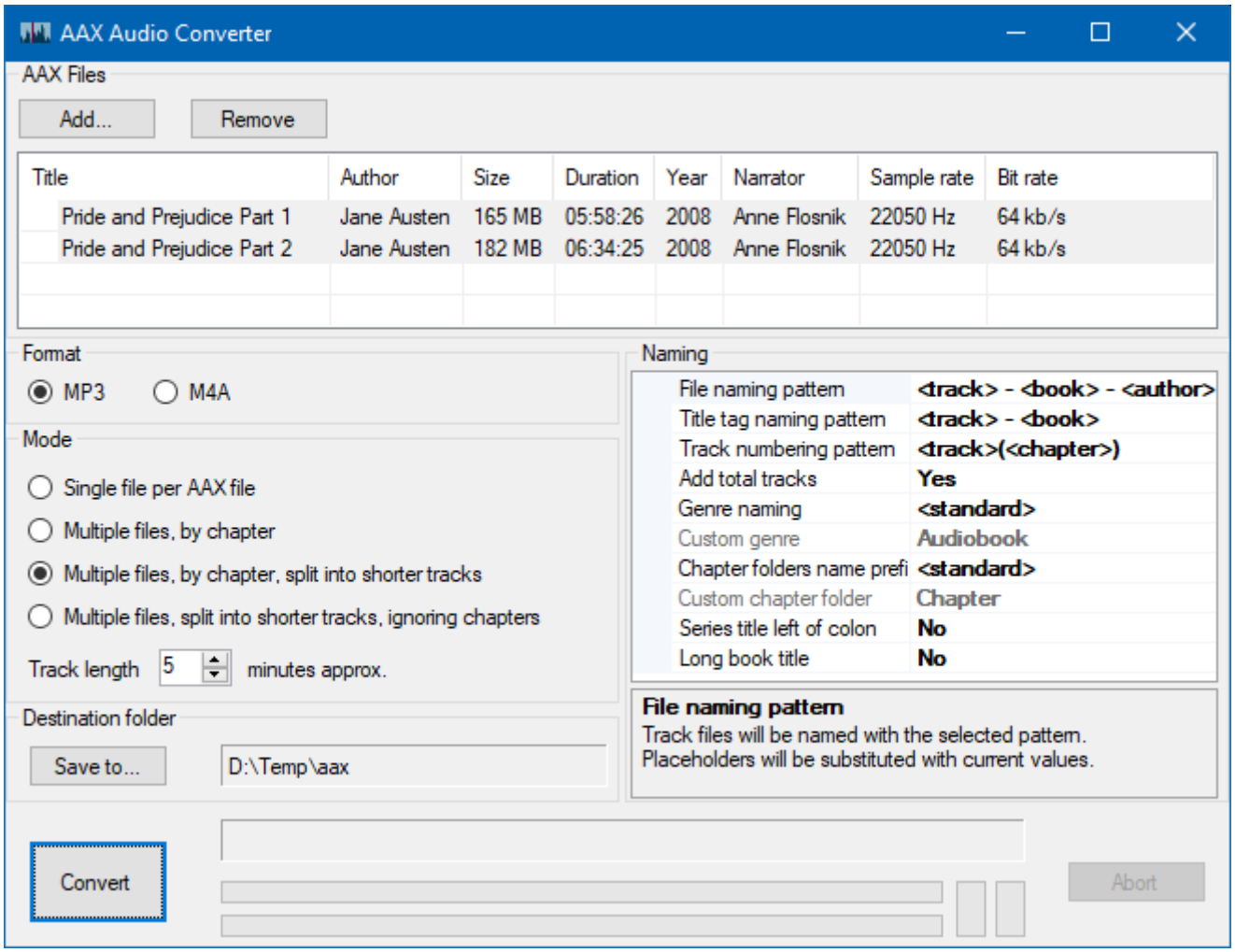

AAX Audio Converter

Version 1.18.2

1 Overview

1.1 Anti-Piracy Notice

Note that this software does not 'crack' the DRM or circumvent it in any other way. The application simply applies the user's own activation code (associated with his/her personal Audible account) to decrypt the audiobook in the same manner as the official audiobook playing software does.

Please only use this application for gaining full access to your own audiobooks for archiving/conversion/convenience. De-DRMed audiobooks must not be uploaded to open servers, torrents, or other methods of mass distribution. No help will be given to people doing such things. Authors, retailers and publishers all need to make a living, so that they can continue to produce audiobooks for us to listen to and enjoy.

This blurb is borrowed from https://github.com/KrumpetPirate/AAXtoMP3 and https://apprenticealf.wordpress.com/.

1.2 Main Features

- Converts Audible proprietary .aax files to plain .mp3 or .m4a/.m4b.
  Also offers basic support for older .aa files.
- Windows application, with all the classic features of the Windows eco-system.
- Requires either Book Lib Connect, (legacy) Audible Manager, or personal activation code.
- Processing Modes:
  - One output file per input file.
  - Multiple output files per input file, divided by chapter.
  - Multiple output files per input file, divided by chapter and further split into shorter tracks of roughly equal length.
  - Multiple output files per input file, split into shorter tracks of roughly equal length, ignoring chapters.
- Creates additional playlist if more than one output file is created per book.
- Handles books with multiple parts.
- Audio compression options: Can apply variable and/or reduced bit rates.
- Manages and preserves all meta-tag information, including chapter meta data.
- Supports named chapters, for .aax files downloaded with the Audible App.
- Can adjust inaccurate chapter marks.
- Allows customization of output naming: files, folders and tags.
- Special functions:

  - Establish iTunes compatibility for very long books in .m4a/.m4b format.
  - Fix AAC encoding bug in 44.1 kHz .aax files.
- Other noteworthy features:
  - Supports more than 255 chapters in a book.
  - Supports very long books.
- Delegates all audio processing to powerful FFmpeg , including DRM handling.
- High performance: Utilizes all available processor cores to run conversion work in parallel.
  - With detailed progress status and performance monitoring.
- Optionally copies original .aax file to a new location after the conversion, with a customizable name.
- Automatically launches default media player after conversion has completed.
- Log facility, optional, to record program activity, activated with program argument.
- Online update function: Will automatically scan the website for a new version, download and install it.
- *Technical*:
  - .Net Framework application, written in C# with Windows Forms, the Task Parallel Library and other goodies from language and framework.
  - Incorporating a number of snippets from the Open Source community.

1.3 System Environment

AAX Audio Converter will run on Windows 7 and above.

It is a .Net application, where the same binaries will be executed as a 64 bit process on a 64 bit system and as a 32 bit process on a 32 bit system.

The bundled FFmpeg binary that comes with the AAX Audio Converter installation package is a 32 bit executable. The user can replace it (see next chapter), but audio conversion is not memory intensive and using a 64 bit FFmpeg will not improve performance.

The application requires .Net Framework 4.8 to be installed. On Windows 10/11 systems this should normally be the case, if the system is kept up to date. On older Windows versions, the Framework may have to be installed separately. AAX Audio Converter will detect the missing Framework and provide a link to the download, automatically opening the relevant Microsoft web page.

AAX Audio Converter is configured to support high DPI monitors under Windows 10/11. It will scale properly if the user changes the DPI or scale factor.

1.4 Dependencies

1.4.1 Audible account

If books are/were not downloaded with Book Lib Connect, but with AudibleSync, legacy Audible Manager or the retired Audible for Win 10, AAX Audio Converter needs the user's personal Audible activation code to be able to process his/her Audible audiobooks.

Book Lib Connect, on the other hand, will manage its own access to the Audible account. With Book Lib Connect any dummy activation code will do.

Without Book Lib Connect the easiest way to obtain the Audible activation code is to install and activate legacy "Audible Manager". While no longer available from Audible directly, other websites still list it. With Audible Manager installed and activated, i.e. associated with the Audible account, AAX Audio Converter should be able to find the activation code automatically.

Each time AAX Audio Converter is started, it tries to retrieve the activation code. If not successful, it will ask to enter the code manually, in case it is known.

The activation code must be the valid one for the user's audiobooks.

1.4.2 FFmpeg

All audio processing in AAX Audio Converter, including DRM handling, is carried out by FFmpeg.

The AAX Audio Converter installation package comes pre-bundled with a suitable `FFmpeg.exe`. This can be substituted with a different one. AAX Audio Converter has been tested with FFmpeg version 4.1, the latest when writing this application. It may also work with older versions of FFmpeg, but AAX support in FFmpeg has only been introduced some time ago (version 2.8.1).

Each time AAX Audio Converter is started it tries to locate `FFmpeg.exe`. If not successful, it allows the user to enter a path manually.

2 Functionality and customization

This chapter gives an overview on available functionality in AAX Audio Converter and its customization options. For the options to be explained in detail, see the relevant chapters further down in the manual.

AAX Audio Converter basically converts AAX (and AA) files to MP3 or MPEG4. But it also offers a number of options to organize the conversion output. These options will especially affect the number and names of audio files created and the embedded tags, e.g. the title tags – the names of tracks that will appear in a media player.

Conversion offers different modes. The mode options will trigger different internal strategies, all of which can be customized.

The program has also has a few options for extra activity at the end of the conversion, see Finalizing the conversion.

2.1 Audio output formats

Output formats are MP3 or MPEG4 audio, with MPEG4 file types .m4a or .m4b.

MPEG4 audio consists of an MP4 container with an AAC audio stream. As AAX files are also MPEG4, albeit with an encrypted AAC audio stream, conversion to plain MPEG4 is very fast, as no actual transcoding is needed. .m4b is the default file type for MPEG4 output (since version 1.18), but can be changed back to .m4a. .m4b is associated with audio books by most players now but was not as common as .m4a for quite some time. The content will be identical for both file types.

MP3, on the other hand, is a completely different audio format. Almost every player, hard- and software, will support it. MP3 needs transcoding to create it. This makes the conversion significantly slower. To improve throughput, AAX Audio Converter will parallelize the work and utilize all processor cores (in all conversion modes except Single File), see Performance

***Note**: AAX Audio Converter also offers basic support for AA files, an older Audible file format, which is an encrypted form of MP3. With an AA file, conversion to MP3 will be fast while conversion to MPEG4 will require transcoding.*

See also Format.

2.1.1 Bit rate

Both MP3 and AAC codecs use compressed audio. Compression is governed by the bit rate. By default, neither AAX Audio Converter nor FFmpeg will alter the audio stream compression. However, as customization options, the user can change the bit rate settings, to obtain shorter output files.

The *variable bit rate* option can reduce output file size without noticeably degrading audio quality. Audible files come with constant bit rate.

The *bit rate* can also be explicitly *reduced*. However, the loss in quality can become severe here. There is one exception: AAX+ files with a bit rate of 128 kbit/s. These can be safely reduced to 64 kbit/s.

Reducing the bit rate will also affect the sample rate (maximum frequency), AAX Audio Converter will handle this.

Both bit rate options can be combined.

Note: *Changing the bit rate may significantly slow down the conversion.*

See Apply variable bit rate and Reduce bit rate in Basic Settings dialog.

2.2 Conversion modes

There are four conversion modes: Single, Chapter, Split-Chapter and Time-Split, see Mode for details.

Only the first one will generate a single audio output file (track), all others will create multiple files (tracks), and for Split-Chapter even multiple sub-folders.

The program will always produce a playlist for multiple output files. The playlist will represent the entire book. Each track will have a different name/title, similar to a music album. This will make it easy to navigate within the book on general media player soft- and hardware. (A typical media player hardware would be a car audio system.)

- In Single file mode, there will be only one track for each aax file, with a single title.

  Chapter marks will be set, taken either from the original embedded .aax chapter info, but renumbered for a multipart book, or from explicit chapter names, see Chapter meta data below. *(Many players can read chapter data from .m4a/.m4b, but very few support it for .mp3.)*

- Chapter and Split-Chapter modes expose the chapter structure as files. This will be based on embedded meta information in the .aax file which is supposed to contain the chapter list and the chapter timings. The alternative source is the extra meta file that accompanies a download via the Audible App.

  Division by chapters can, at minimum, give the chapter number for each track. It may also show an explicit chapter name, see Chapter meta data below. A further subdivision of chapters into short tracks of approximately equal time will simplify fast forward/rewind, as most players offer some kind of jump function to next or previous track.

  So, for instance, an audiobook converted in Split-Chapter mode, formatted as .mp3 and put on a USB stick, will not only play on virtually any car audio system manufactured in the last fifteen years, but will also most probably display track/chapter names and support full navigation.

- Dividing by time for the Split-Chapter and Time-Split modes will always be based on silence detection carried out by AAX Audio Converter itself (via FFmpeg). Thus, a track will never be cut in mid-word and audio quality therefore not suffer.

- Finally, the Time-Split mode completely ignores the chapter structure and splits the .aax file into tracks of approximately equal length. This is similar to the iTunes function that converts an Audible file to CD. Also some predominantly older audio books appear to be divided into chapters on a mere time basis, not on the actual book structure, again very similar to Time-split mode here.

Audible enframes the audiobooks with a short brand intro and outro. The Audible App will skip these frame pieces when playing the book. AAX Audio Converter may achieve the same, particularly if the book has been downloaded with the Audible App, see Skip very short chapters at begin and end in the Basic Settings dialog.

2.3 Multi-part books

AAX Audio Converter has specific functionality to handle multi-part audiobooks.

Audible offers to download longer books in several parts, each part as an independent .aax file. This allows better download control on slow or unstable internet connections. Multiple parts will also make the conversion faster, see Performance. AAX Audio Converter will recombine the individual parts to a complete book (as a playlist), provided all parts are loaded and selected for the conversion.

The program analyses the book title to detect a multi-part book, looking for the word "part" (or a customized variant of it). After examining all titles in the current selection, it will enter one of three internal part-handling modes: none, all or some.

None means no parts are detected and the .aax file will be treated as one complete book.

If it assumes all parts have been selected, the parts will be combined into a single playlist. Chapter and track numbering will be consecutive across the parts.

If some parts are present but apparently not all, the parts are converted individually. The generated files will still be saved in the same book folder, but no book-wide playlist will be generated. If, depending on settings, more than one file is generated per part, the output for each part will be put in a separate sub-folder.

***Note**: The program is not able to determine how many parts the book has, if there are more than two. AAX Audio Converter relies on the user here, to select all parts for the conversion.*

Usually, Audible adds a continuation hint to the end of each part (except for the last) and also starts each part with the book title sequence. These extras are usually marked as separate chapters in the embedded meta data. AAX Audio Converter can remove them, see Skip short chapters between book parts in the Basic Settings dialog.

2.4 Chapter meta data

The meta data contained the .aax file (or .aa file) consists of descriptive information, like author and book title, and of structural information, known as chapter meta data. Meta data can also originate from the additional file that comes with a download via the Audible App.

A chapter meta entry has a name or at least a number, and a timing.

Chapter meta will be transferred – in tailored and possibly in modified form – to all output, i.e. for both file formats and for all conversion modes:

- Single file mode will receive the full chapter list.
- In Chapter and Split-Chapter modes, the individual tracks will be based on the chapter timing. Each track (file) will also receive the current chapter as meta data. This also serves as a hint for the duration of the current track in MP3 format.
- Split-time mode will receive the tailored subrange of the chapter data.

2.4.1 Chapter naming

A standard .aax (or .aa) audiobook comes with embedded meta-data, like book title and author, and also a list of chapters. Although the meta data structure would allow it, the chapters do not have explicit names but are simply numbered. The chapter numbers always start with 1 in each file, even for higher parts in a multi-part book. AAX Audio Converter therefore builds its own chapter numbering scheme, using only the chapter timings from the meta-data, but with continuous chapter numbers across multiple parts.

Audiobooks downloaded with the Audible App often benefit from an additional feature: explicit chapter names. These will be downloaded by the app as a separate file. (*Not available with Audible Manager / Audible Download Helper*.) AAX Audio Converter will try to find and use these explicit chapter names instead of the embedded .aax chapter numbers, unless this option is switched off, see Use named chapters if available in the Basic settings dialog.

For a book that has its chapter structure organized into several logical parts (still in the same physical .aax file), the part headers will come as separate chapters, usually very short ones, only as long as it takes to read the part caption. If AAX Audio Converter is set to Chapter or Split-Chapter mode, it will start a new output audio file with every new chapter, even for the short ones. As all the created files with their individual chapter names are combined in a playlist, the book structure will become visible in the playlist window of the media player.

In an audiobook with multiple logical parts, chapter names sometimes are not unique but repeat themselves in subsequent parts. On the other hand, file names created by AAX Audio Converter always must be unique. If the given chapter names are not unique, the program automatically prepends the chapter name with an ordering number for the chapter-based file name. For consistency, the ordering numbers will be applied to all audio files created for the book. (These extra ordering numbers are not used for the title tag in the meta data created because tag values do not have to be unique.)

The Audible App will usually skip the brand intro and outro ("This is Audible", "Audible hopes..."). AAX Audio Converter can do the same as long as the intro/outro timings are given in the extra meta file. This option can be switched off, see Skip very short chapters at begin and end in the Basic settings dialog.

2.4.2 Chapter timing

Chapter time marks will be taken from the .aax file by default. If additional chapter data is available from a download with the Audible App (*see above*), this will be used instead (unless disabled in the settings).

However, chapter times are not always accurate. AAX Audio Converter has an option to fix this, see Verify and adjust chapter marks in the Basic Settings dialog.

Chapter mark adjustment is also based on silence detection, similar to determining the tracks in split-chapter and split-time modes. The adjustment algorithm will prevent the chapter title from being cut mid-word and also adds a short initial gap, if the narration started immediately.

Adjustment will affect:

- chapter meta data in single file and split-time modes,
- the tracks themselves in chapter and split-chapter modes.

In addition to the verify/adjust mechanism, the original source file can be set as a preferred reference for chapter times, see Prefer embedded chapter times in the Basic Settings dialog.

2.5 Special functions

AAX Audio Converter can address some specific uses cases. These functions are optional and not enabled by default.

2.5.1 Compatibility with iTunes

Very long books, converted to M4B format, may be shown in iTunes with a meaningless absurd duration. This appears to happen with monolithic books in single file mode only, as the other modes produce tracks that should always be short enough. AAX Audio Converter can fix the issue by creating an intermediate pure-audio copy of the AAX file. See Intermediate copy for single file mode.

If the AAX file is 44.1 kHz, see also the next paragraph.

2.5.2 AAX files with 44.1 kHz

AAX files encoded as 44100 Hz, 128 kbit/s may suffer from an incorrect audio setup in the MPEG4 container, which makes the converted file as M4A/M4B unreadable for some players. It can also affect FFmpeg. AAX Audio Converter can fix this by creating a modified copy of the file, see Fix AAC encoding for 44.1 kHz.

2.6 Output structure

The output files of converted books are written to a hierarchical folder structure, following the usual library scheme, sorting by author first, then by book tile.. Accordingly, the default structure has two folder levels, author and book title. The audio track or tracks will be placed into the book folder. If in split-chapter mode, there will also be chapter sublevel, to keep the number of output files per folder reasonably small.

Example in single file mode (two-part book):

Jane Austen
Pride and Prejudice
1 – Jane Austen – Pride and Prejudice.mp3
2 – Jane Austen – Pride and Prejudice.mp3
Jane Austen – Pride and Prejudice.m3u

In split-chapter mode:

Jane Austen
Pride and Prejudice
Chapter 1
001 – Jane Austen – Pride and Prejudice.mp3
Chapter 2
002 – Jane Austen – Pride and Prejudice.mp3
Chapter 3
003 – Jane Austen – Pride and Prejudice.mp3
004 – Jane Austen – Pride and Prejudice.mp3
…
Jane Austen – Pride and Prejudice.m3u

If the book is part of a series and series information can be found in the associated meta data, a middle level with the series title will be inserted between author and book title folders. The book folder name will be prepended with the sequence number of the book within the series.

J. R. R. Tolkien
The Lord of the Rings
[1] The Fellowship of the Ring
1 – J. R. R. Tolkien – The Fellowship of the Ring.mp3
…
[2] The Two Towers
[3] The Return of the King

All this can be customized, see Customization for an overview.

The name of the book folder can be made verbose and also contain author and series (if applicable):

Jane Austen

Jane Austen – Pride and Prejudice

1 – Jane Austen – Pride and Prejudice.mp3

2 – Jane Austen – Pride and Prejudice.mp3

Jane Austen – Pride and Prejudice.m3u

J. R. R. Tolkien

The Lord of the Rings

J. R. R. Tolkien – The Lord of the Rings [1] – The Fellowship of the Ring

1 – J. R. R. Tolkien – The Fellowship of the Ring.mp3

...

J. R. R. Tolkien – The Lord of the Rings [2] – The Two Towers

J. R. R. Tolkien – The Lord of the Rings [3] – The Return of the King

A simpler flat structure is also available, with author and book title in the folder name, but without series title.

Jane Austen – Pride and Prejudice

1 – Jane Austen – Pride and Prejudice.mp3

2 – Jane Austen – Pride and Prejudice.mp3

Jane Austen – Pride and Prejudice.m3u

2.7 Performance

The actual conversion task in AAX Audio Converter is handled by FFmpeg. AAX Audio Converter runs one or more FFmpeg processes in the background, with each FFmpeg process creating one new audio output file. FFmpeg processes may run concurrently, depending on the number of processor cores.

Conversion for AAX to MP3 is computation-intensive. It needs transcoding because the audio compression encodings are different. In contrast, conversion to M4A/M4B does not need real transcoding as both AAX and M4A/M4B are MPEG4 containers with the same compression encoding, an AAC audio stream.

Hence, conversion to MP3 is much slower than conversion to M4A/M4B.

***Note**: Customizing the bit rate will turn each conversion into a transcoding operation.*

AAX Audio Converter tries to speed up the conversion task by parallelizing the work, if possible. Possible means that for a basic parallelization the conversion must produce at least two audio output files.

The worst case under performance aspects is Single file conversion mode, applied to one single part book. It can only run as a single FFmpeg process, without any parallelization. Accordingly, for MP3 this is the slowest of all modes. However, with the book downloaded in multiple parts (if

Audible offers that option), the individual parts can be converted concurrently, as more than one output file is created. Similarly with several books converted together in the same invocation.

For the other conversion modes, where multiple output files are created, parallelization will always be applied. To provide for the nature of compressed audio streams and particularly encrypted audio streams, the conversion into multiple output files is divided into two phases. In the first phase, one or more plain audio files are created as an intermediate working copy. This temporary copy acts as the source for the second phase with the actual transcoding. The overall performance gain justifies the additional overhead introduced with the separation of decryption and transcoding.

For Chapter, Split-Chapter and Time-split modes each FFmpeg process converts only a chunk of the input file. Unfortunately, compressed audio streams do not allow random access. FFmpeg must always search the input file from an earlier position, often the beginning of the stream, to reach the precise start time of the chunk. Again, a book split into multiple parts. i.e. multiple input files, will speed this up. A part of the book is shorter than the whole book and subsequently FFmpeg positioning times will be shorter, too.

Split-Chapter and Time-split modes require silence detection, which will take some extra time. It is run in parallel again. Silence detection will also be performed for chapter mode if the verify/adjust chapter marks option is set for this mode. Additional temporary files will be created for repositioned chapters, slightly slowing down the overall conversion.

The program measures the time for each conversion with an internal stopwatch. It displays the elapsed time in the message box for the conversion result. Elapsed time will also be recorded in the log file, if logging is active. (The stopwatch will be paused during user interaction.)

Here are the performance results of sample runs with two books, with AAX Audio Converter 1.15. The first specimen was a one-part book of 10 hours, with 52 chapters, in standard AAX compression of 22050 Hz and 64 kb/s; the second one another one-part book of 9:35 h, 21 chapters, in AAX+ compression of 44100 Hz and 128 kb/s. The second book also had misaligned chapter marks, the first one did not, but had very short transitions.

The test machine was an older Intel I7 processor with 4 cores and hyper-threading.

	Book 1, 10:01 h, 52 ch. 22.05 kHz, 64kb/s		Book 2, 9:35 h, 21 ch. 44.1 kHz, 128 kb/s	
	MP3	M4A	MP3	M4A
Single file	00:07:14	00:00:05	00:09:39	00:00:10
Single file (adjusting chapter marks)	00:07:38	00:00:25	00:10:02	00:00:34
Chapter	00:01:52	00:00:10	00:02:40	00:00:12
Chapter (adjusting chapter marks)	00:02:15	00:00:27	00:02:53	00:00:30
Split-chapter	00:02:13	00:00:23	00:02:39	00:00:29
Split-chapter (adjusting chapter marks)	00:02:16	00:00:30	00:02:42	00:00:32
Time-split	00:02:13	00:00:31	00:02:47	00:00:42
Time-split (adjusting chapter marks)	00:02:24	00:00:32	00:02:48	00:00:43

(times as hh:mm:ss, default settings: 5 min chunks)

Achievable conversion speed depends on several factors, in particular

- on the book:
  - length,
  - single part or multiple part,
  - bit rate,
  - chapter structure,
- on conversion options
- and on the computer:
  - processor speed,
  - number of processor cores,
  - available memory,
  - drive or network speed.

2.8 Customization

AAX Audio Converter offers different conversion modes, various customization options and a number of other settings. These are accessible via the program main window, the Basic Settings dialog and, on a per-file basis, the Preview dialog. Apart from the per-file settings in the Preview dialog, all settings retain their value until changed by the user again, or if reset globally.

2.8.1 Main window

The main window allows to set the audio output Format, the conversion Mode and essential track, file and tag naming rules (Naming of files, folders and tags).

Each created audio file will stand for one track, where the kind of track will depend on the conversion mode. A track can represent the entire book, a physical part of a book (multi-part books), a chapter, a segment within a chapter, or a segment solely based on time. A track will not only have a file name, but also an embedded title, later visible in the media player. File names and track titles are independent of each other and do not have to follow the same naming pattern.

2.8.2 Basic Settings dialog

The Basic settings dialog lists less frequently changed options and preferences. It is accessible from the application system menu (via the icon on the left of the title bar).

The options are divided into categories

- General: Environment, autoplay, interface language, online update
- Folder structure: Output folders, series titles, handling of output conflicts
- Conversion: Title parsing, bit rate, specific encoding, extra meta files
- Chapters: Named chapters, chapter mark verification and adjustment, handling of short chapters at the beginning and end of a book or part

- Meta Tags: Customization of predefined performer role tags.

This dialog also allows to reset all settings (including most of those shown on the main window) to their default values.

2.8.3 Preview dialog

The Preview and Customization dialog is opened individually for any loaded .aax or .aa file, via the context menu (right mouse button). It initially shows the result for the meta data preprocessing for the author name(s) and the book title, plus publishing year and genre. For some books the preprocessing may not yield the results expected, despite adjustments to relevant other options; in particular, if is the book is part of a series or has more than one author. For such cases, the editable fields in this dialog can be overwritten with customized, arbitrary text.

All modifications in the Preview dialog will only apply to the current book (.aax file) but will be used for all parts of a multi-part book. Only one part has to (and should) be customized.

3 Operation

3.1 First start

When AAX Audio Converter is started the very first time it will or may ask the user for:

1. Whether to associate .aax and .aa file with AAX Audio Converter.

   Doing this would enable double-clicking on any .aax or .aa file in the future, to automatically launch AAX Audio Converter and open the selected file.

   This question will only be asked once. However, this setting can be changed later in the Basic settings, via the System menu.

2. Your personal Audible activation code.

   AAX Audio Converter tries to locate it automatically, but if it does not find it, it will ask to enter the code manually. For books downloaded via Book Lib Connect, any dummy code will suffice. Without a valid activation code (or at least a dummy code for Book Lib Connect), AAX Audio Converter will not work.

   The activation code can also be entered in the Basic settings, via the System menu.

3. FFmpeg path.

   Again, AAX Audio Converter tries to locate it automatically, but if it does not find it, it will ask you to enter the path manually. Without a valid FFmpeg path, AAX Audio Converter will not work.

   The FFmpeg path can also be entered in the Basic settings, via the System menu.

When AAX Audio Converter is started the first time after updating to a new version, the release notes for the new version will be shown in a pop-up window.

AAX Audio Converter also shows a tip window on the first start. Some AAX Audio Converter functions are not directly visible, and my not be obvious to some users. The tip illustrates how to access these.

3.2 Opening files

Files can be opened in three ways:

1. Via the Add button in the AAX Audio Converter window.

   It allows multiple selection, convenient for but not limited to multi-part books.

   ***Note**: For a fresh installation of AAX Audio Converter and with the Audible App installed, the initial input folder will be set to the Audible App content folder.*

2. With drag-and-drop.

One or more files can be selected in Windows Explorer, then dragged onto the file list in the AAX Audio Converter window. Only .aax and .aa files will be accepted.

3. Double-clicking an .aax or .aa file in Windows Explorer, if .aax and .aa files have been associated with AAX Audio Converter.

The list of files will initially be sorted alphabetically by title, which will keep the parts of any multi-part book together and in ascending order. (*This is for convenience. AAX Audio Converter will always re-sort the parts internally when processing the book.*)

***Note**: The actual .aax or .aa file name does not play a role here. The name is often cryptic anyway.*

Optional file date column

There is an option in the Basic Settings to add an additional column to the list view: Date column for .aax/.aa file in main window. This column can be selected to modify the conversion order if multiple books are selected. This will then take the file date as criterion.

Normally, the conversion order will be by book title as shown in the leftmost column. While all columns can be used for sorting the list, ascending or descending, such column sorting will not alter the conversion order, unless the sorting column is the File date column.

However, conversion will always be in ascending order, whether by book title or file date.

File details and tags

In addition to the meta data shown in the file list, More details can be displayed in a pop-up window, accessible via a context menu (right mouse button). The details window shows the cover image and the book description (aka abstract or introduction).

During conversion, all meta information in the .aax file – the "tags" – will be preserved. That includes cover image and book description.

AAX Audio Converter first extracts this information and saves it temporarily, then creates clean output files without tags and finally recreates the tags from the saved data, hereby substituting lesser known and Audible custom tags with more common ones.

Preview and Customization dialog

Also available via the context menu, the Preview/Customize dialog will show the resulting text for author and book title in tags, folder and file names after parsing. This text can be altered arbitrarily in each field. Text that will be part of file and folder names will automatically be checked for valid characters.

All alterations here are for the current file only, with one exception: For multi-part books customization in one part will apply to all parts. Hence, only one part should be customized. The name processing algorithm will only consider the first customization encountered.

To remove customization for a field, completely erase the field. This will bring back its default value.

Customizable fields, automatic processing:

- Author: In case of multiple authors, the algorithm will combine all names.
- Book title: The book title undergoes specific processing. It will be parsed with the intention to extract the actual book title and remove any meta information like "unabridged" or "part" or a series title. The algorithm for this can be modified in Naming of files, folders and tags in the main window, options Series title left of colon and Long book title, and also in the Basic settings dialog, option Additional valid punctuation...
- Year: Some AAX files have an improper or no value for the publishing year tag.
- Genre: The genre will be as specified in Naming of files, folders and tags, usually "Audiobook". Customization here allows more specific tags. New tag names entered will be saved and can later be retrieved from the drop-down list for other books. The Remove button allows to shorten a grown list.

3.3 Output format and processing mode

Changes to the settings will be preserved. Settings apply to all conversion until altered again.

3.3.1 Format

MP3

MP3 is the default output format. MP3 can be played with almost any audio hard- and software and hence is the most universal format. However, it's not the internal format in AAX files and therefore needs transcoding. Transcoding is computation-intensive, but AAX Audio Converter will parallelize the work as much as possible (consequently resulting in high CPU load).

M4A (M4B)

M4A and M4B represent MPEG4 audio. M4A and M4B are often supported by audio hard- and software as well, but to a lesser extent than MP3. M4A and M4B only differ in name. Some players specifically associate M4B with audio book content while M4A is seen as general audio content. They are a combination of an MP4 container with an AAC audio stream. This is also the internal format of AAX files. No actual transcoding is needed; the conversion is reduced to a mere (internal) copy function, including decryption, and thus very fast.

M4A is the default for MPEG4 audio in AAX Audio Converter. It can be changed to M4B in the Basic Settings with File type for MP4 audio.

***Note**: Audible files in the older AA format are MP3 internally*.

3.3.2 Mode

Independent of mode, all output will go to a sub-folder structure, sorted by author and book title.

Single file

Single file mode: Every AAX input file results in one output file. A standard playlist (M3U format) is created for a multi-part book.

Chapter markers will be preserved from AAX meta data or added from the app meta data for M4A/M4B – and also for MP3, but few players are able to read embedded MP3 chapter data.

***Note**: Applying* Single file *mode to a single AAX file and MP3 format is not recommended. It would lead to a single invocation of FFmpeg with no way to parallelize the task on multi-core CPUs, thus taking a long time to transcode*.

Multiple files, by chapter

Chapter mode: Every AAX file is divided into chapters as indicated in the embedded AAX meta data or by chapter names from app meta data. Each chapter produces one output file. Multi-part books will be combined into a single book folder. A standard playlist (M3U format) will be created for each book.

Multiple files, by chapter, split into shorter tracks

Split-chapter mode: Every AAX file is divided into chapters and then further split into shorter tracks of roughly equal length as specified, with 5 minutes as the default. Thus each chapter may produce several output files. A separate folder will be created for each chapter (unless disabled), holding the tracks of that chapter, see Chapter folders name prefix.

Multi-part books will be combined into a single book folder. A standard playlist (M3U format) will be created for each book, flattening the chapter folder structure.

To create the individual chapter tracks, the source file is first searched for moments of silence, to allow clean cuts. This results in an additional processing phase which precedes the transcoding.

***Note**: Split chapters is the most versatile mode. It maintains chapter structure but does not depend on sophisticated audio software for navigation within the book. Basic playlist handling is all that's needed.*

Multiple files, split into shorter tracks, ignoring chapters

Time-split mode: Every AAX file is divided into shorter tracks of roughly equal length as specified, with 5 minutes as the default. The chapter structure will be ignored for defining the tracks, but still be added as meta data.

Multi-part books will be combined into a single book folder with no substructure. A standard playlist (M3U format) will be created for each book.

To create the individual tracks, the source file is first searched for moments of silence, to allow clean cuts. This results in an additional processing phase which precedes the transcoding.

***Note**: This mode is the one closest to the classic iTunes "Burn playlist to CD" method, but without overlaps and without cutting mid-word.*

Track length

Defines the desired average duration of a track for time-based multiple output file modes. The actual duration of each track will be determined by the overall duration of a chapter, part or entire book and by available silence intervals. The default value is 5 minutes, with a higher maximum for time-split than for split-chapter mode.

3.4 Naming of files, folders and tags

The conversion process will create folders, files and tags within the files. The properties in the list define customizable rules for the naming of these items.

The user does not necessarily have to change any of them, as the defaults will work just fine in many cases.

If changes are made – after studying the effects –, all changes to the settings will be preserved. This means one would normally only have to adjust them once or only until they suit personal preferences.

- File naming pattern: Track files will be named with the selected pattern. Placeholders (in angle brackets) will be substituted with current values. A track file name will always be unique within the scope of the book.
- Title tag naming pattern: Track title tags will be named with the selected pattern. Placeholders (in angle brackets) will be substituted with current values.
- Track numbering pattern: Track numbering pattern in title tag and file name. Placeholders (in angle brackets) will be substituted with current values. A track number will always be unique within the scope of the book.

  ***Note**: An option with chapters only takes effect in* split-chapter *mode.*

  - <track>: consecutive number per track, not mentioning chapters.
  - <chapter>.<track>: tracks numbered/named by chapter and track within each chapter.

    ***Note:** Chapter names are not necessarily unique.* <chapter>.<track> *therefore requires chapter-sub-folders, see* Chapter folders name prefix *below.*
  - <track>(<chapter>): consecutive number per track, not structured by chapter, but adding the chapter number or name in parentheses.

  ***Note**: Chapter <u>numbers</u> are taken from the AAX file meta information. They may not reflect the actual chapter number or name in the book. Chapter <u>names</u> are taken from an extra meta file.*
- Add total tracks: Setting it to Yes will add the total number of created tracks for this book to the track numbering pattern chosen. This will affect both the File naming pattern and the Title tag naming pattern. Current track and total tracks will be separated by a comma in the file name and by a forward slash in the title tag:

  001,165 – Jane Austen – Pride and Prejudice.mp3

  001/165 – Jane Austen – Pride and Prejudice

***Note**: the* Add Narrator *option at this place in previous versions of AAX Audio Converter has been removed. Adding the narrator is now controlled with the Basic Settings alone:* Tags: Artist, Album Artist, Composer and Conductor.

- Genre naming and Custom Genre: Source for genre tag: <source>: taken from AAX source; <standard> sets to "Audiobook"; <custom> allows custom value.
- Chapter folders name prefix and Custom chapter: Source for chapter folder name prefix, for split-chapter mode. <source>: taken from AAX source; <standard> sets to "Chapter"; <custom> allows custom value.

  There is also a no chapter sub-folders setting. This will put all tracks into the same folder, without the additional hierarchy level for chapters.

  ***Note:** This setting cannot be combined with the* <chapter>.<track> *numbering scheme, see* Track numbering pattern ***above**.*
- Series title left of colon: For differentiation between book and series title: Series title expected ahead of book title, if yes. Otherwise behind, always separated by colon. Default is no.
- Long book title:
  - no is the default, series title will be removed, from/to colon.
  - <book>: <series> or <series>: <book> shall include series title in specified order. The effective order of book and series title also depends on the setting for Series title left of colon.
  - as is takes the entire book title without interpreting any colon in it.

  ***Note**: phrases like "part" or "unabridged" shall always be removed.*

Additional customization options for book title filtering are available in the Basic settings and, on a per file basis, via the file list context menu: Preview and Customization dialog.

3.5 Conversion

To process files, select them in the list and click Convert.

3.5.1 File selection

AAX Audio Converter allows multiple file selection. All selected files will be processed in a single invocation of the Convert function.

Output will always be sorted by author and book title.

Multi-part books

Audible offers to download longer books in parts. AAX Audio Converter fully supports the merging of the individual parts back into a single book (folder), provided all parts are selected for the conversion.

AAX Audio Converter can also convert individual parts but will not be able to merge parts from different invocations of the conversion function. Converting individual parts should be seen more as an option to inspect the conversion result for a sample.

3.5.2 Destination folder

All output will be saved underneath the same root folder, specified with the Save to button. This can be the Music folder in the user's Windows account. This will be suggested initially but has to be confirmed.

If it has not been set, AAX Audio Converter will ask for the destination folder when starting the conversion.

3.5.3 Start Conversion

The conversion will be started with the Convert button. Selected output format, processing mode and naming conventions will be applied.

Depending on format and mode, AAX Audio Converter will run FFmpeg in several parallel sub-processes for efficiency. This will result in high CPU load.

While running, a conversion can always be cancelled with the Abort button. Due to parallel processing, AAX Audio Converter may take a few moments to stop all currently running sub-processes.

Output folder conflicts

If the conversion encounters a conflict when creating output folders for the book layer, a message box will ask the user how to proceed:

- Yes: overwrite the existing folder,
- No: do not overwrite, create a new folder besides the existing folder instead,
- Cancel: skip that particular book.

A second message box will allow the user to automatically reapply the given answer for all subsequent conflicts during the current conversion.

There is also an option in the Basic Settings: On existing output folders to pre-answer the conflict question for all conversions. **Use with care**.

3.5.4 Progress

Conversion progress is reported with a status message, two progress bars and a performance monitor. Progress is measured in steps where each step represents a single audio processing invocation of FFmpeg.

The displayed number of steps to be executed will increase (and sometimes decrease) during the conversion process, depending on the number of files selected and the conversion mode.

The status message also informs about the currently processed book, the conversion phase (see below), the number of chapters and tracks and the currently processed chapters or tracks.

The lower progress bar corresponds to the step numbers in the status message, but may be subdivided further and will then report progress from a long running FFmpeg process.

Conversion for each book consists of up to five phases.

- The core phase, the *Transcoding*, suffices as the only phase for single file mode.
- For chapter mode a short second phase is introduced, preceding the actual transcoding. In this additional phase, indicated as *Copying*, an intermediate working file will be created first, for performance reasons and parallelization (see Performance).
- For Split-chapter and Time-split mode this additional phase will be extended significantly for *Silence* detection and shown as such.
- If the verify/adjust option for chapter marks is active, a *Silence* phase is also added for single file and (unsplit) chapter modes. An *Adjusting* phase will be added for chapter and split-chapter modes. This can be very short or unnoticeable, if no inaccurate chapter marks are found.
- If the copy option for .aax files is active, another *Copying* phase will be added at the final stage of the conversion.
- If a "special" function is enabled, affected books will go through an additional initial *copying* phase.

The upper progress bar indicates top-level progress for the individual input files and the phases. Steps here are rather big, but the number of steps is known right from the beginning and does not change.

The two short vertical bars act as a performance monitor. The left bar indicates the number of parallel FFmpeg processes currently running. The right bar shows average relative CPU load across all processes controlled by the program.

3.5.5 Result

A message box will report the final result, including the elapsed time for the conversion.

Successfully converted files will receive a check-mark in the file list.

3.5.6 Finalizing the conversion

There are three options in the Basic settings for activity at the end of the conversion.

- Additional meta files: AAX Audio Converter can create an extra text and image file with the meta information from the book: author, title, chapter etc., plus cover image. This is not normally needed as AAX Audio Converter will always transfer this data to each audio file created. Extra files for book info and cover image activates this option.
- Copy/rename .aax file: AAX Audio Converter can create a copy of the .aax (or .aa) under a new customizable name at a new location. The original .aax file names may be too short or too cryptic to be easily identified if the conversion should be run again at a later time, with different parameters.

  The Copy Audible .aax/.aa file(s) to second folder and rename option allows to set the file naming scheme and the destination folder.
- Autoplay: Once the conversion is complete, AAX Audio Converter will launch the default media player to play the first audio book of the current conversion. The media player will be triggered when the result message box (see above) is closed.

  The default media player is the one registered for the file type in question: .mp3, m4a, m4b or .m3u (playlist).

  Autoplay is on by default. It can be switched off with Automatically start playing after conversion.

  ***Note**: With long path names, autoplay may fail for some players.*

3.6 System menu

Clicking on the icon in the top left corner of the AAX Audio Converter window opens the standard window system menu. In addition to its default commands it allows to

- Open an About box with a link to the AAX Audio Converter web page.
- Open the Basic Settings dialog, see below.
- Open the Help file, i.e. this document

3.6.1 Basic settings

The Basic Settings dialog allows access to more fundamental and less frequently altered settings. It is grouped into tab pages.

Tab page: General

Path to FFmpeg

Option to select or change the FFmpeg executable. AAX Audio Converter has been tested with FFmpeg versions 4.1 and above. A warning message will appear if an older version is selected.

Relaxed FFmpeg version check

Allows user-provided FFmpeg variants where the version reporting string may not fully comply with the standard form, e.g. nightly or alpha builds. Default is off.

Audible App/Manager activation code(s)

Option will show the activation code(s) on the current Windows machine, provided Audible Manager or the otherwise defunct Audible App for Win 10 is installed and activated for the user's Audible account. If Audible Manager has been activated for a different account in the past, more than one code may be shown.

***Note**: AAX Audio Converter and FFmpeg in particular can only decode audiobooks where the activation codes matches that of the individually licensed book. **Exception**: Books were downloaded with Book Lib Connect.*

The activation code(s) can be selected and copied to the Windows clipboard, hereby making it possible to transfer them to a different machine without Audible Manager installed, and still being able to run AAX Audio Converter. On the second machine the activation code will have to be set as user provided.

User provided Audible activation code

Option allows the manual input of an activation code on a machine with Audible App or Manager not installed, e.g. retrieved as shown above.

For books downloaded with Book Lib Connect, any dummy code will do.

Associate .aax and .aa files with AAX Audio Converter

Option to enable/disable the double-click feature to launch AAX Audio Converter. Modifying the option will take effect when clicking OK.

Date column for .aax/.aa file in main window

If set, an additional column will be shown for the books in the list view in the main window, with the date of the .aax/.aa file. Like the other columns this is also sortable, but it is the only one that can influence the order of conversion if multiple books are selected. Conversion order is normally defined by the book title as it appears in the first column. However, if the date column has been made the sorting column, the books will be converted by file data, but still always in ascending order.

The default is off, the date column will not be shown.

Copy Audible .aax/.aa file(s) to second folder and rename

With this option, the Audible .aax (and .aa) source files can be copied to a new location with a new and customizable name after the conversion, as the original file names may be too short or too cryptic for easy identification. (AAX Audible Converter will never modify the original files.)

For files copied and renamed, author and book title will be taken from the book meta data, which are also subject to customization, see Preview and Customization dialog.

If the original Audible file name has has an ASIN code, this will be appended to the new file name as well. An associated `content_metadata.json` file (for chapter names) will also be copied to the same destination.

For multi-part books, the part number will always be added to the new file name.

The naming scheme:

- No: No file copies will be made. This is the default.
- (flat) \ <author> - <book> and (flat) \ <book> - <author>: The files are copied to the destination folder specified, see below, with the selected order of author and book title in the new file name.
- <author> \ <book>: The files are copied to an author-specific sub-folder beneath the specified destination folder, see below. The new .aax file will not contain the author's name.
- <author> \ <author> - <book> and <author> \ <book> - <author>: The files are copied to an author-specific sub-folder beneath the specified destination folder, see below, with the selected order of author and book title in the new file name.

The Folder button opens a file dialog to set the destination folder for all .aax copy/rename activity. The destination folder must be set for copy/renaming to be applied. There is no default.

Automatically start playing after conversion

Automatically launches the default media player with the first or only book after successful conversion. This will either be the created playlist for this book or, for single file conversion, the created audio file.

The default is on.

Online update

Sets the automatic update option. AAX Audio Converter can look for, download and install a new program version on/from the GitHub website.

- Disabled: turns the feature off.
- Prompt for download: will look for a new version at each program start, will notify the user via message box. Download will start in the background after confirmation. Will ask again to launch the installer.
- Auto download, prompt for installation: will look for a new version at each program start and download automatically in the background. Will ask via message box to launch the installer. This is the default setting.

Language

If a localization for the current Windows user interface language exists, AAX Audio Converter will start in that language. If not it will start in English.

This behaviour applies as as long as the language setting remains at <automatic>.

The drop-down list will show all available languages. Explicitly setting a language will override the automatic selection.

For a new language setting to take effect, AAX Audio Converter has to be restarted. This can be initiated from within AAX Audio Converter. If the language has been changed, clicking the OK button in the Basic Settings dialog will display a message box with the option to restart AAX Audio Converter immediately.

***Note**: The standard AAX Audio Converter installation package comes with English (default) and German languages.*

Tab page: Folder structure

Flat folder structure and naming

Option to combine author and book title into a single folder level. The folder name can be author or book title first. (The default – flat folder option off – is a two level hierarchy, with the author name at the upper level and the book title at the lower level).

Option off (default):

Jane Austen

Pride and Prejudice

Option on:

Jane Austen – Pride and Prejudice

or

Pride and Prejudice – Jane Austen

This option may be useful for targeting certain media players that do not support folder hierarchies when adding books to their library. Alternatively, there is the Full caption for book folder option which still maintains the output folder hierarchy.

***Note**: Series titles, see below, are not supported for this option.*

Series title in folder structure

If a book is part of a series and the series information can be found in the associated meta data files – the book must have been downloaded with the Audible App – this option will insert a middle level into the output folder hierarchy, between the top level for the author and the bottom level for the book title. The middle level folder will receive the series title. The book folder name will be prepended with the sequence number of the book within the series.

Folder hierarchy with this option off:

J. R. R. Tolkien

The Two Towers

With option on:

J. R. R. Tolkien

The Lord of the Rings

[2] The Two Towers

The default is on.

Sequence number digits: Controls the number of digits for the sequence number of the book within the series and hereby any padding zeros if the current sequence number has fewer digits than specified in this option. This enables alphanumeric sorting of the book titles within the series.

The converter cannot know how many book titles comprise the series and as there can be more than 9, zero padding may be needed for sorting.

The default is 2, allowing for up to 99 titles in the series without losing alphanumeric sorting.

Full caption for book folder

Creates a verbose name for the book folder in the output folder hierarchy, adding the author and, if applicable, also the series title and sequence number to the book folder name.

Option off (default):

Jane Austen

Pride and Prejudice

J. R. R. Tolkien

The Lord of the Rings

[2] The Two Towers

Option on:

Jane Austen

Jane Austen – Pride and Prejudice

J. R. R. Tolkien

The Lord of the Rings

J. R. R. Tolkien – The Lord of the Rings [2] – The Two Towers

This option is an alternative to Flat folder structure and naming.

Name prefix for part folders

This Option selects the naming convention for book part folders. <source> takes the name from the title tag, <standard> uses "Part" and <custom> allows a user defined name.

This will only apply if a conversion of a multipart book only comprises one or some but not all parts of the book. Otherwise the individual parts will not be distinguished in the output folders.

On existing output folders

This option allows to predefine the behaviour if the conversion tries to create a book folder which already exists. If set to any other reply than Ask, the reply selected will always be applied, without reconfirmation

- Ask: The default. In case of a folder name conflict a message box will pop up during the conversion to ask the user how to proceed. The possible replies are the same as here.
- Overwrite: The existing content in the folder will be deleted and new output will be written into this folder.
- New folder: A new folder will be created besides the existing one, the new folder name like the existing name, amended with a sequence number in parentheses.
- Skip: The book will not be converted.

Use with care.

Tab page: Conversion

Custom search words for "part" in title of partial books

Option for books in different languages. To identify a multi-part book and a part of it, AAX Audio Converter applies predefined search words to the title tag (in the .aax file), as presented in the file

list. In English, the keyword is "Part" while for a book in German it would be "Teil". The applicable translations for *part* in other languages than English should be entered here. More than one word can be entered. Separate them with a semicolon.

***Note**: German "Teil" has already been pre-configured in the embedded resources for the English language.*

Additional valid punctuation characters for filtered book title

Option to allow customization of the resulting book title tag and file name.

AAX Audio Converter tries to strip off meta information from the book title, such as "unabridged" or "part". With the built-in filter criteria some book title may end up too short, as all punctuation characters apart from dot, comma, hyphen and apostrophe will terminate the title text.

Specific for hyphen: A hyphen (or dash) will always be accepted as a valid character for the title if embedded between two words without any spaces. However, a hyphen surround by spaces (typically used to separate groups) will only be accepted as a valid part of the title, if the hyphen is specified here.

But additional punctuation characters entered here will be regarded as valid for a book title and will be retained, including trailing words. However, some punctuation characters are not valid for file names. Those will still be applied when filtering the title, but will not appear in a file name.

Intermediate copy for single file mode

This is a special function to address a problem with iTunes compatibility for very long books in M4B format, where the book duration may be shown as a corrupt value in iTunes.

It will only affect single file conversion mode, because the track duration of books split into multiple files should fall below the critical threshold. And it will only be applied to M4A/M4B (MP4) formats.

With this option activated, the problem will be fixed with the help of an intermediate copy of the AAX file, as a pure audio stream (AAC format), hereby stripping off the original MPEG4 container and any residue therein. Afterwards, a new container will be built from scratch.

The default is off.

***Note**: If the AAX file to be converted with this option is a 44.1 kHz file, this function may fail, unless the AAC encoding fix is also applied, see below.*

Fix AAC encoding for 44.1 kHz

This is another special function.

AAX files with a sample rate of 44100 Hz and 128 kbit/s may suffer from an incorrect setup of the audio codec AAC in the MPEG4 container. This makes the converted M4A/M4B file unreadable on some players and may also cause the FFmpeg audio extraction function to fail (*needed for the AAC-only copy, see above*). AAX Audio Converter can fix this by creating a modified copy of the file during which the error will be corrected.

If the function is enabled, it will only affect 44.1 kHz files, and only M4A/M4B (MP4) formats.

- No. The function is disabled.
- In MP4 single file mode with intermed. copy. The error correction copy is made in single-file mode only and only if the intermediate copy option (*see above*) is also active. In this variant the fix is applied immediately before the actual transcoding.
- In all MP4 conversion modes. The error correction copy is made in all conversion modes, if the destination format is M4A or M4B. This will happen at the very beginning of the conversion process.

Apply variable bit rate

AAX (and AA) files have constant bit rate encoding. This option allows to encode the converted audio file with a variable bit rate, usually resulting in smaller output files, without noticeable degrading of audio quality. The program will pick a suitable setting, derived from the source bitrate. Will work with MP3 and AAC (M4A/M4B) conversions.

Also observes any reduced bitrate setting (see below).

Default is off.

Note: *Selecting variable bit rate will turn any conversion into a transcoding operation, thus significantly increasing conversion time for conversions that would otherwise run as a copy operation, e.g. AAX to M4A/M4B.*

Reduce bit rate

Can reduce the bit rate of the converted audio file, hereby creating shorter files, but also degrading audio quality. Will only take effect if source bit rate is higher than the selected value. Some settings will also affect the sampling rate which the program will adjust accordingly.

Can be combined with variable bit rate.

Default is no

Note: *If this setting takes effect, it will turn the conversion into a transcoding operation, thus significantly increasing conversion time for conversions that would otherwise run as a copy operation, e.g. AAX to M4A/M4B.*

File type for MP4 audio

Option to set the file type for MPEG4 audio. The default is .m4a but can be changed to .m4b. The content will be identical, an MP4 container with an AAC audio stream.

Use ISO Latin1 encoding for .m3u playlist instead of default UTF8

The playlist (.m3u) will be encoded with the UTF8 character set (8bit Unicode) by default. Certain devices or software may not be able to read this format, if the file names contain diacritic characters, such as accents. With this option, the ISO Latin 1 character set (ISO 8859-1) can be used instead.

Default is off.

***Note**: This only affects the entries in the .m3u file, not the audio file names themselves. The latter can be customized in the Preview and Customization dialog.*

Extra files for book info and cover image

With this option, book meta info will also be extracted into additional, separate text and image files, if set. (Core meta info like author, title, description and cover image will always be embedded into each generated audio file, independent of this setting.)

Default is off.

Tab page: Chapters

Use named chapters if available

Option to use extra meta information with explicit chapter names, for .aax files downloaded with the Audible App.

- No will only use chapter numbers and timings as embedded in the .aax file. This is also the only option for files downloaded with Audible Manager / Download Helper.
- Yes will look for and use chapter information in separate meta file for .aax files downloaded with the Audible App.

  Audio file names, based on chapter names used, must be unique. If chapter names appear twice, all file names will be preceded with an order number in parentheses. Order numbers will not be added to tag names.
- Yes, always precede with order number: Even if file names are unique, they will still be preceded with an order number. This allows alphabetically sorting of the created audio files and folders in Windows Explorer for convenience. (This is not strictly necessary as the automatically created playlist will always be in chronological order.) *Order numbers will not be added to tag names.*

Skip short chapters between book parts

Book parts may contain additional short chapters at the beginning and the end of a part, like a continuation hint at the end of a part or a repeated introduction with book title, author and narrator and the beginning of a part. This option skips such chapters as long as they are shorter than the specified duration. A setting of 0 disables this option. Default is 25 sec.

Skip very short chapters at begin and end

Some book parts may contain separate very short chapters at the beginning and the end, particularly for the Audible brand name, called “intro” and “outro”. This option skips such chapters as long as they are shorter than the specified duration. A setting of 0 disables this option. Default is 10 sec. (The Audible brand name announcements are usually integrated into the first and last

chapter. They will not be removed in this case, unless the book has been downloaded with the Audible App and Audible specified the intro/outro in the extra meta data.)

Verify and adjust chapter marks

Chapter marks, embedded in the .aax file, or from an external meta data file (see Use named chapters if available above), define the positions, where the original audio file will be divided into individual chapter files (in chapter mode) which will then be further subdivided into shorter chunks in split-chapter mode. They also mark the positions in the chapter meta data for navigation within the audio file.

However, the given chapter marks are not always accurate and may have been set slightly early or late. With the option here, AAX Audio Converter can try to verify the chapter marks and adjust them if necessary. It is a simple heuristic approach based on silence distribution near the original chapter mark. Hence, it requires the silence analysis to be run.

- No: The option is off.
- only in split-chapter mode and split-time modes: The option is active in split-chapter and split-time modes, where silence detection is always needed. This is the default.
- in all conversion modes: The option is active for all modes. In single file and (unsplit) chapter mode, the silence analysis phase will be added to the conversion.

Limitations: The given chapter mark position must be close to the correct position, within a few seconds, and the chapter title must be framed by noticeable silence. The option cannot fix false or missing chapter marks.

Prefer embedded chapter times

Chapter marks that come with the external meta data file (see Use named chapters if available above) often have inaccurate times.

To help with such inaccuracies and in addition to the Verify/Adjust mechanism above, the original AAX chapter times can be used as an extra and preferred reference. If the external meta data file is in use it will act as the primary source. But if this option here is also active, an embedded chapter mark in the AAX file will be preferred, if it is close enough to a chapter mark in the external meta file.

- No: The option is off. This is the default.
- If silent: The AAX embedded chapter times will be only be preferred, if they lie in a period of silence.
- always: The AAX embedded chapter times will always be preferred.

***Note**: This option only becomes available if* Use named chapters *is active.*

Tab page: Meta Tags

Tags: Artist, Album Artist, Composer and Conductor

These options allow customized assignment of the audiobook author and narrator to the four predefined meta tags for performers.

Available settings for each of the performer tags are:

- <empty>
- Author
- Author; Narrator
- Narrator

Reset button

The Reset button will reset all settings to their default values. Affects both the basic settings here and all settings shown in the AAX Audio Converter main window. **Use with care**.

4 Logging

To track down unexpected behaviour, AAX Audio Converter can write log files. The log will record essential processing steps, down to every single audio track to be created.

Privacy note:

Log files are plain text files. The files are stored locally, the program does not upload them anywhere.

The log files will contain potentially sensitive data:

- *Full path for input, output and temporary files. However, if the path starts with the user's default profile, the user name will be substituted with "USER".*
- *Book meta data, like author/narrator name and book title, chapter titles and timings.*

The log files will not show the Audible activation code.

4.1 Start AAX Audio Converter with logging

To run AAX Audio Converter with logging enabled, it has to be started with an additional program argument, with the numerical parameter specifying the log level between 1 (minimum) and 4 (maximum). Recommended setting is 3. Level 4 additionally logs all FFmpeg console output.

```
-Log=3
```

The argument can be passed from a Command or PowerShell window or from a Windows desktop shortcut.

From a Command window:

```
"C:\Program Files\audiamus\AAX Audio Converter\AAXAudioConverter.exe" -Log=3
```

From a PowerShell window:

```
cd 'C:\Program Files\audiamus\AAX Audio Converter'
.\AaxAudioConverter.exe -Log=3
```

4.2 Log files

All log files will be saved to this folder:

```
C:\Users\<User>\AppData\Local\audiamus\AaxAudioConverter\log
```

The files have the following naming scheme:

```
AaxAudioConverter_<year>-<month>-<day>_<nnn>.log
```

Example:

```
AaxAudioConverter_2020-03-16_001.log
```

A new log file will be created for every start of AAX Audio Converter.

Log entries in the file are single line messages, with timestamp, thread ID, class and method name, and a message text, usually with parameters.

Since the program code is Open Source, each log message origin can easily be found in the GitHub repository.

5 Background

I have been an Audible subscriber for many years. But I never used Audible software to play my books. Before I started my subscription I investigated the options to convert the proprietary format to plain MP3. I often listen to my books while driving and in the car the simplest thing is to load the book as a playlist of MP3 tracks onto a USB stick and run it from the car radio. The playlist can easily be controlled with a minimum of distraction from traffic.

You may argue that you could use Android Auto or Apple CarPlay with the latest in-car infotainment systems. Yes. But what an overkill of technology for playing simple audio files!

For a long time, I followed Audible instructions to obtain my MP3 files. This meant to download via Audible Manager and then invoke Apple iTunes to burn the book to music CDs, since iTunes was the only officially supported way to remove DRM. As audiobooks usually don't fit onto a single CD, iTunes created a series of these. Each CD would hold a number of tracks, all exactly 8 minutes long. Of course, my CDs have always been virtual ones. That required additional software to provide a virtual burner.

The (virtual) CDs contained uncompressed audio until I found a virtual CD software that would also encode to MP3 in the same step. Before that, I had to fire up an MP3 encoder manually.

A few annoyances remained. For the transition between CDs, iTunes creates an overlap of about 15 seconds which is quite confusing when you listen to the book. And you had to tweak iTunes to omit a 2 second gap between tracks. Then it turned out that later versions of iTunes no longer offered this option. The 2 second gap is disrupting, in particular as iTunes brutally cuts a track in mid-word (which also produces crackling noise on many players).

So, the virtual CDs, even if already with MP3 tracks, needed post-processing to get rid of the 15 second overlap. I used mp3DirectCut and it worked quite well. But when it came to also tackling the 2 second gap between tracks I started to get second thoughts.

The final step was to restore the lost meta information, or most of it, plus a more readable file naming. Mp3Tag helped here.

I established a kind of proven workflow over time and it became sort of semi-automatic as you have to do it every month. However, when friends pointed out that other methods to obtain MP3 had emerged I started a bit of research on my own.

I discovered two different approaches. One relied on a proprietary library that is installed as part of Audible Manager, and people had found out how to use its functions. The other was based on FFmpeg and its rather new ability to process AAX files, if you know your Audible Activation code.

However, none of the solutions available offered all the features I wanted and was used to, by doing it my way. So I decided to create my own application and defined my user requirements:

- Plain MP3 output.
- Use FFmpeg.
- Short tracks, well structured and cleanly cut.
- Ability to merge multi-part books.
- Nicely numbered and named files and title tags.
- All tags preserved, including narrator, cover image and book abstract.
- Speedy performance.
- Convenient graphical user interface
  - One-Click workflow.
- *Last but not least*: Having lots of fun writing the program.

AAX Audio Converter is the result. I hope, other people will find it useful, too. I also make the source code available. I don't think it's too bad an example of a C# Windows Forms application. Enjoy.

February 2019

6 Release Notes

Version 1.18.2 (09/2023)

- Empty or invalid cover image no longer terminates the conversion.
- Obsolete track numbering patterns removed.

Version 1.18.1 (03/2023)

- Adapted to interface changes of external library ATL.
  - "Description" and "Publisher" fields are now read directly.
  - Update to ATL 4.20 to restore year-only date field for "Date recorded".

Version 1.18 (01/2023)

- Update to .Net Framework 4.8.
  - Also updated external dependency libraries.
- Hints to Book Lib Connect in
  - the auto-update prompt,
  - the activation code dialog
  - and in the documentation.
- Simplified version checking for FFmpeg.
- Fix for series folder creation.
- Support for Unicode file names in Win32 copy operation.
- Typos and glitches.

Version 1.17.1 (05/2021)

- Bugfix for 1.17. Mid-level folder for series title was created despite option off.

Version 1.17.0.1 (05/2021)

- Bugfix for 1.17. App would not start on some systems.

Version 1.17 (05/2021)

- The setup package contains 32 and 64bit variants of FFmpeg. On 64bit systems both variants will be installed. However, the slightly older 32bit version will be used for most books and conversion modes because of its better performance. Only very long books to

be converted in single-file mode, which are critical for memory, will make use of 64bit FFmpeg.

- The Basic Settings receive a new tab page Folder structure for all settings related to output folders, due to another increase in the total number of options.
- New option in Basic Settings to preselect the behaviour if the output folder for a conversion already exists.
- Support for series titles: New option in Basic Settings for books that are member of a series. The hierarchical output folder structure with author and book title layers will receive an additional middle layer for the series title, if the series information can be found in the associated meta data (download via the Audible App required). The book folder name will be amended with the book sequence number in the series.
- New option in Basic Settings for a full caption with author, series (if applicable) and book title for the book folder name.
- New option to add the total number of tracks to the track title tag and the track file name.
  - This option replaces Add Narrator in the property grid in the main window.
  - The narrator will now exclusively be added with the Meta tags page in the Basic Settings.
- New optional AAX file date column for the list view in the main window (via Basic Settings).
  - Conversion order for multiple books is normally defined by the book title, independent of the sorting column. It will become by file date, if the file date column has been selected as the sorting column., but will always be in ascending order.
- The installer now also offers a personal installation mode, i.e. for the current user only, when installing the program for the first time. The personal mode does not require administrative privileges.
- Some additional or enhanced log messages.
- A number of small enhancements and fixes.

Version 1.16 (02/2021)

- The setup package now contains 32 and 64bit versions of FFmpeg. The installer will select the one matching the operation system. On 64bit systems this allows for very long books to be converted in single-file mode which previously would trigger an out-of-memory exception in 32bit FFmpeg.
- New option for less strict version FFmpeg checking to allow user-provided FFmpeg builds where the version string does not fully comply with release builds.
- New options for allowing variable and/or reduced bitrate and thus creating smaller output files, at the possible cost of audio quality and slower conversion.
- New option to prefer chapter times from embedded AAX meta if using explicit chapter names from the extra JSON file, but where the chapter times are often inaccurate.

- New customization options for individual assignment of book author and narrator to the four predefined performer tags in meta data.
- The Basic Settings options are spread across four tab pages now, due to the additional options introduced in this release.
- The main window has been fitted with a little performance monitor which is active during conversion, in addition to the existing progress bars and status report. Two new small bars indicate the number of FFmpeg process currently running and the relative CPU load.
- Better error detection and reporting if FFmpeg aborts the conversion.
- More efficient parallelization in split-chapter mode for books with long chapters.
- Fixed retrieval of the activation code from Audible Manager which did not work on some 64bit systems.
- Fixed sorting order for multipart books with more than 9 parts, both in the list view in the main window and during conversion.
- Meta data previously still handled by the TagLibSharp library has now been completely replaced with ATL.net. TagLibSharp is no longer used.
- Some additional or enhanced log messages.
- A number of small fixes.

Version 1.15.3 (11/2020)

- Bugfix in ATL.net: "Quicktime" chapters, one of the two chapter variants for MPEG4 (M4A/M4B), came out unreadable or with missing or incomplete chapter titles. The bug was related to the new ATL.net buffered mode, introduced in ATL.net 3.13, and used by AAX Audio Converter in versions 1.15.1 and 1.15.2. This has been fixed in ATL.net 3.14.

Version 1.15.2 (11/2020)

- Bugfix: In version 1.15 and 1.15.1, conversion of only a subset of a multipart book could erroneously encounter temporary chapters without a name when initializing target directories. This triggered a `NullReferenceException`. Such chapters will now be ignored at this stage.

Version 1.15.1 (11/2020)

- Bugfix: Version 1.15 erroneously no longer set track duration as meta data for MP3 files, which is expected by some players. Brought back by reverting to FFmpeg for adding MP3 chapter meta data.
- A new version of ATLnet is used which now adds MP4 chapter meta data in an efficient buffered memory mode, which is faster than working directly with the file on disk as before.

- Enhancement: Temporary audio files with a track duration of zero will normally be intercepted. Under certain conditions, they can survive, though. They are now handled properly.

Version 1.15 (10/2020)

- Chapter meta data is now added in all conversion modes, for both MP3 and MP4
  - ID3v2.3 for MP3
  - "Nero" and "Quicktime" for MP4 (M4A/M4B)
  - Full chapter list for single file mode, current chapter for chapter and split-chapter modes, and accurate subrange for split-time mode.
- Chapter mark adjustments:
  - Now available for all conversion modes
  - Enhanced algorithm:
    - to detect and handle very short silences between chapters
    - includes intro and outro
- Improved error detection with corrupt AAX files
- New special functions:
  - To establish compatibility with iTunes for very long books (M4B format)
  - To handle an AAC encoding flaw in 44.1 kHz AAX files
- Slightly modified progress report, for better visual feedback, in both progress bars and the status text.
- Basic settings dialog now with tab pages, as number of settings has increased again.
- Bugfixes:
  - "Nero" chapters for M4A/M4B were often ill-formed. Apparently a bug in FFmpeg, now replaced with ATL.net
  - Some minor issues resolved
- More or enhanced log output
  - FFmpeg thread association
  - Progress report

Version 1.14 (08/2020)

- New usage tip window on first start-up shows access to functions not directly visible from the main window, i.e. system and context menus.
- File association for AAX/AA files (initial launch only) now runs in the background, to keep the user interface responsive.

- Fix for the upper progress bar which could fall out of sync when adjusting chapter marks (version 1.13).
- Max track duration for time-split mode can now be 90 min, with bugfix, as previous max of 30 min was cut to 15 min.
- Activation code enhancements:
  - Accept activation codes from all sources, no longer abandoning search after first find.
  - More logical workflow/feedback for cancelling books without matching activation code.
- More log output from the auto-update mechanism.
- A few other minor fixes and enhancements.

Version 1.13 (07/2020)

- New option to detect and adjust inaccurate chapter marks, using a simple heuristic approach based on silence distribution near the given chapter mark, for chapter and split-chapter modes.
- New option to disable chapter sub-folders in split-chapter mode, putting all generated files into the same folder.
- Pseudo chapters for MP3, introduced in version 1.12 to convey accurate track duration, now receive a meaningful chapter title as well, copied from the normal ID3 title tag, as certain audiobook players try to interpret this tag.
- The full chapter list, with explicit chapter names as introduced in version 1.7, is now also added to MP3 unsplit audio (single file mode), as ID3 chapter tags. *(Supported by selected players only.)*
- Show latest release notes on first start of new version.
- More and improved log output for chapter processing.
- Tiny enhancements and a few minor fixes.

Version 1.12 (05/2020)

- Significant performance boost for MP3 output and Chapter mode, due to a modified and enhanced workflow. Time-split mode also benefits.
- Conversion result message box now includes elapsed time.
- Meta data enhancement for MP3 output regarding track duration. Explicit duration is added as pseudo chapter data. Several media players can interpret this. Without it, those media players would estimate duration from the bitrate, with varying readings.
- If running under Windows versions below 10, meta data in MP3 output will be downgraded to ID3v2.3. This enables the "Length" column in Windows Explorer on these systems to display MP3 track duration as well. (Windows 10 systems accept ID3v2.4.)
- Slightly more log output again.

- Fix for finding `content_metadata.json` if AAX file resided in the top level directory of a drive.
- Additional chapter "Performance" in the manual.

Version 1.11 (04/2020)

- Option to copy original .aax file to a new location with a customizable name after conversion.
- Supports long path names (> 260 characters) now for all input and output. It includes all three input methods: open file dialog, drag & drop and double click. It also extends to network drives, mapped and unmapped.
- More log output again.
- Minor fixes and enhancements.

Version 1.10 (04/2020)

- Enhancements for "single file per aax" mode:
  - Named Chapters, introduced in version 1.7 for chapter modes, now also available for unsplit audio, embedded as markers *(M4A/M4B format, not for MP3)*.
  - Audio file tailoring, skipping of intro/outro and skipping of continuation hints and repeated opening credits now also applied to unsplit audio.
- Title name parsing allows custom order of series and book title for output.
- More log output.
- Minor fixes.

Version 1.9 (03/2020)

- Added a logging facility to track down unexpected behaviour.
- Tiny enhancements and a few minor fixes:
  - Issue with multiple narrators.
  - Issue with punctuation and special characters when parsing book title.

Version 1.8 (03/2020)

- Now also allows .m4b as MPEG4 output, via Basic Settings.
- Handling of named chapters with a given length of 0 ms.
- A few minor fixes.

Version 1.7 (02/2020)

- Supports Named Chapters for .aax files downloaded with the Audible App.
- Auto-launches the default media player after conversion.
- Initial input folder set to Audible App content folder for a fresh installation, if Audible App is present.
- New overview chapter in manual on AAX Audio Converter functionality and customization options.
- Bugfixes:
  - Audiobooks longer than 24 hours now display the correct duration and convert without error.
  - List of loaded files in main windows now correctly sorts by columns with an underlying numerical value, e.g. file size.
  - For a multi-part book the program no longer assumes missing parts, although all parts were selected, but the book parts were downloaded with the Audible App.
  - For a multi-part book, where not all parts were selected, part folders are only created if they will contain at least two files.
  - Some other minor fixes and adjustments.

Version 1.6 (11/2019)

- Optional text encoding for .m3u playlist in ISO Latin 1 instead of default UTF8.

Version 1.5 (08/2019)

- New configurable options (via Basic settings):
  - Skipping short chapters between book parts, max. duration.
  - Skipping very short chapters at begin and end, max. duration.
- A few minor fixes:
  - Individual part handling: Existing parts will no longer be deleted when different parts are converted.

Version 1.4 (05/2019)

- New options (via Basic settings):
  - Extract book meta-info into separate cover image and text file.
  - Flat folder hierarchy: Combine author and book title into a single folder level.
- Tiny adjustments.

Version 1.3.1 (04/2019)

- Glitch/enhancement: Trailing and leading dots in author and title tag will automatically be removed for file/folder name.
- Bugfix: Folder and tag customization was ignored for single part books.

Version 1.3 (04/2019)

- Additional conversion mode:
  - Split book into tracks of roughly equal length, ignoring chapters.
- Automatic online update feature.
- Minor fixes/enhancements.

Version 1.2 (04/2019)

- Support Audible App (Windows 10) for retrieving activation code.
- Support long path names (> 260 characters) for all output.
- Title tag parsing:
  - Detect book series title by colon position.
  - Allow long titles including book series.
- Full customization per .aax file in extra dialog:
  - Tailor author and book title tag and file name.
  - Publication year tag.
  - Genre tag.
- One additional track numbering pattern.
- Tiny bugfixes.

Version 1.1 (03/2019)

- Additional customization for title tag parsing:
  - Punctuation marks to be included as valid.
- Restrict to single instance (double-click launching).
- Tiny bugfixes.

Version 1.0 (03/2019)

- Initial Release.

