ▶ IVAN PESIC ▶ MARCEL BARBULESCU ▶ PHIL LIGHT ▶ ROB PURCHASE ▶ ANDREAS MÜLLER ▶ CHRISTOPHER WILLIAMS ▶ MARTIN RITTER ▶ JUSTIN HANNIGAN ▶ TOMASZ WASILCZYK ▶ KENJIRO ARAI ▶ JOHN KAMINAR ▶ JORIS GOOSEN ▶ MARK GANSON ▶ DAVIDE GENTILE ▶ JAMES VASILE ▶ MOHAMED TAREK ▶ MIKE BURKE ▶ MICHAEL CHICOINE ▶ MACIEJ ADAMCZAK ▶ TOMER SHALEV ▶ THIBAUT GIRKA ▶ RASMUS RY ▶ WILLIAM POETRA YOGA HADISOESENSO ▶ ADRIAN OSOIANU ▶ MARTIN PAHL ▶ ORI AVTALION ▶ THOMAS SCHOTT ▶ DENNIS IVANOV ▶ TAKUMI SUZUKI ▶ SHUNSUKE SHIMIZU ▶ TADAYUKI NISHIZONO ▶ JUN GU ▶ DANIEL WECK ▶ CLÉMENT PIT-CLAUDEL ▶ JELLE GEERTS ▶ TADEUSZ PYŚ ▶ ROSTISLAV CHEKAN ▶ FLORIN POPESCU ▶ VOLKER MISCHE ▶ VITJA MAKAROV ▶ FRANCISCO VILA ▶ CHRISTIAN LEES ▶ RAFAËL CARRÉ ▶ DENES BALATONI ▶ ROY WALLACE ▶ ERIC LASSAUGE ▶ FRANÇOIS DINEL ▶ FRANCESCO RIGONI ▶ JOËL PUIK ▶ KLAAS BOSTEELS ▶ TERUAKI KAWASHIMA ▶ MARCIN LUKASIK ▶ LE JIN ▶ ALEX BENNEE ▶ STÉPHANE QUERTINMONT ▶ BARTOSZ FABIANOWSKI ▶ ADAM HOGAN ▶ ANDREW MAHONE ▶ ANTON VERETENENKO ▶ VICENTE IBARRA ▶ RUI ARAÚJO ▶ BRIAN CLOUTIER ▶ OLIVIER BARBUT ▶ YOSHISHI UCHIDA ▶ SANGGON LEE ▶ KASPAR ROTHENFUSSER ▶ RYAN PRESS ▶ CRAIG ELLIOTT ▶ KENDERES TAMAS ▶ ERIC SHATTOW ▶ JOSHUA SIMMONS ▶ SEI AOYUMI ▶ MARTIN POOL ▶ GARETH SCHAKEL ▶ BRIAN SUTHERLAND ▶ SAM BOUWER ▶ JOHANNES LINKE ▶ MICHAËL BURTIN ▶ SASHA KHAMKOV ▶ KAI POSADOWSKY ▶ JACK HALPIN ▶ JOHANNES SCHWARZ ▶ DUSTIN SKORACKI ▶ TORNE WUFF ▶ WOOKEY ▶ NICK SANT ▶ MICHAEL CARR ▶ ERIC CLAYTON ▶ MARKO PAHLKE ▶ VYTENIS SABELKA ▶ NICOLAS PITRE ▶ BENEDIKT GOOS ▶ FREDERICK FULL ▶ JEFFREY GOODE ▶ RAAFAT AKKAD ▶ DAVIDE QUARTA ▶ ANDRE LUPA ▶ HILTON SHUMWAY ▶ MATTHEW BONNETT ▶ NICK TRYON ▶ DAVID JOHNSTON ▶ RALPH SOTO ▶ MYKHAILO RADZIEVSKYI ▶ CHRISTOPHE GOUIRAN ▶ ASael REITER ▶ JENS ERDMANN ▶ ROSSO MALTESE ▶ AMAURY POULY ▶ LAURENT PAPIER ▶ JOHANNES BOY ▶ JASON YU ▶ AARON DEMILLE ▶ TOMASZ KOWALCZYK ▶ MICHAEL LECHNER ▶ PETER SCHLENKER ▶ DAN DAVISON ▶ DAVID KAUFFMANN ▶ CARSTEN SCHREITER ▶ MICHAEL SPARMANN ▶ SETH OPGENORTH ▶ JONAS AABERG ▶ JUNIO C HAMANO ▶ BOB COUSINS ▶ CHRISTOPHE NICOLAS ▶ YANN MULLER ▶ SASCHA WILDE ▶ FRED BAUER ▶ SIMON ROTHEN ▶ PAVEL RZEHÁK ▶ DIEGO HERRANZ ▶ VIKTOR VARGA ▶ JULIUSZ CHROBOCZEK ▶ CHRISTIAN BEIER ▶ GIOVANNI ZILLI ▶ SHILOH HAWLEY ▶ PETER LECKÝ ▶ WILFRED HUGHES ▶ LAURENT GAUTIER ▶ SIMON ZHUKOVSKY ▶ DANIEL KLUZ ▶ PHINITNUN CHANASABAENG ▶ TSE-HSIEN CHIANG ▶ SZYMON DZIOK ▶ DOMENICO DI

MISA ▶ DELYAN KRATUNOV ▶ PURLING ▶ THE LIBA52 TEAM ▶ THE SPEEX TEAM
YUKIE ▶ MAREK SALABA ▶ ALTAY OZ ▶ THE LIBFAAD TEAM ▶ THE DOOM TEAM
▶ PETER LECKY ▶ MARK BORGERDING ▶ THE GNUCHESS TEAM ▶ THE GNUBOY
▶ TOBIAS DIEDRICH ▶ ANDREW ENGELBRECHT ▶ KEVIN SCHOEDEL ▶ JENS THEESS
▶ ALEXEY NEMTSEV ▶ PASCAL BELOW ▶ THE LIBMPEG2 TEAM ▶ THE GAME_MUSIC_EMU
▶ DANNY ATTAR ▶ PHILIPP STEPHANI TEAM ▶ THE OPENSPC DSP EMULATOR
▶ TORE JOHNNY BRÅTVEIT ▶ MARCIN TEAM ▶ THE ALAC DECODER TEAM ▶ THE
BUKAT ▶ ANDREW RODLAND ▶ LUCA UCL TEAM ▶ THE IPOD LINUX TEAM
LEONARDO SCORCIA ▶ GERHARD ZINTEL ▶ THE VISION-8 EMULATOR TEAM ▶ THE
▶ ADRIÁN CERETO MASSAGUÉ ▶ CHRIS SAV- ROBOTFINDSKITTEN TEAM ▶ THE LIBMTP
ERY ▶ RAPHAËL JAKSE ▶ WINCENT BALIN TEAM ▶ THE ASAP TEAM ▶ THE LIBPNG
▶ AARON ROTHBAUM ▶ NEJC LOTRIC ▶ THE TEAM ▶ THE PURE DATA TEAM (MILLER
LIBMAD TEAM ▶ THE WAVPACK TEAM ▶ THE PUCKETTE AND OTHERS)
FFMPEG TEAM ▶ THE OGG VORBIS TEAM

G Licenses

G.1 GNU Free Documentation License

Version 1.2, November 2002
Copyright ©2000,2001,2002 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 purpose of this License is to make a manual, textbook, or other functional and useful document “free” in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or non-commercially. Secondly, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

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

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

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The “**Document**”, below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as “**you**”. You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

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

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

The **“Invariant Sections”** are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The **“Cover Texts”** are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A **“Transparent”** copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not “Transparent” is called **“Opaque”**.

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

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

A section “**Entitled XYZ**” means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as “**Acknowledgements**”, “**Dedications**”, “**Endorsements**”, or “**History**”.) To “**Preserve the Title**” of such a section when you modify the Document means that it remains a section “Entitled XYZ” according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

2. VERBATIM COPYING

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

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

3. COPYING IN QUANTITY

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

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

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If

you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

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

4. MODIFICATIONS

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

- A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
- B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.
- C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
- D. Preserve all the copyright notices of the Document.
- E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
- F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
- G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
- H. Include an unaltered copy of this License.
- I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document,

- create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
- J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the “History” section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
 - K. For any section Entitled “Acknowledgements” or “Dedications”, Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
 - L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
 - M. Delete any section Entitled “Endorsements”. Such a section may not be included in the Modified Version.
 - N. Do not retitle any existing section to be Entitled “Endorsements” or to conflict in title with any Invariant Section.
 - O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version’s license notice. These titles must be distinct from any other section titles.

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

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

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

5. COMBINING DOCUMENTS

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

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

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

6. COLLECTIONS OF DOCUMENTS

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

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

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an “aggregate” if the copyright resulting from the compilation is not used to limit the legal rights of the compilation’s users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document’s Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

8. TRANSLATION

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

If a section in the Document is Entitled “Acknowledgements”, “Dedications”, or “History”, the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See <http://www.gnu.org/copyleft/>.

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

ADDENDUM: How to use this License for your documents

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

Copyright ©YEAR YOUR NAME. Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled “GNU Free Documentation License”.

If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts, replace the “with...Texts.” line with this:

with the Invariant Sections being LIST THEIR TITLES, with the Front-Cover Texts being LIST, and with the Back-Cover Texts being LIST.

If you have Invariant Sections without Cover Texts, or some other combination of the three, merge those two alternatives to suit the situation.

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

G.2 The GNU General Public License

Version 2, June 1991

Copyright © 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 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) <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 Library General Public License instead of this License.