



Operational Manual

AMB

Audio Management Batch Processor

V1.1



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1. Introduction

The NUGEN Audio AMB system is an off-line file-based audio analysis and processing program designed for rapid management of audio content.

A variety of processing modules are available to meet your processing needs:

1. **Loudness analysis and correction** processing designed for rapid assessment and correction of files for loudness and true-peak content to ITU-R BS.1770 (revisions 0-3), and EBU R128 based specifications.
2. **Upmixing** for generating 5.1 and 7.1 audio from stereo input audio using NUGEN Audio's Halo Upmix technology.

AMB is capable of producing detailed post-mortem logs and includes an in-built graphing facility. With a drag and drop interface and/or specific watched folders, AMB automatically handles the processing of files to multiple criteria.

By default, AMB will natively handle WAV and AIFF files containing PCM audio data. Additional expansions are available for the support of other file formats:

1. **MXF** - supports OP-1a and OP-Atom formats containing PCM data (including D10 encoded audio).
2. **MOV** - supports all Quicktime formats containing PCM data (including files often referred to as ProRes).

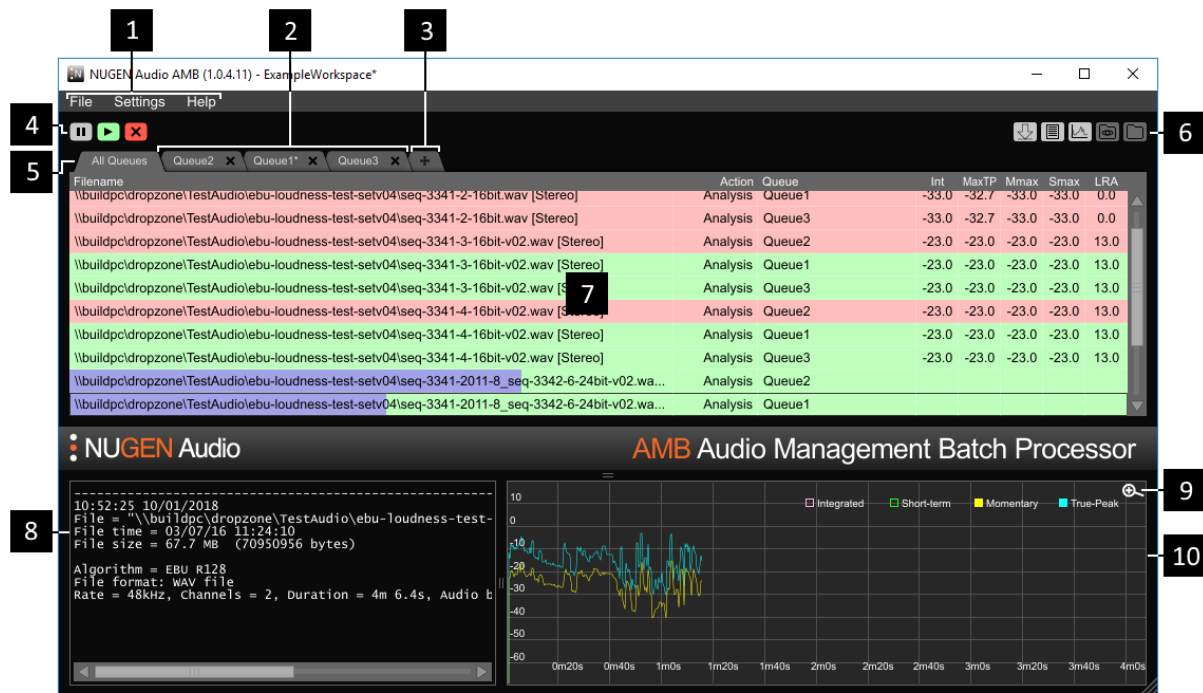
AMB can also process Dolby® E encoded WAV files with an optional expansion.

2. Interface

2.1 General Layout

The interface is designed to facilitate intuitive operation by following a logical flow from top to bottom, left to right, grouping similar aspects of operation into distinct zones as shown below.

The interface can be resized using the standard corner drag and maximise/restore functions. You can also resize the various panels by dragging the = symbol in the gaps between them.



1. Drop-down menus

Menu	Item	Description
File	Load Settings...	Loads overall AMB settings files *.amb
	Save Settings	Saves current settings.
	Save Settings As...	Saves current settings as *.amb
	Load Workspace...	Loads a workspace *.ambw
	Save Workspace	Saves the current workspace.
	Save Workspace As...	Saves the current workspace to a new file.
Settings	Add to queue	Browse for files to add to the currently selected queue. Hold down ctrl or shift to add more than one file.
	Edit Global Settings...	Opens the global settings dialog box.
Help	Edit Settings...	Opens the queue settings dialog box.
	Manual	Opens the AMB manual (pdf).
	Visit website	Opens the NUGEN Audio AMB web page.
	About	Opens the credits and version dialog box.

Note that a settings file holds the settings used for just one queue. You will need multiple files to use multiple queues. AMB uses the concept of a 'workspace' to group several queues together. When you close AMB, the current workspace will be saved.

The next time you launch AMB, the previous workspace will be reloaded and your queues will be restored.

2. **Queue Tabs.** Each tab represents the items in a queue. You can double-click the tab to display the settings for that queue. Click on the X button within the tab to close the queue (and stop processing items in it) - it will be removed from the workspace. With a tab selected, only the items in the selected queue are visible. Initially, the name of the tab will be automatically generated. Once you save the settings for that queue, the filename you choose will be displayed on the tab instead.
3. **Add Queue.** This button will add an extra queue (if you have sufficient licenses available). By default, AMB will allow you to create 2 queues. Additional queues can be purchased for greater flexibility.
4. **Queue Controls.** These buttons control the currently displayed queue (or all queues if the 'All Queues' tab is active (see below)). The first button pauses the queue - it will flash when the queue is paused and a small pause icon will appear on the queue tab. The second button will unpause the current queue. It will be green when the queue is running. If you are looking at the 'All Queues' tab and some, but not all queues are paused, then both the play button and pause button will be illuminated. The final button will clear the queue. This stops any processing that is currently taking place and removes all items from the queue (both those that have been processed and those that were still waiting). Note that some parts of the process require OS actions such as copying/moving files to complete. These cannot be interrupted so processing may take a moment to come to a halt.
5. **All Queues.** This tab is only visible if you have 2 or more queues in your workspace. With this tab selected, you can see all of the files in all of the queues. An extra column is displayed which indicates which files belong to which queues.
6. **Shortcuts.** These shortcuts (in left to right order) allow you to:
 - (a) Follow the active process on/off. If you click on an item in the queue, auto-follow will be turned off. Click this button to continue tracking active items. Note that with multiple processing threads you won't track all of the items being processed. Once the currently active item has completed, the log/graph view will automatically jump to the next item that starts.
 - (b) Toggle the log window on/off.
 - (c) Toggle the graph window on/off.
 - (d) View watch folder - if the current queue has a watch folder enabled, clicking this button will open that folder for you. This is disabled when the "All Queues" tab is selected.
 - (e) View output folder - if the current queue creates any output files, clicking this button will open the target folder for you. This is disabled when the "All Queues" tab is selected.

The log and graph information will still be collected if their windows are not displayed.

7. **Processing queue.** This area shows the files queued for processing, and previously processed in this session, in tabulated summary, with results of analysis and any correction applied. The different coloured lines have the following meanings:

Colour	Description
Grey	Pending - this is a queued item that has not yet been processed.
White	Group - if a file contains multiple streams of audio, this line appears as a header to group the sub-items together.
Light Blue	In Progress - this file is currently being processed.
Light Green	Completed successfully - the process completed successfully. If this is on an analysis line then the analysis passed.
Light Red	Completed unsuccessfully - the process completed but the analysis failed.
Dark Red	Failure - something went wrong during the processing of this file. You should check the log for details of the failure.

8. **Analysis output window.** Clicking any file in the processing queue will generate a detailed summary of any analysis and correction associated with the current session.
9. **Zoom.** Clicking on this icon opens a new window containing the graph data (see below). You can resize the new window to provide more detailed information.
10. **Output graph.** The graph area provides a thumbnail overview of Short-term, Momentary loudness and True-Peak over time, plus a line showing the integrated level. The four traces can be toggled on and off by clicking the title in the key. This information is only available if loudness processing is active in this queue.

2.2 Processing Queue

This area of the interface gives an overview of the files to be analysed and/or corrected, along with a summary of any loudness data generated.

Drag and drop files here to add to the processing queue. Once data is generated, it is tabulated in summary columns to the right hand side of the window. Corrected files are shown below the original file.

Files may also be added to the queue using the 'Add to queue' option in the File drop-down menu, or added automatically using the watched folder option in the settings dialog. Options are also available here to adjust the results column display.

If you have multiple queues active, and you have the 'All Queues' tab active, adding files will add them to all queues.

Clicking on a file updates the log and graph windows to display the corresponding information.

Files are processed in the order that they were added to queues. Each time a processor becomes available, it takes the next item from the longest queue and processes that file. Initially, AMB will allocate 2 processing threads for handling queues. You can purchase additional licenses for more threads to improve the throughput of files.

2.3 Analysis Output

Clicking any analysed file in the file overview window will call up the analysis details for that file in the analysis output window, showing file location, format, and processing details.

```

-----
09:17:09 07/09/2016
File = "\\buildpc\DropZone\TestAudio\ebu-loudness-test-setv04\seq-3341-7_seq-3342-5-24bit.wav"
File time = 03/07/16 11:24:12
File size = 7.7 MB (8064032 bytes)

Algorithm = EBU R128
File format: WAV File
Rate = 48kHz, Channels = 2, Duration = 28.0s, Audio bits = 24
Analyzing took 1 secs
Source 0 (2 channels):
  Int = -23.0 LUFS
  MaxS = -21.0 LUFS
  MaxM = -19.4 LUFS
  MaxTP = -8.9 dBTP
  LRA = 5.0 LU
  
```

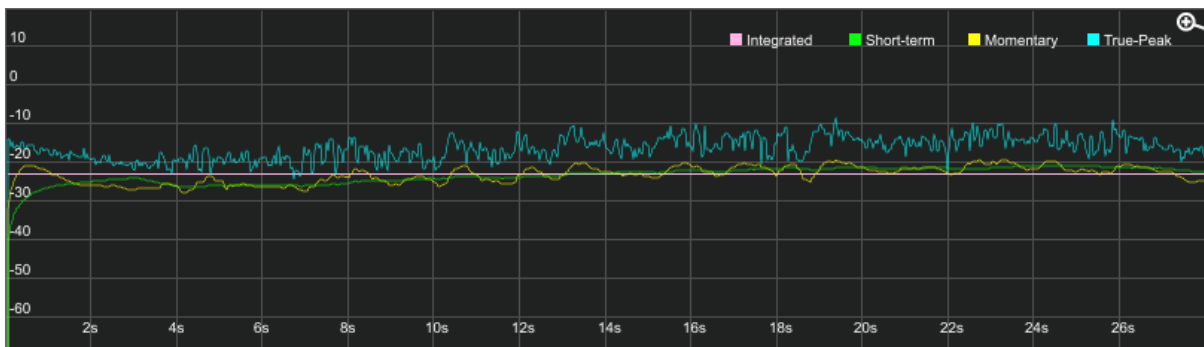
When processing for loudness, values that fail the specification criteria are marked with an exclamation mark.

A critical file failure parameter will be marked '!!!'. A corrected file will then not be produced and the file will be marked 'CANNOT CORRECT' in the file overview window. For the file to pass the specifications, the original audio will need some form of compression/limiting.

2.4 Output Log Graph

The graph area provides a thumbnail overview of Short-term, Momentary loudness and True-Peak over time, plus an indication of the integrated reading. The three traces can be toggled on and off by clicking the title in the key.

The magnifying glass in the right hand corner will open a second, large-scale graph view. From the large scale-view it is possible to toggle between original and corrected file traces (if a corrected file exists) using the graph button in the top-right corner. Graphical traces can also be saved as a PNG file by clicking on the 'Export' button.

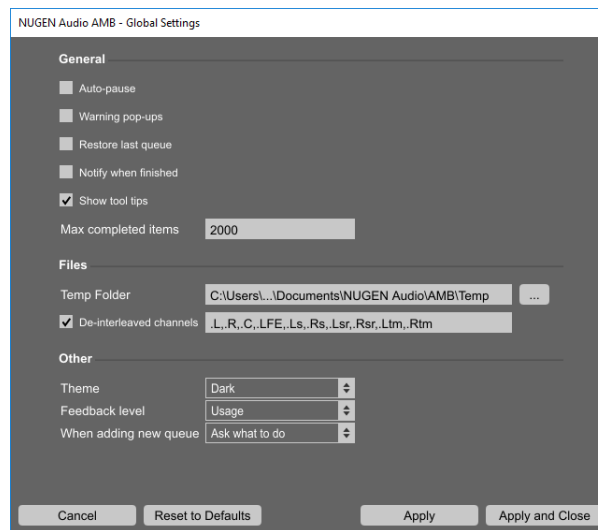


2.5 Settings

The settings are split into two categories. Those that affect AMB as a whole (Global Settings) and those that affect only the currently selected queue. You can open the Global Settings from the Settings menu. To open the settings for a specific queue, either double-click on the tab for the queue, or single-click on the tab and then select Settings->Edit Settings... from the menu. If you have the 'All Queues' tab selected, then the Settings->Edit Settings menu will display all of the available queues in a list so that you can pick the settings you wish to edit.

The available settings will vary depending upon which additional licenses you have purchased.

2.5.1 Global Settings



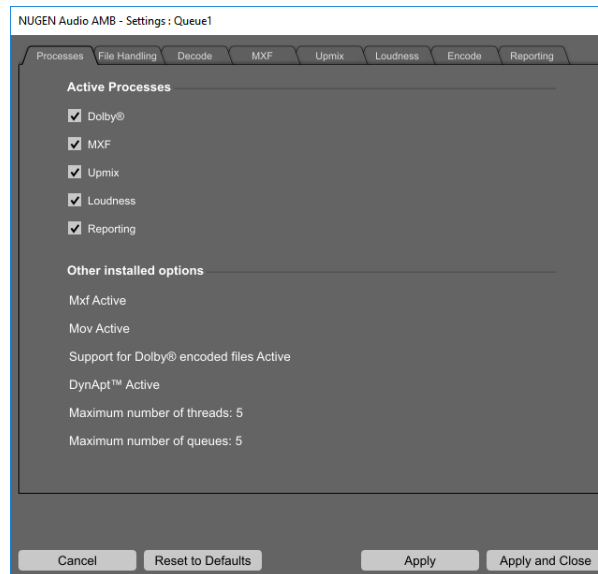
1. **Auto-pause.** If this option is enabled, applying changes to a queue's setting will automatically pause the queue.
2. **Warning pop-ups.** Some errors, critical to the function of AMB, can display a warning pop-up. If this box is not ticked, the warning will not be displayed.
3. **Restore last queue.** If there are unprocessed items in any queues when AMB is closed, that list of items is saved. If this box is ticked then those items are added back into the queues when AMB is next launched.
4. **Notify when finished.** With this item ticked, a pop-up box will be displayed once processing of all items in all queues is complete.
5. **Show tool tips.** Tick this item to display tool tips for many of the options in AMB.
6. **Max completed items.** This is the maximum number of completed items that should be held in memory for each queue. Once this limit is reached, completing an item will remove the oldest complete item from the list.
7. **Temp folder.** Whilst processing files, AMB stores temporary copies in this folder. If your target corrected folder is a local drive, then it is a good idea to have these temporary files on the same drive so that completed items can simply be moved rather than copied. If your target folder is a network drive then having your temporary folder on a local drive may improve performance.
8. **De-interleaved channels.** With this item ticked, AMB will process de-interleaved files with the specified extensions. They are expected in the ITU channel order and default to .L,.R,.C,.LFE,.Ls,.Rs,.Lsr,.Rsr,.Ltm,.Rtm. If AMB encounters a file with one of these extensions then it will look for others that match. For example, if you have a file called test.L.wav, then AMB will also search for test.R.wav etc. AMB will only process de-interleaved files if all of a 'set' are present. You must have L+R or 5.1 or 7.1 channels in order to continue.
9. **Theme.** This allows you to choose the 'look' of AMB.
10. **Feedback level.** AMB can report back information about the kinds of files and processes you are performing and the time those processes take. This is useful feedback for us and will help us make sure we are concentrating on optimising the relevant features. The information gathered is anonymous and doesn't contain any personal information. You can turn this option to 'Off' if you would rather not take part. There is also a 'Debug' level. A NUGEN Audio Service Engineer may ask you to select this level should you encounter any issues. This passes additional license information to enable us to identify the feedback associated with a particular process.

11. **When adding a new queue.** The first time you add a new queue, you will be asked whether you wish to load an existing file, or create a new one. You can change this behaviour by selecting a different option here.

2.5.2 Queue Settings

Processes

This page allows you to configure which processes you wish to apply and also provides you with a summary of the licenses you have available. When a module is enabled, a corresponding tab will appear to allow you to configure that process more thoroughly.



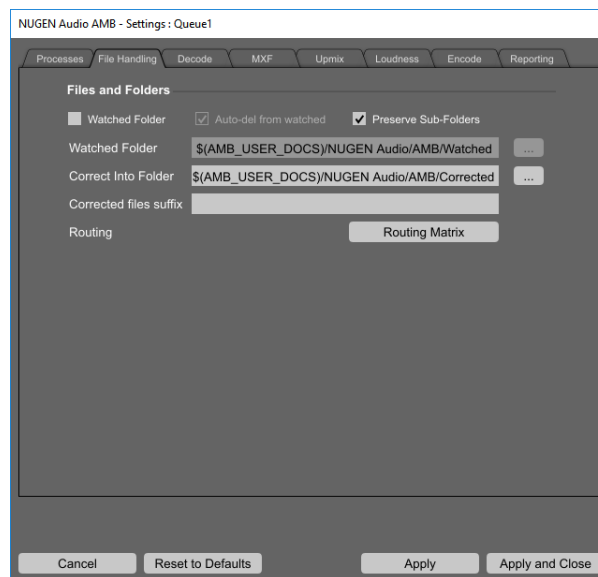
1. **Dolby®** . Turns the Dolby® module on and off (license required). With this module enabled, AMB can convert WAV files to and from Dolby® E encoded streams. Activating this module will add two tabs labelled 'Encode' and 'Decode' for configuring options.
2. **Mxf**. Turns the native processing of Mxf files on and off (license required). The Mxf expansion supports Op-1a and Op-Atom files containing PCM data (including D10 formatted audio). Activating this module will add a tab labelled 'MXF' for configuring options.
3. **Upmix**. Turns the upmix module on and off (license required). You can currently upmix from stereo to 5.1 or 7.1. Activating this module add a tab labelled 'Upmix' for configuring options.
4. **Loudness**. Turns the loudness module on and off (license required). With this, you can analyse and correct to a variety of loudness standards. Activating this option adds a tab labelled 'Loudness' for configuring options.
5. **Reporting**. This is a global enable for the reporting options.
6. **Mov**. If a license is available, the Mov Expansion will enable the native processing of Mov files containing PCM audio data.
7. **DynApt™** . If a license for the NUGEN Audio DynApt™ expansion is available, you will have access to some additional settings in the 'Loudness' tab. This can be used to alter the dynamics of a file to meet loudness requirements or to re-purpose audio from cinema to TV to podcast (for example).
8. **Maximum number of threads**. By default, AMB will process files using two threads. This means that up to two files can be processed simultaneously. If you are running AMB on a server machine with multiple cores, you will probably be able to get better

performance by processing more files simultaneously. You can purchase additional thread licenses in order to open up this feature.

9. **Maximum number of queues.** By default, AMB allows you to set up two queues. These queues can provide different processing on different files, or you could set them up to perform different processing on the same files. If you are targeting multiple markets, you may need more than two queues, in which case additional licenses can be purchased to allow this.

File Handling

This tab allows you to configure how files are handled by AMB.

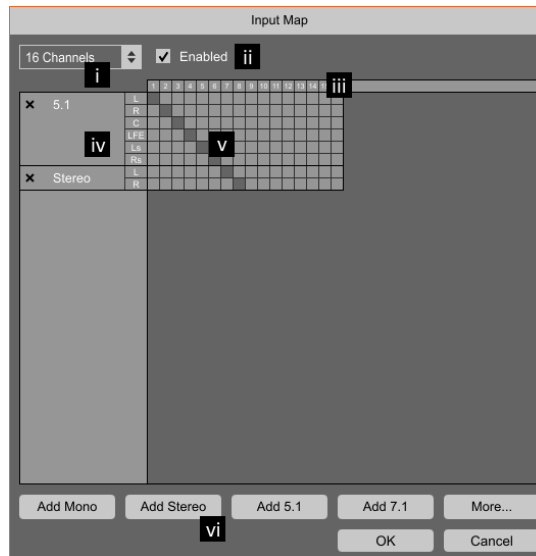


1. **Files and Folders.** This section allows you to specify folders used for various actions. You can type in the path directly or click on the button to the right to browse to the desired path.
 - (a) **Watched Folder.** In addition to the drag and drop method, files can also be added to the queue using the watched folder option for fully automated processing.
 - (b) **Auto-del from watched.** With this tick-box ticked, any items successfully processed from the watch folder will be deleted once processing is complete. This option is only available if parsing of a watch folder is turned on, and auto-correction is also turned on.
 - (c) **Preserve Sub-Folders.** With correction turned on, dragging an entire directory into the watch folder can result in the processed files ending up in slightly different locations. With this option turned off, each file will be processed and then placed directly in the 'Correct Into Folder'. With this option turned on, the directory structure will be preserved and a new folder will be created inside the 'Correct Into Folder' that contains the files.
 - (d) **Watched Folder path.** This is the folder that is watched for new entries. Note that like most text-entry fields in the settings, there are a number of macros that are available that will be expanded when being processed. Using these macros allows the configuration settings to be more portable between systems. A macro follows the form `$(macro_name)` where the 'macro_name' part is replaced by an item in the following table:

Variable	Description
AMB_USER_DIR	The user folder for the currently logged-in user
AMB_USER_DOCS	The documents folder for the currently logged-in user
AMB_TEMP_FOLDER	The settings value for the temp folder
AMB_WATCH_FOLDER	The settings value for the watch folder
AMB_LOG_FOLDER	The settings value for the log folder
AMB_DETAILED_LOG_FOLDER	The settings value for the detailed log folder
AMB_GRAPH_IMAGE_FOLDER	The settings value for the graph image folder
AMB_QUEUE_NAME	The name of the current queue (as displayed in the tab)
AMB_UPMIX_FILE	The file to be upmixed (after decoding / conversion)
AMB_UPMIXED_FILE	The output of upmixing process
AMB_ANALYSIS_FILE	The file to be loudness analysed
AMB_CORRECTION_FILE	The file to be loudness corrected
AMB_CORRECTED_FILE	The output of the loudness correction process
AMB_TARGET_FILE	The final file in the output folder
AMB_XML_LOG_FILE	The XML log file
AMB_TXT_LOG_FILE	The text log file
AMB_CORRECTED_FOLDER	The settings value for the corrected folder
AMB_SOURCE_FILE	The original file being processed
AMB_CONVERTED_FILE	The file after conversion
AMB_DECODED_FILE	The file after decoding
AMB_WORKSPACE_NAME	The name of the workspace (as displayed in the title bar).

Note that you can also specify any environment variable and it will also be replaced. If an environment variable is defined with one of the names mentioned above then it will take precedence over the internal macro. Macros are recursive so if you specify a macro which contains another macro then that will be expanded too.

- (e) **Correct Into Folder path.** With auto-correct turned on, this folder specifies where corrected files are placed after processing.
- (f) **Corrected files suffix.** Type a suffix to be appended to corrected files here to make corrected files easier to identify if required.
- (g) **Routing.** Click on the settings button to specify how files with different numbers of channels are handled.



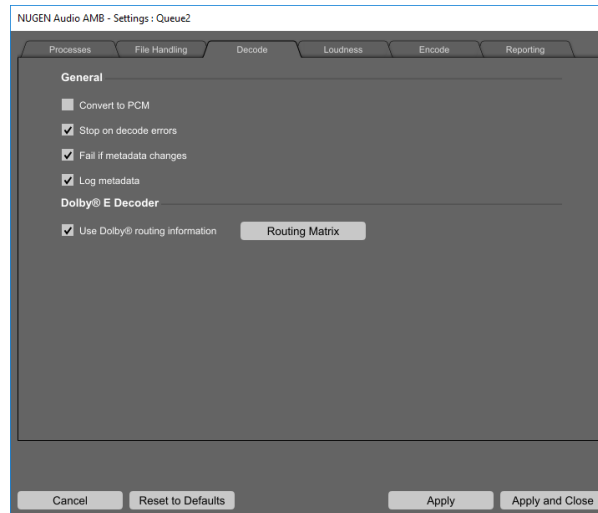
- i. You can configure the routing based on the number of channels in the incoming file.
- ii. You can enable/disable processing of specific channel counts. If a specific channel count has been disabled, processing files with that number of channels will fail.
- iii. The number of channels is displayed along the top axis.
- iv. The different streams to be processed are displayed on the left. Click on the X button to remove a stream.
- v. Click the grid to select which file channels are assigned to which stream.
- vi. New streams can be added by clicking the appropriate Add button. If there are not enough file channels available for the specified channel configuration to be added then the button will be greyed out. The most common stream formats are available on the main interface, but additional arrangements can be chosen by clicking on the "More..." button. This pops up a list of other formats to choose from. Each format is defined as three numbers X/Y/Z where X is the number of front channels, Y is the number of surround channels and Z is the number of LFE channels. The following table describes the speakers used in each layout:

Format	L	R	C	LFE	Ls	Rs	S	Lb	Rb
1/0/0 (mono)			X						
2/0/0 (stereo)	X	X							
2/1/0	X	X		X			X		
2/1/1	X	X		X			X		
2/2/0	X	X			X	X			
2/2/1	X	X		X	X	X			
3/0/0	X	X	X						
3/0/1	X	X	X	X					
3/1/0	X	X	X				X		
3/1/1	X	X	X	X			X		
3/2/0	X	X	X		X	X			
3/2/1 (5.1)	X	X	X	X	X	X			
3/3/0	X	X	X		X	X	X		
3/3/1	X	X	X	X	X	X	X		
3/4/0	X	X	X		X	X		X	X
3/4/1 (7.1)	X	X	X		X	X		X	X

- vii. Click **OK** to accept your changes, or **Cancel** to discard them.

Decode

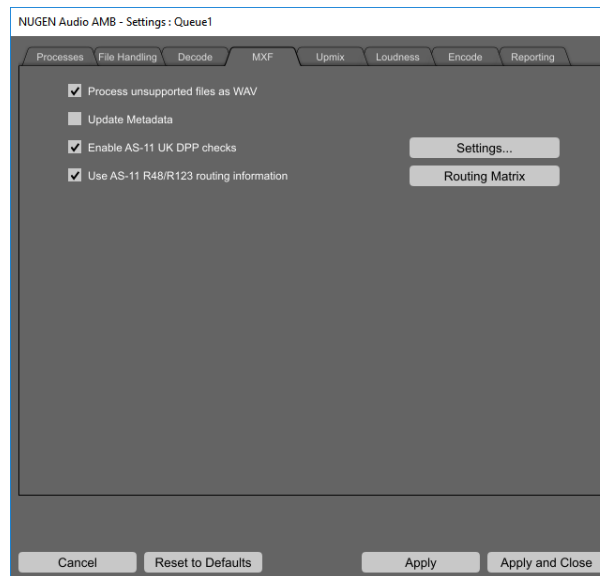
This tab allows you to configure how Dolby® E encoded files are processed. In order to process DolbyE files, AMB first converts them to PCM format before processing them as usual. AMB can then optionally re-encode the audio back into a Dolby® E encoded file. This tab only appears if you have purchased a Dolby® license and have enabled the Dolby® option in the 'Processes' tab.



1. **Convert to PCM.** Dolby® E files are always decoded to PCM prior to processing. With this option turned on, they will not be re-encoded back into Dolby® E files at the end of processing.
2. **Fail if metadata changes.** When Dolby® E files are decoded, the metadata associated with the Dolby® E stream is saved into a special block inside the PCM WAV file. This metadata is then used when the file is re-encoded at the end of processing. However, the standard metadata block only contains a single 'frame' of metadata so if the metadata changes during the audio then the changes and timing information cannot be stored in the resulting WAV file. With this option turned on, AMB will fail to process a file where the metadata changes over time. If this option is turned off, a warning will be displayed in the log but processing will continue as if no change had occurred. The first frame of metadata will be used as the source of information when the audio is re-encoded.
3. **Log metadata.** Turn this option to log all metadata to the log window.
4. **Use Dolby® routing information.** Turn this option on to use the routing information in the Dolby® metadata to inform AMB about how to process the file. You can use the 'Routing Matrix' button to decide which program configurations you wish to support. These routings will then show up in the routing options of the processing tabs so that you can select how you wish to process them. With this option turned off, the decoded Dolby® E file will be treated as any other WAV file and the processing will be based on the number of channels rather than any routing information.

MXF

This tab allows you to configure how MXF files are handled by AMB. This tab only appears if you have purchased an MXF license and enabled the MXF processing option.



1. **Process unsupported files as WAV.** With this tick-box ticked, any MXF file that is not in a supported format will be converted to a WAV and processed in the same way that other non-native files are processed. If you un-tick this box then non-supported MXF files will trigger a failure.

AMB supports the OP-1a and OP-Atom operating patterns, and any audio in the file must be in either PCM or D10/AES3 format.

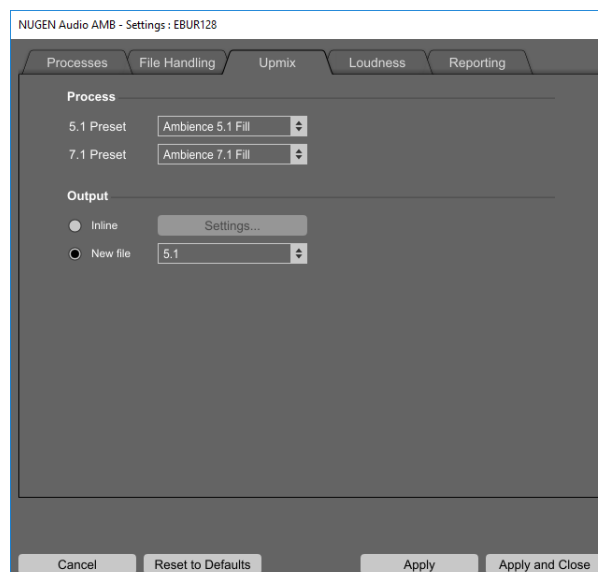
2. **Update Metadata.** Part of the MXF specification says that any program that modifies an MXF file should add some specific metadata to say that a modification had taken place. With this option turned on, AMB will add that metadata, with it turned off, it will not.
3. **Enable AS-11 UK DPP checks.** Globally enable/disable AS-11 checks as required by the UK DPP. For specific tests, click on the 'Settings' button.
 - (a) **Skip line-up if present.** With this option turned on, AMB will ignore any line-up tone found at the beginning of the file. This is done by looking for the 'Line up start' metadata and then skipping forward to the 10-hour time-code mark in the file. Specifically, there is no checking for a line-up tone in the audio. If some audio needs to be skipped, this overrides the 'Ignore Head' setting.
 - (b) **Reject if shim information is missing/invalid.** This version of AMB has been written with the UK DPP shims for SD and HD content version 1.1. With this option turned on, if there is no shim information in the file, or if the version does not match, then the file will fail.
 - (c) **Reject missing details.** With this option turned on, AMB will check for the required metadata. If any is missing then the file will fail. Note that the contents of the metadata are not validated. The list of items checked are:

Section	Item
AS-11 Core metadata	Series Title Program Title Episode Title Number Shim Name Shim Version Audio Track Layout Primary Audio Language
AS-11 UKDPP metadata	Production Number Synopsis Originator Copyright Year Secondary Audio Language Tertiary Audio Language Audio Loudness Standard

- (d) **Copy side-car file.** AMB will look in the same folder as the MXF file for a file with the same name but the xml extension. If this option is turned on and that file exists, it will copy the file to the 'Corrected Folder' upon completion. N.B. The file is not modified in any way.
- (e) **Log all metadata to the log file.** With this option turned on, all discovered metadata is sent to both the log window and the log file.
4. **Use AS-11 R48/R123 routing information.** With this option enabled, the metadata of the file is checked for AS-11 routing information. If routing information is available then that is used to determine channel layout rather than the channel-count based routing information set up in the File Handling tab. Click on the 'Routing Matrix' button to choose which routings you wish to support. Once enabled in this tab, those routings will show up in the routing matrix settings of the processing tabs so that you can choose how AMB should process those files. If this option is disabled, the file is processed based on the number of channels in the file as specified in the 'File Handling' tab.

Upmix

This tab allows you to configure the way that files are upmixed using NUGEN Audio's proprietary Halo Upmix technology. Please note that at this time, the upmixing can only be applied to stereo audio to upmix it to 5.1 or 7.1. This tab will only appear if you have an Upmix license and have activated upmixing in the 'Processes' tab.





1. **5.1 Preset.** This is the preset used to upmix files to 5.1 format.
2. **7.1 Preset.** This is the preset used to upmix files to 7.1 format.
3. **Inline.** If this radio button is selected, then upmixing will occur inline. That is, you must provide a file that has the source stereo data, but also has enough channels to contain the 5.1 or 7.1 upmixed audio. To configure how this takes place, click on the 'Routing Matrix' button. Note that you must already have set up the stereo and surround streams for the desired number of input channels in the File Handling tab. If you have a license for MXF/Dolby® file processing, you must also set up the appropriate routing information on those tabs before they will show up here.

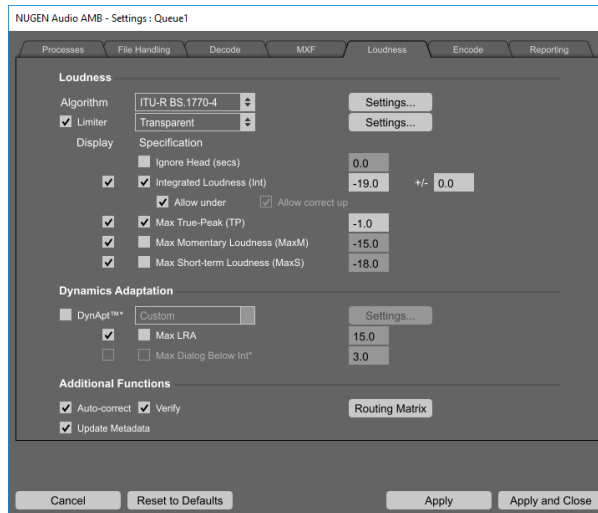
The upmix configuration display you are shown here looks very like the routing configuration panel from the 'File Handling' tab, however, you cannot change the file channels. Select the source routing from the list and the available source and destination mappings will be displayed. Note that the list will only contain routings where there are at least one stereo and one surround stream.

With the routing selected, check the radio buttons next to the desired stereo source and surround target.

4. **New File.** With this radio button selected, files will be upmixed to a new file.

Loudness

This tab allows you to configure all of the options related to analysis and correction of loudness parameters. This tab will only appear if you have a Loudness license and have activated it in the 'Processes' tab.



1. **Display options.** The left column of tick-boxes allows you to choose which items are displayed in the analysis summary of the process queue. Note that only LRA is available from the Dynamics Adaptation section unless you have a DynApt™ license and DynApt™ processing is turned on.
2. **Specifications.** The specification options are in the second column and allow you to choose which criteria you wish to test for. If these tick-boxes are ticked, then incoming audio is compared against the corresponding values and will pass or fail as appropriate.
 - (a) **Algorithm.** In this area the fundamental analysis algorithm is selected, governing all loudness calculations made by this instance of AMB. AMB is capable of performing calculations compliant with ITU-R BS. 1770-1, ITU-R BS. 1770-2/3¹, ITU-R BS. 1770-4, EBU R128 (2010)², EBU R128 (EBU mode), Dialog Gate, Leq(a) & Leq(m). Current loudness standards are based around these algorithms eg. ATSC A/85, ARIB TR-B32, AGCOM 219/9/CSP etc. although many delivery specifications simply refer to the algorithm directly.
 - (b) **Algorithm Settings.** Clicking on this button opens up another display where you can tweak the values of the selected algorithm. Note that if you adjust any of these values then the Algorithm setting in the main page will display 'custom'.
 - i. **Short Term Sliding Window.** This is the period over which the short-term loudness is calculated. You should only change this if your delivery specifically states a different value.
 - ii. **Algorithm.** This is the actual algorithm to use.
 - iii. **Channel weight L/R Rear Surround.** This is the channel weighting that should be assigned to the rear/additional channels in a 7.1 mix. At the time of writing, there was no formal specification for the weighting that should be used in these channels and the weighting is therefore configurable for forward compatibility. The weighting is listed as a dB offset.

¹Our implementation of the ITU-R BS.1770-3 algorithm is also ITU-R BS.1770-2 compliant, so you can use this setting to cover both requirements

²The EBU R128 (2010) algorithm is a legacy setting. This uses the G8 gating system superseded by the G10 gate in the current EBU R128 algorithm.

- (c) **Limiters.** With this option turned on, a look-ahead True-Peak limiter is applied to the audio to make sure that the specified MaxTP is not exceeded. If this option is turned off, but the MaxTP criterion is still set then the incoming audio will be gain-adjusted to make sure that peak-overs do not occur.
 - (d) **Limiters Settings.**
 - i. **Look Ahead.** This is the number of samples to look ahead for peak-overs. The larger this value is, the smoother gain adjustments prior to a peak-over will be.
 - ii. **Release.** This is the time in milliseconds over which the gain adjustment is released. The larger this value is, the smoother gain adjustments after a peak-over will be.
 - (e) **Ignore Head.** Use this parameter to cause AMB to ignore the front section of audio in a given file. This is useful where test and alignment tones are present, which should not be included in the loudness measurement. This section of the file is also left out of any file processing adjustments made.
 - (f) **Integrated Loudness.** Files will be assessed and or corrected to the defined value. In some situations, it can be possible for a file to fail to comply with a single target value, as other requirements require gain reduction that reduces the integrated loudness below the target. In these situations, AMB will indicate that this condition has not been met.
 - i. **Tolerance.** The +/- parameter allows a tolerance to be applied, passing audio within the tolerance range.
 - ii. **Allow Under.** The Allow under option will allow the integrated value to be quieter than the specified limit. Louder audio will be reduced but quieter audio will not be turned up.
 - iii. **Allow Correct Up.** Allow correct up will raise the level of audio with integrated loudness lower than the target value. With this option turned off, audio that is too quiet will fail and will not be corrected.
 - (g) **Max True-Peak.** Sets the target value for maximum True-Peak level. Overall file level will be reduced to ensure this target value is not exceeded. As extremely short sections of audio can cause the reduction in level of the entire file a back-stop peak-limiter option is available as an alternative method of preventing Max True-Peak being exceeded.
 - (h) **Max Momentary Loudness.**³ Sets the target value for MaxM. Overall file level will be reduced to ensure this target value is not exceeded. This setting is unavailable if DynApt™ is turned on - use the Max Momentary Above Int option instead.
 - (i) **Max Short-term Loudness.**³ Sets the target value for MaxS. Overall file level will be reduced to ensure this target value is not exceeded. This setting is unavailable if DynApt™ is turned on - use the Max Short-term Above Int option instead.
3. **Dynamics Adaptation.** With the exception of the LRA test criteria, this section is disabled unless you have purchased and activated a valid license for the DynApt™ add-on.

DynApt™ is a proprietary algorithm which analyses the loudness levels throughout a piece of audio and then carefully reduces the loudness range of the audio, according to several measures, while preserving the short-term dynamics and "space" in the audio, and ensuring the dialog level results in good intelligibility. The end result is audio that has been re-purposed for different play-out contexts, while doing minimal damage to the original sound and feel of the audio. Example uses are re-purposing

³This applies a simple gain offset which may conflict with the Integrated Loudness correction. To correct for both Integrated and Short-term/Momentary values use the DynApt™ expansion.

cinema sound-tracks for TV broadcast, or re-purposing radio broadcast programming for podcast.

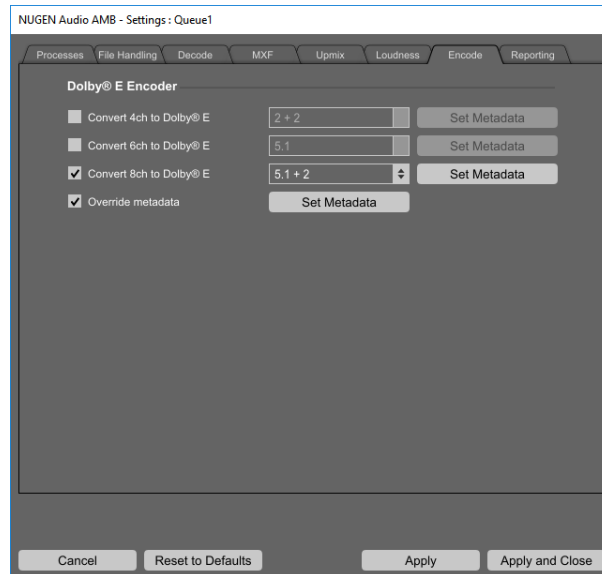
- (a) **DynApt™ Presets.** Use this option to select the target audience for the DynApt™ algorithm. To customise the settings, click on the settings button to the right.
- (b) **DynApt™ Settings.** Here you can set the specific settings used by the DynApt™ algorithm.
 - i. **Loudness Compression Ratio.** When DynApt™ reduces the Maximum Momentary Loudness and Maximum Short-term Loudness the Loudness Compression Ratio controls how hard or soft the compression will be, with 1.0 being very hard and 0.3 being very soft.
 - ii. **Macro Transition Threshold.** DynApt™ respects the transitions in the original audio. The Macro Transition Threshold controls the detection of transitions. A lower number will detect more transitions.
 - iii. **Time Smoothing (secs).** DynApt™ processing is generally applied in a time-smoothed way. The parameter Time Smoothing controls how many seconds the processing is smoothed over.
 - iv. **Ignore Transitions Relative to Integrated.** DynApt™ will ignore transitions it detects if the loudness levels on both sides of the transition are sufficiently low. This level is controlled by the Ignore Transitional Relative to Integrated parameter.
- (c) **Max LRA.** This function sets the maximum allowable LRA (Loudness Range) value for the file. If the DynApt™ expansion is not available then marking this criteria as required will cause the file to fail if it is not met. AMB will only correct for LRA when DynApt™ is available.
- (d) **Max Dialog Below Int.** Only available when using DynApt™. This is a measure of the difference between the integrated loudness of the whole file compared with the integrated loudness of the sections containing dialog. This will be reduced to make sure that the target level is not exceeded.

4. Additional Functions

- (a) **Auto-correct.** Check this option to auto-correct the files to the specifications into the 'Correct into folder' which is specified on the 'File Handling' tab. With this option turned off, files will be compared against the criteria specified above and will fail if they do not meet the desired targets, however, no correction will take place.
- (b) **Verify.** Checks the corrected file for conformity. This requires another scan, creating the possibility for an iterative process to exactly meet all requirements. With this option turned off, files that require heavy use of the limiter in order to be corrected may not exactly meet the target values set.
- (c) **Routing Matrix.** Set up the channel arrangement of files using the 'Routing Matrix' button in the 'File Handling' tab (and optionally in the Decode and MXF tabs) then click this button to set up which channels you wish process.
- (d) **Update Metadata.** When processing WAV files, a Broadcast WAVE 'bext' chunk (see [EBU Tech. Doc 3285](#)) will be added (or updated if already there) with the loudness readings. Note that the loudness values will match the chosen algorithm. If you have the Dolby® extension and the WAV file contains the Dolby® metadata chunk (see [EBU Tech Doc 3285 supplement 6](#)), then the dialnorm will be updated. When encoding the file, the dialnorm will also be passed to the encoder.

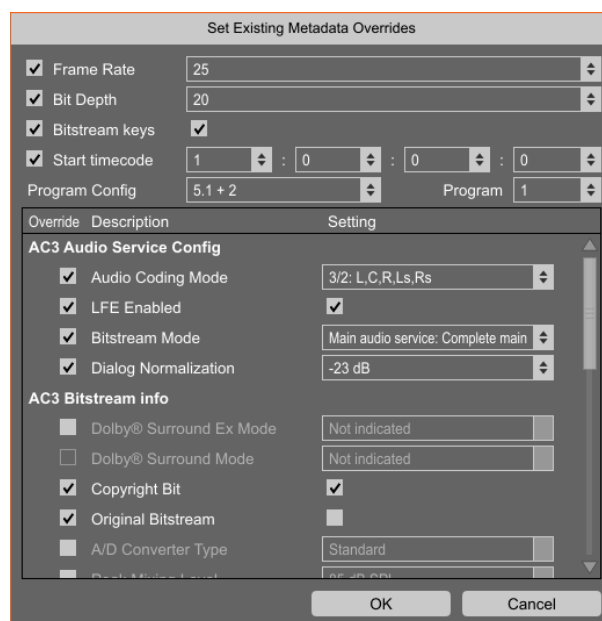
Encode

This tab allows you to specify if/how files are encoded after processing is complete. This tab is only visible if you have a Dolby® license and have enabled the expansion in the 'Processes' tab.



1. **Convert *ch to Dolby® E**. These options are for encoding 4,6 or 8 channel files into DolbyE when they were originally in PCM WAV format. The tick box on the left allows you to enable/disable the option. With the option enabled, you can select the intended program configuration and then click the 'Set Metadata' button to select the metadata you wish to use (described in more detail below).
2. **Override metadata**. This option allows you to override the metadata stored in a Dolby® E stream when you are processing a file that was originally a Dolby® E file. Note that this does not allow you to change the program configuration, just change the metadata associated with each program. To set the metadata you wish to change, click on the 'Set Metadata' button.

Clicking the 'Set Metadata' buttons will display a pop-up that looks like this:



The options are slightly different depending on whether you are setting overrides for an

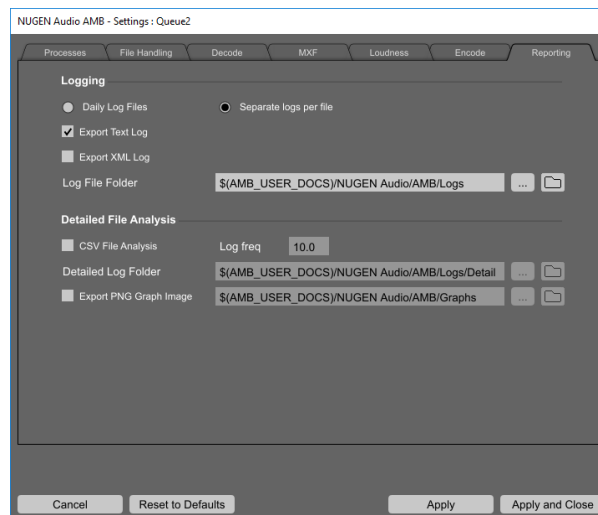
existing Dolby® file or a new one. The check-boxes down the left-hand side will only show up if you are overriding existing data and they allow you to specify whether you wish to override that particular element or not. When creating a new file, they do not appear as all settings are mandatory. The 'Program Config' option is also disabled for the 'new file' settings as the config is specified in the main 'Encode' tab.

Note that if you are setting values for an existing Dolby® file then the 'Program Config' option allows you to specify the settings for an existing file with that configuration. As mentioned earlier, you cannot change the program config in an existing file.

Note also that in the settings for new files, the Dialog Normalization setting will be greyed out if the Update Metadata option is turned on in the loudness tab. This is because the reading will be taken from the loudness calculations directly.

Reporting

The reporting tab allows you to specify what information is logged out when files are processed. You can disable all reporting on the processes tab.



1. **Logging.** Logging can be enabled to store a history of what has happened to a file whilst it has been processed.
 - (a) **Daily Log Files.** With this option selected, AMB will generate log files where the name is the current date. This way, any work that is performed is grouped based on the day it was done. Note that because AMB supports multiple threads, using the same log file for everything could cause conflicts. AMB will cache the logging for each file it is processing and when processing is complete, the entire cached log will be written to the shared file.
 - (b) **Separate logs per file.** With this option selected, AMB will use the name of the file being processed as a base for the log file name.
 - (c) **Export Text Log.** Tick this box to generate log files in a human-readable format. This contains the same information that is displayed in the log window in AMB.
 - (d) **Export XML Log.** Tick this box to generate log files in XML format. This format is more easily processed by external programs, but is still formatted in a way that can be easily read by a human being.
 - (e) **Log File Folder.** This specifies the target location for the log files.
2. **Detailed File Analysis.** Detailed information can be saved out on a per-file basis.



- (a) **CSV File Analysis.** Tick this box to export a detailed log of the various loudness parameters to a comma separated value (CSV) file. This file can be imported into graphing and analysis packages (eg. MS Excel) for additional examination.
- (b) **Log frequency.** This parameter specifies the time between logs, in seconds. Note that making this number very small will slow down the processing of files and could generate very large files.
- (c) **Detailed Log folder.** This is the location where the detailed CSV logs will be stored.
- (d) **Export PNG Graph Image.** With this box ticked, AMB will automatically save out a PNG of the graph for each file it processes.
- (e) **Graph Folder.** You can specify where the PNG files are saved. The filename used will be the same as the original file with PNG as the extension.

3. Command-line Interface

AMB supports control via command-line interface if you have purchased an Enterprise license. AMB is supplied with a tool called AMBCmd. You can type AMBCmd -h at the command line which displays the following help:

```

AMBCmd : A command line interface for communicating with AMB.
Usage: AMBCmd [options]
  -? -h          --help      Show this information.
  -r <host name> --remote    Specifies the name of the host to connect to.
  -p <port number> --port    Specifies the port to connect to.
  -s <settings file> --settings Specifies the name of the settings to use.
                               This should just be the settings file name
                               with no path and no extension. If no settings
                               file is specified, the file will be added to
                               all queues.
  -a <file/folder> --add     Specifies the name of the file to be
                               processed. You may specify multiple files on
                               one command line and they will all be added to
                               the most recently specified queue.
                               The filename must be from the point of view of
                               the host and must be quoted if it contains
                               spaces.
  -f            --force     Forces files to be reprocessed. Without this
                               flag, any files that are being processed or
                               have already been processed will not be
                               reprocessed.
  -v            --verbose   Extra information is output to aid debugging.
  -q            --quiet    No output is shown.
  -x            --exit     Exit as soon as the files are added to the
                               queue. Without this flag, AMBCmd will not exit
                               until all files have been processed.

```

Return codes:

```

-100  Invalid parameters passed on the command line
-99   Failed to connect to the server
-98   Connected to server, but it didn't reply with the expected response
-97   Connected to server but it is a different version than was expected
-96   The queue specified is not valid
-95   The file specified is not valid
-94   No files were specified on the command line
-93   The server sent back an invalid response to a file processing request
-92   There was an unknown server error whilst waiting for files to process
-91   Server sent back a response for an unknown file ID
-90   Server said work was complete but our internal list does not match
-89   The connection to the server was lost unexpectedly
-88   The server rejected the request to force processing
-87   The server said it would not supply updates about processing files

0     No error - everything went okay
1     The help was displayed
2     Processing of some files was cancelled on the server
3     There was an error processing one or more files

```

The AMBCmd tool connects to AMB via a TCP connection, so it can be run from a remote computer. Be aware that the path names you specify must be relative to the machine running AMB. There are options in the [Global Settings](#) for enabling/disabling this functionality, and for setting the port that AMB uses for communication. If you change the port in AMB, you must use the -p option in AMBCmd to specify the port. By default, AMBCmd attempts to connect to a copy of AMB running on the same machine. If you are using AMB remotely, you can specify the IP address or name of the machine on which AMB is running using the -r option.

On Windows, the AMBCmd.exe is installed to the same directory as AMB. It has no dependencies and can be copied to wherever is most convenient.



On OSX, the AMBCmd executable is installed to the /usr/local/bin folder and is therefore included in the search path so it can be executed from anywhere.



4. File Exclusion List

The file exclusion list is a list of file types (file extensions) that AMB will automatically ignore. This will speed operation and avoid AMB listing 'unsupported' files in the processing queue.

This list is contained within the file "ExcludeExtns.txt" which can be found in the AMB install directory, and can be manually edited to add/remove file exclusions to suit your operational requirements.

By default:

On OSX ExcludeExtns.txt is found in
Macintosh HD/Library/Application Support/NUGEN Audio/AMB

On Windows ExcludeExtns.txt is found in
C:\Program Files (x86)\NUGEN Audio\AMB



5. Reporting a Problem

If you encounter a problem with any of NUGEN Audio's products, please let us know, to help us improve them.

Please email NUGEN Audio at support@nugenaudio.com giving a clear explanation of the problem. Please state how frequently you've experienced the problem. If there are any particular steps you need to go through to see the problem, please detail these.

Your query will be handled more quickly if you include the following information:

1. Operating system (OSX/Windows)
2. Operating system version
3. CPU type and speed
4. RAM size

If you are having problems with a specific file then including a link to that file and the settings you are using to process it would also be very helpful.

Please be patient with any problems you may experience, particularly with products at a beta stage of release. At NUGEN Audio we take problems with our software seriously, and will endeavour to correct them as quickly as possible.



6. Special Note on the Use of Dolby Trademarks

Dolby Laboratories encourages use of Dolby trademarks to identify soundtracks that are encoded with Dolby technologies. This is an effective way to inform listeners of the soundtrack format, and the use of a standard logo promotes easy recognition in the marketplace. However, as with all trademarks, Dolby trademarks may not be used without permission. Dolby Laboratories therefore provides a trademark agreement for companies that wish to use Dolby trademarks.

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7. Version History

- 1.0.0 Initial release.
- 1.0.1 Various bug fixes and stability improvements.
Added a menu shortcut for closing a workspace without closing the application.
Added workspace name to title bar.
Created a default workspace if one hadn't been previously saved.
- 1.0.2 Various bug fixes and stability improvements.
Improved buffering of audio files to increase performance.
Added support for using environment variables in settings (use the \$(variable_name) format).
Improved watch folder support - better handling of large files.
Added a copy-to-clipboard context menu to the log window.
- 1.0.3 Fixed launching VLC to convert files in OSX.
- 1.1.0 Added support for Dolby® E encoded files.
Added support for mono and quad routings.
Added support for ITU BS.1770-4.
Added support for Leq(a).
Added support for more routing options.
Saved queues when saving the workspace.
Improved stability when changing settings whilst files are being processed.
Added the 'track active items' button.
Improved iterative corrections for large gain applications than miss on the first attempt.
Fixed support for daily logs.
Added buttons to the settings panels to open folders.
Stored the last used settings on the graph panel.
Fixed a bug in the "Allow Under" option.
Fixed a bug where using DynApt™ but not correcting TP would result in silence.
Fixed a 64-sample latency issue when using DynApt™ .
Fixed a 64-sample silence issue when using "Ignore head" option.
- 1.1.1 Added command-line support for Enterprise licenses.
Added option to stop processing on an error.
Added support for skipping based on timecode.
Added support for settings processing duration.

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