Aqualung

Music Player for GNU/Linux

4th February 2007

User's Manual

Contents

1   Introduction

Aqualung is a music player originally designed for the GNU/Linux operating system, but also running on FreeBSD and NT-based versions of Microsoft Windows. It plays audio CDs, as well as audio files from your filesystem and has the feature of inserting no gaps between adjacent tracks. It also supports high quality sample rate conversion between the file and the output device, when necessary.

Audio CDs can be played back and ripped with on-the-fly conversion to WAV, FLAC, Ogg Vorbis or CBR/VBR MP3 (gapless via LAME). Seamless tagging of the created files is offered as part of the process. Almost all sample-based, uncompressed formats (e.g. WAV, AIFF, AU etc.) are supported. Files encoded with FLAC (the Free Lossless Audio Codec), Ogg Vorbis, Ogg Speex, MPEG Audio (including the infamous MP3 format), MOD audio formats (MOD, S3M, XM, IT, etc.), Musepack and Monkey's Audio Codec are also supported. Numerous formats and codecs are supported via the FFmpeg project, including AC3, AAC, WMA, WavPack and the soundtrack of many video formats. The program can play the music through OSS, ALSA or the JACK Audio Connection Kit, or even using the Win32 Sound API (available only under Cygwin or native Win32). Depending on the compile-time options, not all file formats and output drivers may be usable. Type 'aqualung -v' to get a list of all the compiled-in features.

Aqualung supports the LADSPA 1.1 plugin standard. You can use any suitable plugin to enhance the music you are listening to.

Other features of the program are: internally working volume and balance controls (not touching the soundcard mixer), multiple skin support, random seeking during playback, track repeat, list repeat and shuffle mode (besides normal playback). In track repeat mode the looping range is adjustable. Aqualung will come up in the same state as it was when you closed it, including playback modes, volume and balance settings, currently processing LADSPA plugins, window sizes, positions and visibility, and other miscellaneous options. Aqualung has the ability to display and edit Ogg Xiph comments, ID3v1, ID3v2 and APE tags found in files that support them.

Currently metadata editing capability is considered dangerous and is turned off by default, because the TagLib library which Aqualung uses for metadata access has some yet unfixed, serious bugs which may cause invalid tags to be written or may result in outright corrupt (unplayable) files. If you decide to build Aqualung with metadata editing support, make sure to have backups of your files and proceed with care.

You can control any running instance of the program remotely from the command line (start, stop, pause etc.). Remote loading or enqueueing soundfiles as well as complete playlists is also supported.

In addition to all this, Aqualung provides a so-called Music Store that is an XML-based music database, capable of storing various metadata about music on your computer (including, but not limited to, the names of artists, and the titles of records and tracks). You can (and should) organize your music into trees of Artists/Records/Tracks, thereby making life easier than with the all-in-one Winamp/XMMS playlist. Importing file metadata (ID3v1, ID3v2 tags, Ogg Xiph comments, APE metadata) into the Music Store as well as getting track names from a CDDB/FreeDB database is supported. For audio CDs, CD-Text retrieval is also implemented.

2 Quick Start Guide

If you'd like to get your hands on the program quickly rather than to spend your evening reading the rest of the manual, here is the absolute minimum you need to know to successfully use the program. So make sure to read this (deliberately short) chapter, and come back for the rest when you have questions while using the program. Ultimately, you may ask questions on the Aqualung-friends mailing list.

2.1 Getting Aqualung

It is not hard to get Aqualung up and running on your machine, although for beginners the number of options might be intimidating at first. The steps you need to take depend on the platform and operating system you use. For detailed information please look at the relevant page of the Aqualung website.

In case you are not used to compiling software yourself, you may check whether there is a distribution-provided package of Aqualung. Installing such a package is generally the easiest and fastest way to get Aqualung, however this way you won't be able to try the latest features. Currently there are Aqualung packages for major Linux distributions such as Debian, Gentoo, SuSE, etc. If your distribution lacks such a package, consider contacting the organization maintaining the distribution and ask them to provide a package of Aqualung. Anyway, you might have to compile Aqualung from source. This is not very hard, either – the `configure` script tries to adapt Aqualung to your system as much as possible without breaking the program. See the above website for more information.

On Microsoft Windows, all you have to do is download and run the self-extracting installer utility, which guides you through a few easy to follow steps and installs the program on your machine. Make sure to visit this page for more information about the Windows version of Aqualung.

2.2 Starting the program for the first time

Aqualung has a large number of configuration settings, which are adjustable through the user interface at run-time (no need to edit config files by hand), and are remembered across multiple invocations of the program. When Aqualung starts for the first time, it creates a configuration based on some wired-in defaults. A good way of exploring the program's capabilities is poking through the configuration area. You can access this by clicking in the main window with the right mouse button, which will pop up the program's main menu. Choosing Settings from the menu will open the configuration dialog.

In fact, clicking with the right mouse button almost anywhere is a generally smart idea. Aqualung has lots of context-sensitive popup menus in the Music Store, the Playlist (often embedded in the main window) and elsewhere. It's good to keep this in mind when taking the explorative approach instead of reading the whole manual right away.

Let's add some music to the playlist and start playback right away. Right-click the 'Add files' button, and choose 'Add directory' from the menu. (The right-clicking trick works for the other two buttons as well. Left-clicking is a shortcut to immediately execute the action denoted by the button's caption.) Choose a directory with some music under it. It's OK to have subdirectories under this directory, the program will search for playable files recursively. After the playlist starts to get populated with tracks, press play, or double-click on one of the tracks to play. Press 'i' to see metadata information about the selected track.

2.3 Setting up a Music Store

Now that you have some music playing, let's get more organised. In the Music Store window click in the empty area with the right mouse button and choose 'Create empty store...' from the menu. Enter a meaningful name such as 'Tom's Music' and choose a location to save the XML file of the store to. This should be a writable location, so it is wise to stick to a location inside your home directory. (A system-wide path or a remote NFS mount with read-only access won't do.)

You can have any number of such stores in the Music Store organizer, and it is indeed a great idea to have separate stores for music differentiated by origin, genre, or some other aspect. One great use is multiple stores with the actual music files stored on multiple remote machines, one store for each

machine. Or just a store for your local music and another for files on your bedroom file server box. There are several possibilities.

But how do you populate the store with music you already have on your drive? It's easy if your music is stored in an organized manner on the filesystem level. As a minimum, this means that tracks intended to go into one store are found under a common root directory in the filesystem (there may be several directory layers down from the root to the individual files, but there must be a common ancestor). In this case the so-called Music Store Builder will take care of things for you. Right-click on your newly-created empty store and choose 'Build / Update store from filesystem'. Choose Independent mode and in the dialog you get, enter the root directory under which your collection resides. As you can probably guess at this point, the store builder interface is pretty flexible, however the default settings should be good to get something together quickly without further hassle.

Pressing OK will start the process, during which the directory structure below the root you specified will be traversed. The artist/record/track names are determined from potentially multiple data sources (CDDB, metadata e.g. ID3v2 tags or Ogg Xiph comments, and filesystem names). The logic involved is fairly elaborate. You are strongly advised to read the detailed usage instructions for the Music Store Builder at Section 4.2.2.

2.4   Playing and ripping an Audio CD

You can play CDs with Aqualung easily. Just put the CD in one of your CD drives, and if everything goes well, Aqualung will detect it, do a CDDB lookup to retrieve artist, record and track info (CD-Text is also used if the CD has it), and make it available to you through the special Music Store node called 'CD Audio'.

You don't have to be happy with what you have so far. The Music Store paradigm is fairly addictive, as it's much easier to drop something into the playlist from the Music Store than physically placing a CD in the drive. So as you keep expanding your CD collection, you will probably want to have those records in one of your music stores, too. In this case all you have to do is choose 'Rip CD...' from the disc's popup menu, and supply some information. We won't go into details here (please refer to Section 4.2.5 in case the interface is not obvious). However, it is worth stating that you should have a separate directory for the files of each record. Ripping multiple CDs into the same directory won't work.

3 Command Line Interface

3.1 Invocation

aqualung --help Print help message with valid parameters and example invocations.

aqualung --version Print version information and list of compiled-in features.

aqualung [--output (oss|alsa|jack|win32)] [options] [file1 [file2 . . .]]

3.2 General options

-D, --disk-realtime Try to use realtime (SCHED_FIFO) scheduling for disk thread, a background worker thread doing file decoding and sample rate conversion. Try this (and optionally -Y) if you experience short audio dropouts caused by other programs (e.g. web browser loading a complex page).

-Y, --disk-priority <int> When running -D, set scheduler priority to <int> (defaults to 1).

3.3 Output specific options

3.3.1 ALSA

-d, --device <name> Set the output device (defaults to plughw:0,0).

-p, --period <int> Set ALSA period size (defaults to 8192).

-n, --nperiods <int> Specify the number of periods in hardware buffer (defaults to 2).

-r, --rate <int> Set the output sample rate.

-R, --realtime Try to use realtime (SCHED_FIFO) scheduling for ALSA output thread.

-P, --priority <int> When running --realtime, set scheduler priority to <int> (defaults to 1).

3.3.2 OSS

-d, --device <name> Set the output device (defaults to /dev/dsp).

-r, --rate <int> Set the output sample rate.

3.3.3 JACK

-a[<port_L>,<port_R>], --auto[=<port_L>,<port_R>] Auto-connect output ports to given JACK ports (defaults to first two hardware playback ports).

-c, --client <name> Set client name (needed if you want to run multiple instances of the program).

Note that in the case when JACK output has been selected as part of the automatic output device detection, the -a option is implicitly applied.

3.3.4 Win32

-r, --rate <int> Set the output sample rate.

3.4 Options relevant to the Sample Rate Converter

-s[<int>], --srctype[=<int>] Choose the SRC type, or print the list of available types if no number given. The default is SRC type 4 (Linear Interpolator).

3.5   Options for remote cue control

Note that remote controlling of instances is only possible if the instance you want to send a command to is running as the same user as you are when you issue the remote command.

-N, --session \<int\> Specify the instance number to send the remote command to. Instances are numbered on a per user basis, starting with 0. Except for the zero-th instance (started first), the instance number is displayed in the title bar of the main window (e.g.: Aqualung.3). If you don't use this option, the following options will control the zero-th instance by default, except for -L which defaults to the present instance (so as to be able to start playback immediately from the command line).

-B, --back Jump to previous track.

-F, --fwd Jump to next track.

-L, --play Start playing.

-U, --pause Pause playback, or resume if already paused.

-T, --stop Stop playback.

-V, --volume [m|M]|[=]\<val\> Adjust the volume. m/M means mute; if = is present, the remote instance's volume control will be set to the value specified, otherwise, the volume will be adjusted by the supplied (signed) value. The values are in dB units.

-Q, --quit Terminate remote instance.

3.6   Options for file loading

You may specify filenames on the command line. These may be ordinary soundfiles playable by Aqualung, or playlist files you saved earlier. The program will decide if a file is a playlist, and add its contents accordingly. In addition to Aqualung's native (XML) playlist format, the program will load M3U and PLS playlists whenever possible.

If you used the –session option (see above), the files will be sent to the Aqualung instance you specified. Otherwise a new instance will start up with the files you specified. Note that if you enabled the 'Save and restore the playlist on exit/startup' option in the program setup dialog, the files you specify will be loaded after the automatically loaded ones.

-E, --enqueue Enqueue added files to the playlist instead of loading them (which removes the previous contents of the playlist). Use this if you want to keep the existing items in the playlist.

3.7   Options for changing state of Playlist/Music Store windows

-l [yes|no], --show-pl=[yes|no] Show/hide playlist window.

-m [yes|no], --show-ms=[yes|no] Show/hide music store window.

3.8   Examples

$ aqualung -s3 -o alsa -R -r 48000 -d hw:0,0 -p 2048 -n 2

$ aqualung --srctype=1 --output oss --rate 96000

$ aqualung -o jack -a -E 'find ./ledzeppelin/ -name *.flac'

3.9   Environment

Aqualung obeys two environment variables concerning LADSPA plugins. LADSPA_PATH should contain a colon-separated list of paths to search for LADSPA plugin .so files. LADSPA_RDF_PATH should contain a colon-separated list of paths to RDF metadata files about these plugins. When any of these is not specified, the program will use sensible defaults and look in the obvious places.

3.10   Files

Here is a list of files that Aqualung creates, reads and relies on.

˜/.aqualung Directory containing user settings.

˜/.aqualung/config.xml GUI (skin, window size/position, etc.) and other settings.

˜/.aqualung/plugin.xml List of running plugins and all their settings.

˜/.aqualung/playlist.xml Automatically saved and restored playlist (if you enable this feature).

˜/.aqualung/<skin-name> Locally available skin <skin-name> (useful for skin development).

${prefix}/share/aqualung/skin System-wide skin directory.

4 Graphical Interface

4.1 Main window

You can control most of the program from this window. The cue controls in the bottom-left corner are fairly obvious. You can drag the large slider in the middle for seeking. There are two smaller sliders above that, the left one is for adjusting the volume and the right one for adjusting the balance. Above these, there are two horizontal text areas showing information about the currently playing track, and input/output parameters such as sample rate, mono/stereo, bitrate, output driver (e.g. OSS, ALSA, JACK) etc. The first trick to learn is that these lines are horizontally draggable with the mouse if the text does not fit in the available visible space. However, they don't scroll automatically, and for a very good reason.

In the upper left corner, you find one bigger and two smaller displays that show track times: elapsed time, remaining time and total track time. The big display also shows the current volume and balance setting when appropriate. By clicking in these displays with the left or right mouse button, you can rearrange the displays as you want them. The following table may seem a bit confusing at first, but once you realize the point, it becomes blindingly obvious.

A	
B	C

| | clicked into |||
mouse button	A	B	C
left	A$\Longleftrightarrow$B	B$\Longleftrightarrow$A	C$\Longleftrightarrow$B
right	A$\Longleftrightarrow$C	B$\Longleftrightarrow$C	C$\Longleftrightarrow$A

In the bottom right corner there are additional buttons. The buttons with the letters display or hide additional windows of the program:

FX	Ladspa Patch Builder
MS	Music Store
PL	Playlist

Note that depending on the skin, these buttons may come with images instead of the letters above. However, their functionality does not change.

The remaining three buttons are to select the playback mode. When none of these buttons is depressed, playback goes the normal way. The buttons are mutually exclusive, and select track repeat, list repeat or shuffle mode. I'm sure you can figure out which is which. If you select track repeat, a loop bar appears above the seek bar, with two markers. The markers can be dragged to select the looping range. When they are at the left and right end positions, the whole song is repeated.

Volume and balance slider tricks:

- Shift + any mouse button sets the volume and balance sliders back to 0 dB and Center position, respectively. This combination also works for the loop bar, in which case the looping range is set to the whole song.

- Clicking and holding the right mouse button on these sliders shows their position in the big time display without altering the value.

An additional thing to know about the volume control is that it ranges up to +6 dB. This means you can send a bigger signal to the audio device than in the original file. With 0 dB corresponding to 100% signal level, +6 dB is almost exactly 200% signal level (and 4 times signal power as well). This means you can overdrive your output device, and since clipping will occur at 100% anyway, it will cause nasty digital distortion much worse than simple analog overdrive. If you have a track with a reasonably low level, you can go above 0 dB with the volume control. But today most CDs are mastered to keep the average volume level very close to the 0 dB (or 100%) top, and so they will likely distort with as little as +1 dB additional gain. The moral is: if you want it loud, turn up your external amp. You can also consider using RVA if the volume level of your tracks tends to vary in a wide range – see section 4.2.7.

On a related note, another thing to watch out for is LADSPA plugins (in case you use them). It is very common that the signal level leaving a plugin is greater than the signal level the plugin gets on its

input. So it is best to leave a few dB of headroom if you do that. A very typical case is boosting some frequency bands a few dB with an EQ plugin. You should decrease the overall volume level with as much dB as the largest boost (or even more), or you are risking that the signal will get chopped causing bad distortion. Alternatively, apply this limiter plugin as the last one in the processing chain, but only if you know what you are doing.

Right-clicking almost anywhere in the window will bring up a menu that allows access to the 'Settings' dialog, the 'Skin Chooser', the 'JACK Port Setup' dialog (present only when running the program with JACK output), and the 'About' box. The latter may be useful to see which features have been compiled into the program. (If you haven't read the page about compiling yet: the configuration of the program can be adapted so as not to require certain libraries when compiling, and not provide certain features accordingly.)

4.1.1 Shortcuts for this window

z, Z, y, Y, comma	jump to previous track
x, X, p, P	play
c, C, space	pause
v, V, s, S	stop
b, B, period	jump to next track
left arrow	jump (seek) backwards in current track
right arrow	jump (seek) forward in current track
backspace	restart current track
/	volume down
*	volume up
i, I	bring up the File Info dialog for currently played track
Alt+/	balance towards left
Alt+*	balance towards right
Alt+S	show/hide Music Store
Alt+L	show/hide Playlist
Alt+X	show/hide LADSPA patch builder
k, K	show Skin Chooser
o, O	show Settings
1	toggle track repeat
2	toggle repeat all
3	toggle shuffle
ESC	hide all windows (works only with systray support)
Ctrl+Q	quit Aqualung

4.2 Music Store

4.2.1 Overview

The Music Store is a simple database of all your music. The central philosophy of this program is that you have a large storage (ideally an entire hard drive or a separate partition) to store all your music files. This is not necessary for the program to work. The audio files can be scattered around your system as long as you have read permissions to them. However, it is strongly recommended that you devote a separate directory for all the music (for example, `/music` would be a convenient place to store files that are owned by root, but readable by all users). Moreover, you can maintain several collections on different machines this way, and share them with other users via NFS, while keeping a (probably smaller) collection on your local hard drive.

In these central directories, create subdirectories for each artist you have CDs from. The directory names do not have to contain the exact names, you can for example create `/music/ledzep` for Led Zeppelin, `/music/crimson` for King Crimson, `/music/hendrix` for Jimi Hendrix and so on. In these directories, create subdirectories for each CD you have. Once again, the directory names for the records do not need to fully contain the record titles; they can be short and without spaces and special characters.

Into the directories of records, you should rip the CD using the built-in ripper of Aqualung, tagging the files and adding the record to the Music Store as part of the process. See Section 4.2.5.

4.2.2   Building or Updating store from filesystem

Aqualung comes with a Music Store Builder facility, which allows you to easily create a store from your existing audio files. This is useful if you already have a large music collection on your harddrive.

The Builder supports two approaches for automatically adding audio files to the Music Store. The directory driven mode requires the collection to be organized in a strict filesystem structure, where the directory structure itself specifies which files belong to a record, and which records belong to an artist. The structure should conform to one of the following patterns:

a) root / record / track

b) root / artist / record / track

c) root / artist / artist / record / track

d) root / artist / artist / artist / record / track

Pattern a) is useful when you do not have separate subdirectories for artists, only for records. The b) means that each artist and record has its own subdirectory. It corresponds to the structure introduced above along with the Music Store. The patterns c) and d) are for those who have too many artists to keep them at the same level; you may thus have a subdirectory for every artist starting with letter a, b, etc., or you can even dedicate two levels to them, perhaps as b/be/beatles, c/cr/crimson, etc.

The independent mode does not follow any directory structure, only searches for audio files recursively starting from root. This doesn't allow the Builder to perform CDDB lookups, so only metadata and filename transformations are available with this mode. If your audio files are basically organized in a directory structure that allows a directory driven build to be performed, but you also happen to have audio files on higher (record or artist) levels, run the Builder in directory driven mode first, then use the independent mode on the same root directory to add the outstanding files too.

The Builder can gain information about your music from three sources: metadata (if your audio files are correctly tagged), CDDB lookups, and the filesystem names of the audio files and directories themselves.

If you are up to building a new store, first create an empty store (right-click in Music Store, then choose the 'Create empty store' item), then right-click on the new store and choose 'Build / Update store from filesystem'. After selecting the desired building mode, the builder dialog appears with several options broken down into five notebook pages. Later, if you only want to update the content of a store, you can start a build process on a non-empty store as well.

On the 'General' page you have to select the root directory of your music collection. With the directory driven mode, the appropriate structure should also be selected.

You can exclude files from the build process that match a wildcard pattern (or more precisely, at least one element in a list of wildcard patterns). The list is comma-separated, e.g. '*.jpg,*.png,*.gif' will cause all files having jpg, png, or gif extension to be left out. Note that hidden files (whose name starts with a period) are always excluded. Also note that no spaces should be used around the commas, because they would be counted in the wildcard patterns, causing a lot of headache.

Similarly, you may include only those files that match a wildcard pattern. The syntax is the same as with the exclusion. This easily allows you to build a store containing music e.g. encoded with FLAC, and another store for Ogg, while the audio files can be placed together even in the same directory. Exclude and include patterns are case-insensitive.

If you choose to reset existing data, only track name, length, manual rva and empty comment fields will be overwritten, and the latter two are only if you have enabled them.

The builder dialog has separate notebook pages for artists, records and tracks. The settings made on a page only concern the appropriate category (either artist, record or track). The operations and transformations are performed in the same order as they are placed on the page, from top to bottom.

Data sources   With each mode you can set the priority of data sources for artist names, record titles and tracks independently (highest comes first). Simply drag & drop the lines of the list to achieve the desired order. For example, if you have proper tags in you audio files for track names only, but none for artists and records, you may use metadata for tracks at first place, and use CDDB for artists and records instead. The data sources can also be disabled by clicking on the check boxes.

The Builder looks for usable data in the given priority, and will use the first suitable one.

A short note on the Filesystem source. When using the directory driven mode with structure a), the artists and records will have the same filesystem name, which is the name of the record directory. Using pattern b), c) or d) will result in all artists, records and tracks having the name of their respective directory (or file, for tracks) as the filesystem name. With c) and d), the name of the rightmost artist directory is used. When using the independent mode, artists, records and tracks will have the same filesystem name, which is the filename of the audio file being imported.

Regardless of the data source that won the contest for being the source of your artist, record or track name, you can perform several transformations on this string before accepting it as final.

Regular expressions   The main goal of the regexp module is to perform sed-like substitutions, allowing you to extract the artist, record or track name from the string. It has the effect of a 'sed s/regexp/replacement/g' command. The regexp must not match the empty string (the only exception is leaving the regexp entry empty, which disables the whole regexp module). The replacement is allowed to be empty in which case the matched parts are deleted. The replacement may also contain the special escapes \1 through \9 to refer to the corresponding matching sub-expressions in the regexp. See sed(1) and grep(1) for more information on sed substitution and regexp syntax. There is a sandbox where you can enter a string and see how it would be transformed, providing a safe environment for experiments.

Predefined transformations   They provide some basic fixes, such as removing the extension or leading numbers, converting underscores to spaces, and trimming leading, tailing or multiple spaces. You can use them together with the regexp module as well, in which case only the replacement will be transformed, as expected.

Capitalization   Finally, with this module you can force a capitalization pattern on the string. The force case entry is a comma-separated list of words or expressions that will be left in the form you entered them. An obvious example is the case of roman numbers.

After the standard modules present for artist, record and track names, there are some category dependent settings. For artists and records you can set the source of the sort name field, for tracks you can decide whether to import the Replaygain and Comment tags, if available. If you choose to reset existing data (on the General tab), only track name, length, manual rva and empty comment fields are overwritten, and the latter two are only if you enabled them.

Once you are satisfied with the settings click 'OK'. A new window showing the progress is displayed, and the store is filled up. You can abort the process if you encounter some error or weirdness, or just want to refine some settings.

4.2.3   Arranging your collection

Each store, artist, record and track has fields you can fill in via bringing up the 'Edit' dialog for that item. The 'Visible name' is obviously the string that will appear in the Music Store tree, and in the Playlist. The 'Name to sort by' is a string key used for sorting items on the same level of hierarchy (all artists, records of a given artist, and tracks of a given record).

For artists, you should enter the same here as the 'Visible name' for ordinary band names (you can use copy & paste to do that, or simply press Enter while the cursor is in the visible name entry). However, for some artists you will enter a slightly modified string: 'Mayall, John' or just 'Mayall' for John Mayall, for example. This is to ensure that 'John Mayall' (which is the visible name) appears between 'Mahavishnu' and 'Morphine', and not somewhere near 'Jethro Tull'.

For records and tracks, the 'Name to sort by' should be a decimal numbering of the items. If you added tracks to the records using the aforementioned 'Auto-create tracks from these files' feature of the Record add dialog, the tracks will be automatically numbered for you this way.

Last but not least, every item has a 'Comment' field that may contain multiple lines of text, and is perfectly optional to use for any store, artist, record or track. When you have entered something in this field, it will be displayed in the lower area of the Music Store window when the corresponding item is selected in the tree. Use this to store miscellaneous data, such as birth dates of artists, release dates or comments like 'Recorded live at Royal Albert Hall, . . . ' or 'Digitized from original LP' for records, and movement subtitles for tracks that have them.

4.2.4   Dealing with multiple stores

As mentioned before, you may maintain several collections of audio files on several machines. Each collection is arranged in an artist/record/track hierarchy, and appears under a store item in the Music Store tree. The metadata describing one collection is located in one file on your filesystem.

On the Settings/Music Store page you can specify several database files whose content is intended to appear in your Music Store. If a given file is unavailable, the corresponding store item will be missing from the Music Store. If the file is readonly, you can play the music, but you won't be allowed to change (add, edit, remove, etc.) the items in the store. Finally, if you have write permission on the file, you will be allowed to change the items.

The order in which the stores appear in the Music Store is the order of the corresponding database files in the list. The list can be reordered via drag & drop.

4.2.5   Audio CD

If Aqualung was compiled with Audio CD support, a store called 'CD Audio' appears as the first store in Music Store. This special store contains a node for each drive in your machine. Detecting hot-swappable devices such as external USB drives is supported, so you don't need to restart the program after plugging in your drive. Aqualung will notice not only the change of discs in devices, but device changes themselves, too.

When you insert a CD in a drive, the corresponding node will contain the audio tracks on that disc. The artist, record and track names are automatically set from CD-Text information if found on the CD, or a CDDB lookup.

The drive nodes have options available from the popup menu for adding content to the Playlist, manual CDDB lookup and submission just like normal album nodes do. They have some further CD specific options as well.

The most important feature is ripping the CD. Choosing 'Rip CD. . . ' from the popup menu will bring up a dialog with several options broken into notebook pages. The 'Source' page is for selecting the tracks to be ripped, and specifying the artist, record and track names. If the CDDB lookup was successful, these fields are initialized appropriately. On the 'Output' page you can select the directory where to put the audio files, and optionally the music store to which you would like to add the ripped CD. The destination directory must be empty; it is best to create a fresh new directory each time you rip a CD. Only music stores with write permission are offered, so you might not see all of them. The desired file/encoding format can also be selected, along with settings concerning quality, such as compression level or bitrate. The supported destination formats are WAV, FLAC, Ogg Vorbis and MP3. There is also an option to set whether the files should be tagged with metadata. (WAV does not have a tagging mechanism. Other formats are tagged according to their native tagging mechanism.)

CD Ripping always happens with maximum available speed and with error correction modes manually set before every run on the last page titled 'Paranoia'. Here you can basically choose between safe and slow ripping, and faster, but more insecure operation. The latter might be useful if you know by experience that your equipment is reliable, and the CD you are about to rip is not scratched or dirty. Even so, it is probably a good idea to use the available extra error protection unless you are really in a hurry.

It is possible to display information about the inserted disc (CD-Text), or the drive itself (general info, reading or writing capabilities, etc.). The tray can also be ejected, if the driver supports this operation. Note that ripping and playing a CD at the same time is impossible for obvious reasons.

4.2.6   Handling file metadata

The program can read and write Ogg Xiph comments, ID3v1, ID3v2 and APE tags present in the files themselves. To see such metadata for a particular track, you will utilize the 'File info' dialog accessible from the Music Store (right-click popup menus for Tracks, or press 'i') and the Playlist (right-click popup menu for playlist entries, or press 'i').

When you open the 'File info' dialog from the Music Store, you will find buttons to the right of every metadata field that was read from the file (unless the store is readonly). By pressing these buttons, the associated data will be imported into the corresponding field of the relevant Track. For metadata fields that don't have a corresponding field in the Music Store, you can append their contents to the 'Comment' field as a catch-all solution.

The so-called basic fields (that are common in all supported metadata formats) are editable, thus you can modify their contents and save them by pressing the 'Save basic fields' button. Other format specific fields are also displayed, but modifying them is not supported. Creation and removal of the tags is also supported for the appropriate file formats.

Aqualung supports mass tagging, that is, writing data from the Music Store into file metadata. The feature can be invoked on a store, artist, record or a single track using the 'Batch-update file metadata...' popup menu item. Supported metadata fields are artist, record and track name, track number, track comment and year. The names are copied from the visible name fields of the artist, record and track, the track number and comment are set from the sort name and comment field of the track, respectively. The year is extracted from the sort name field of the record.

4.2.7   Using the RVA system

RVA stands for Relative Volume Adjustment, and refers to a system that is supposed to compensate for the fact that the perceived volume levels of tracks from different records are sometimes quite different. With usual players, you are left with the possibility to adjust the volume manually, when necessary; but not with Aqualung.

You have to do two things prior to using RVA in Aqualung. First, you have to calculate the volume of the tracks you want affected by the RVA system. To do this, use the 'Calculate volume' option found in the right-click popup menus of Stores, Artists, Records and Tracks. When you activate this option, a small window will pop up with a progress bar. You can move this window out of your way, and proceed with using Aqualung. Processing will be carried out in the background, and should not affect your ability to play music at all. Calculated volume levels will be saved and restored with the rest of the Music Store. The values are shown in the 'Edit track' dialog.

When you are done with this, open the 'Settings' dialog (right-click almost anywhere in the main window), and select the 'Playback RVA' notebook page.

If 'Enable playback RVA' is unchecked, the whole RVA system is turned off. No tracks receive adjustment. If playback RVA is enabled, you can select a listening environment that matches your setup. The idea is that the better your environment, the smaller adjustment you need to enjoy the music. If you work in a noisy workshop (and listen to Aqualung-played music) then it is best to minimize the volume differences between tracks so all tracks will be uniformly audible at a particular volume setting. If you can afford to listen to music in a silent room with high quality headphones or good near-field monitors, you should choose 'Audiophile' which will yield no change to volumes.

The diagram shows the input/output transfer function applied to the previously measured track loudness to obtain the needed adjustment needed for a particular track. The diagram is 24 dB large in both directions, with the (0, 0) point being in the upper right corner. The blue line shows the identity function (no change), while the red line shows the output volume (the actual transfer function). The adjustment applied at a particular track volume is the vertical distance between the two lines at that position. The transfer function is linear. You can use the 'Reference volume' and 'Steepness' controls to change its position.

In most cases, it is desirable that tracks of the same record receive the same adjustment, so as to preserve the volume differences internal to the record. This can be enabled by checking 'Apply averaged RVA to tracks of the same record'. When enabled, volume levels of the same record will be averaged and all tracks will be adjusted by an average value. Please note that measured volume levels are converted to

RVA values when you add something from the Music Store to the Playlist. Therefore, this feature works only when you add an Artist or a Record. If you add a record by adding all the Tracks manually one after another, they will all receive independent RVA values. Also, changing RVA settings will not affect entries already in the Playlist.

There are many records having one or two tracks that really stand out of the average volume level. (For example, there is one very silent track on an otherwise loud record.) In this case, these tracks would 'pull down' the average volume. To get around this, you can adjust a threshold that will be used to sort out tracks that stand out too much and will be disregarded when computing the average volume.

You can select whether you want to specify a threshold in linear volume units [dBFS] or you want to specify a percentage of the standard deviation of the set of individual track volumes to use as a threshold. The default values should work well for the vast majority of records. If you always want every track's volume to count in the average adjustment of the record, choose the linear threshold and set it to a really big value (say, 30 dB) so all tracks will be within this range.

You also have the possibility to always use a manually specified, fixed value as RVA for a particular track. In the 'Edit track' dialog for that track, check the 'Use manual RVA value' checkbox and set the value with the spinbutton on its right. If you e.g. import an ID3v2.4 RVA tag from an MP3 file, it will also set this field thereby circumventing Aqualung's own RVA calculation.

4.2.8 CDDB Support

Aqualung supports retrieving matches from a CDDB database, as well as submitting new records or updating existing ones. The features are available by right-clicking on a record in the Music Store and choosing the appropriate menu item.

The CDDB query option starts a query (which can last a bit long if there are a lot of matches), and displays a dialog with the search results. It tends to work even if you have already encoded your audio files in a lossy format.

If there are multiple matches, you can select any of them using the combo box at the top of the dialog. The displayed fields are all editable, which is useful in case you find no fully acceptable match, but want to use one that is almost perfect. The track names can be edited by double-clicking on the desired track, or single clicking on an already selected entry.

By pressing the 'OK' button the track names of the currently selected lookup results will be propagated into the Music Store. The artist name and record title are not automatically set, but can be imported using the 'Import as Artist' and 'Import as Title' buttons on the right. Year can be imported as the sort key of the record. Other data (category, genre and extended data) can be appended to the comment field of the record in question using the 'Add to Comments' button next to the appropriate text entry.

The CDDB submission option brings up a dialog which contains the artist, title, year, category, genre and extended data fields, and the tracklist. All fields (including track names) are editable. The artist, title, year and category fields are mandatory, the genre and extended data are optional. Track names should be all set as well. If you are about to update or correct an existing CDDB record, make sure that you choose the same category as the existing record has (this information can be retrieved via a CDDB query). You are also recommended to comply with the naming rules when submitting new records.

4.2.9   Shortcuts for this window

double click, a, A	add store/artist/record/track to playlist
n, N	new store/artist/record/track
s, S	save store
b, B	build store/artist from filesystem
e, E	edit store/artist/record/track
i, I	bring up the File info dialog (for tracks only)
v, V	start volume calculation for unmeasured items (recursive for stores, artists and records)
delete	remove store/artist/record/track
+	add new artist/record/track to this store/artist/record
enter	expand/collapse current row non-recursively
w, W	collapse all rows
up/down arrow	navigation in the tree
f, F	search in all stores
q, Q, ESC	hide window (same as Alt+S in main window)

In addition to the popup menu items and keyboard shortcuts, you can also add an item to the playlist by drag & dropping from the Music Store window into the Playlist. This method has a further advantage: you can place the newly added items in any position, not just append to the end of the list.

4.3   Playlist

This window has relatively few surprising features. It normally receives its contents from the Music Store. However, you can put any file in the playlist regardless of the contents of your Music Store, using the 'Add files' button at the bottom of the window. Adding a directory is also supported, by right-clicking on the button and selecting the appropriate menu item.

The other two buttons ('Select all', 'Remove selected') function as you would expect them when clicked with the left mouse button. Clicking with the right mouse button brings up popup menus that contain further options as seen with the 'Add files' button.

There is a statusbar under the list showing the total time of the playlist and the duration of the selected tracks, as well as the size of the songs if enabled.

The contents of the playlist can be saved and restored automatically when the program exits and starts up. (Whether this should be done is a configuration option, covered later.) In addition to this, you can save the playlist manually at any time, or load a previously saved playlist file. To do this, right-click in the playlist area, which will bring up a popup menu with these features. The playlist is saved as an XML file, so you should normally end your filename with .xml – however, this is only good practice and not necessary. Note that the playlist file format is not compatible with Winamp/XMMS .m3u files. However, Aqualung will open playlists in .m3u and .pls format whenever possible.

The playlist can not only maintain a linear list of songs, but also capable of keeping the tracks of albums together. This is done when a Store, Artist or Record has been added to the playlist using the so-called Album mode, available from the popup menu in Music Store. If you tend to use it extensively, there is an option on the Settings/Playlist page to make it default, so drag & drop and adding via keyboard shortcut will use this mode automatically.

You can rearrange the list at any time by drag & dropping items with the mouse.

4.3.1   Shortcuts for this window

up/down arrow	navigation in the list
delete	remove selected tracks
SHIFT+delete	remove all tracks
CTRL+delete	remove selected tracks from filesystem
enter, double click	start playback of the selected or double-clicked track, or jump to it if already playing
i, I, F1	bring up the File info dialog (also accessible from the right-click popup menu)
insert	add files
SHIFT+insert	add directory
u, U	cut selected
f, F	search in Playlist
t, T	send selected songs to iRiver iFP device
a, A	scroll list to show active track
w, W	collapse all nodes
q, Q, ESC	hide window (same as Alt+L in main window)

4.4   Settings

This dialog lets you set some options that affect the behavior of the program. It is split into multiple notebook pages to make arranging and accessing all the options easier.

4.4.1   General

The 'Title format' string will be used to construct a single title line from an Artist, a Record and a Track name when adding tracks to the Playlist. The Artist, Record and Track names should appear as '%a', '%r' and '%t' in the template, respectively. Such strings may be '%a: %t [%r]', '%a / %r / %t', '%a :: %r :: %t', or just about anything else you can think of. Note that once you add something from the Music Store to the playlist, the strings in the Playlist window will not update if you change this setting afterwards.

The so-called 'implicit command line' is something you should pay attention to. It exists mainly for those who have a stable sound setup and always use the program with the same output device, e.g. they have only OSS and don't plan to upgrade. For such users it may be cumbersome to always specify the desired output device on the command line, along with its optional parameters if needed. So here you may enter something that you would otherwise enter on the command line every time.

But beware: you cannot override or turn off every option, so for example if you enter '--help' here, the program will always display the standard message and exit immediately; and there is no way to override that from the command line. If you get into trouble, all you have to (or can) do is grab a text editor and hack it out of ~/.aqualung/config.xml where it is stored. You will find it between '<default_param>' and '</default_param>'.

There are some global options to set here as well, which should be quite obvious to use.

4.4.2   Playlist

The option to save/restore the playlist when exiting and starting the program is turned on by default. If you prefer starting with an empty playlist every time, turn it off. Here you can also set the visibility of the track lengths and RVA values in the playlist. By drag & dropping entries in the list, you can rearrange the columns. The position of those that are not shown is of course irrelevant. Other options should be obvious, such as embedding the Playlist in the Main window, hiding the statusbar, and showing active track name in bold.

4.4.3   Music Store

The purpose and usage of Music Store and database files have been covered in section 4.2. On this page you can somewhat customize the Music Store, decide whether to hide the comment pane or the status bar, or to enable rules hint. If you choose to expand stores on startup, all toplevel tree nodes will automatically be expanded after starting Aqualung.

There are also some options to handle the cover arts of your records. The feature can be turned on by placing an image file in the same directory where you keep the tracks of a record. The filenames that will at first be looked for are 'cover.ext', '.cover.ext', 'front.ext', '.front.ext', 'folder.ext', '.folder.ext', where 'ext' is one of 'jpg', 'jpeg', 'png', 'gif', 'bmp', 'tif', 'tiff'. If none of them exists, the first image file having an appropriate extension will be used. If you select the record (or one of its tracks) in the Music Store, the image will be displayed in the comment pane and the File Info dialog, as well as in the Main window during the playback of a track from this album. Clicking the image will show a zoomed version of the cover.

At last, as already mentioned before, this page is the place to manage music store database files too. Pressing the 'Refresh' button will update the accessibility (r, rw, unreachable) flags of the specified store files.

4.4.4   DSP

Changing the two options on the 'DSP' page takes effect immediately, and stays that way regardless of whether you leave the dialog with the 'OK' or 'Cancel' button.

The sample rate converter type should be chosen to fit the resources of your computer, and provide the best affordable quality at the same time. So fire up top or something similar on a spare terminal, and start with the best converter. If your machine is not very new, this will consume huge amounts of CPU, and the playback will very likely be choppy. If this is the case, you will have to pick another converter. 'Fastest Sinc Interpolator' is usable on today's most machines. If not, use 'Linear Interpolator' instead of 'ZOH' since both are blindingly fast, but linear is naturally much better than zero-order (constant hold). It should also be noted that the CPU usage of sample rate conversion is greatly affected by the difference between the two sample rates: upsampling 32k to 96k will be much more expensive than, say, upsampling from 44.1k to 48k.

Of course, sample rate conversion springs into action only when the output sample rate (the sample rate you specified in case of OSS or ALSA, or the sample rate the JACK server specified in case of JACK) does not match the sample rate of the track you are playing. A typical situation is when you have 44.1k files grabbed from CD and play back at 48k.

4.4.5   Playback RVA

This page is for setting the RVA options. RVA has already been discussed above, see section 4.2.7 for details.

4.4.6   Metadata

On this page you can decide whether you prefer using file metadata (if available) instead of information from the Music Store. Settings can be made on Artist / Record / Track basis. Metadata can also be used when adding external files to Playlist (enabled by default).

4.4.7   CD Audio

You can set the drive speed for CD playing in CD-ROM speed units. Lower speed usually means less drive noise. However, when using Paranoia error correction modes for increased accuracy, generally much larger speeds are required to prevent buffer underruns (and thus audible drop-outs).

Most drives let Aqualung know when a CD has been inserted or removed. However, some drives don't report correctly, and thus it may happen that a newly inserted CD remains unnoticed to Aqualung. In such cases, forcing TOC re-read on every drive scan should help.

Aqualung can automatically add newly inserted CDs to the Playlist, and remove them when the CD is removed from the drive. A CD will only be added if the Playlist doesn't already contain any of its

tracks. The newly added CD will appear at the top of the Playlist, but after all CD tracks or albums being in the list.

Removal from Playlist will happen if the CD is removed from the drive, or the user quits Aqualung while the CD is in the drive. All tracks of the CD will be removed, even if they were mixed with other audio files or some of them were removed manually.

4.4.8 CDDB

You can customize the CDDB lookup here. As for the query protocol, standard CDDBP (port 888) and CDDB over HTTP (port 80) are supported. The standard CDDBP port is the recommended choice unless some unavoidable firewall settings prevent you from using it. For submission always HTTP is used.

The default CDDB database server address is freedb.org, but you may specify another server (maybe a close mirror). The connection timeout can also be set here.

If you want to update or submit records to the CDDB server, you will have to give a valid email address. Should your submission be rejected for some reason, you will receive a note about the failure to this address.

Instead of connecting directly to the CDDB server you can use an HTTP proxy. This case you have to specify the proxy server address and port (the protocol will be HTTP).

4.4.9 Appearance

On this page you can decide whether to override some fonts and colors provided by the skins. You can change the font of the Music Store, Playlist, the track and timer labels, and set the color of the active track in Playlist.

4.5 LADSPA Plugins

One great feature of the program is that you can apply LADSPA plugins to the music. You can use the equalizer of your choice instead of a built-in one, along with other plugins. You can process your sound with Aqualung in ways that the author of this program never thought of. A recommended set is TAP-plugins.

Of course, faithful reproduction of music does not require or permit pervasive signal processing, since that is not the purpose of such activity. However, the technology is at your disposal and it's up to you to use or misuse it. It may be necessary to adapt your listening gear to the acoustic environment, using small amounts of equalization preferably in a subtractive manner. In addition to this, I also like to spice my tracks with a small amount of tubewarmth to feel that warm tube sound even with my transistor amplifiers, and to bring out even the finest details of the music.

The plugin chain you build is automatically saved and restored, so once you get it right for your listening environment, you should rarely need to touch it.

Some tricks concerning the LADSPA patch builder:

- Multiple plugins can be selected from the available plugins list and added at once by clicking on the 'Add button' or pressing 'a' or 'A'.

- A single plugin can be added immediately by double-clicking it in the available plugins list.

- Plugins in the running list can be (un)bypassed with the middle mouse button.

- Running plugins' configuration window can be brought up by double-clicking on them (same as clicking on the 'Configure' button).

- If a plugin is selected in the running plugins list, pressing delete will remove it (same as pressing the 'Remove' button).

- Running plugins can be rearranged at any time (changing the order in which they are processed) via dragging them with the mouse.

- In the configuration windows of plugins, setting input controls back to their default value is possible by shift-clicking on the slider. This does not work for toggled or integer inputs (those that don't have a slider displayed for them).

4.6   JACK Port Setup

If you use JACK output, you need this dialog to route the outputs of the program somewhere (most likely to the playback ports representing the soundcard driver). If you want the outputs to be connected automatically to the first two hardware playback devices, use the -a (or --auto) command line option.

On the left, each output port has a list of its current connections. By clicking on any list item, that connection will be removed. The 'Clear connections' button removes all connections from the output ports.

The notebook on the right has a page for all client programs and hardware devices available to the JACK server. Naturally only those are shown which are data sinks (hardware playback devices or inputs of JACK clients), thus connectable to outputs which are data sources. By selecting a notebook page, you will see a list of that client's input ports. Clicking on a list item connects the port to the currently selected Aqualung output port (which has a blue header). You can change the selected output port by clicking on the unselected (grey) list header. When you add connections to the output ports, the selection alters between the two outputs so connecting both outputs is very fast and easy.

If you start up another JACK client while the dialog is open, you may press the 'Rescan' button to make it appear in the notebook. Closing and re-opening the dialog has the same effect, since JACK ports are re-read and a new dialog instance is built every time.

4.7   Skin Chooser

This dialog lets you choose from the available skins at any time. All officially supported skins are shipped with Aqualung, and installed in the system-wide skin directory during 'make install'. Skins placed in the local skin directory will only be locally available, which is useful for developing new skins or experimenting with the existing ones. If there are skins in the system-wide directory and the local directory having the same name, the local one takes precedence.

4.8   System Tray Support

When compiled with Systray support, Aqualung will place its icon in the system tray (notification area), and lets all of its windows be closed while still playing music. In this mode pressing the upper right X on the main window will not exit the program, only hide its windows.

Clicking on the systray icon with the left mouse button will toggle visibility of the program's windows. Clicking with the right button will bring up a popup menu allowing showing/hiding the windows, basic cueing, and quitting Aqualung.

The systray icon has a tooltip displaying the same text as the main window's title. So it's easy to see what track is currently playing, and also the Aqualung instance ID (in case of more instances).