EAR Production Suite (v1.1.0 release)

The latest builds of the EAR Production Suite are available under GitHub Releases or from the EAR Production Suite website. Please download the files from there. The EAR Production Suite (EPS) download package comprises of multiple components:

- EPS VST® Plug-ins
- EPS REAPER Extension
- ADM Export Source VST® Plug-in
- REAPER project templates
- Project Upgrade Utility (for REAPER projects created with EPS v0.6.0 beta)
- Setup application

Release notes

v1.1.0 supports 128 channels in REAPER v7.0 or greater and improved compatibility with ADM generated by third-party tools. It also includes various bug fixes, performance fixes, and other feature improvements. Please see detailed changelog below.

Known issues

The EPS exports ADM using egocentric, polar coordinates and conforming to the EBU Broadcast Production Profile. It is very tolerant in the ADM it will import meaning it can import files that conform to other profiles. ADM authored using the Dolby Atmos ADM profile can be imported, but coordinates and directspeakers pack formats are converted on import and exported files will instead conform to the Production Profile. To import Production Profile ADM in to third-party tools which do not support this profile, the ADM must be converted. BBC R&D along with the EBU have developed the EBU ADM Toolkit to assist with this task.

To fix a problem using the plug-ins with some hosts, the ID for all plug-ins changed with the 0.7.0 release. This change will break any REAPER projects created using the 0.6.0 plug-ins. Please use the Project Upgrade Utility to convert these. There is a command-line tool available in the `Tools` directory of the download package, and a GUI tool available either in the download package or via the `Extensions > Browse tools and templates...` menu option in REAPER once the EPS is installed.

For an up-to-date list of known issues, please refer to GitHub

Changes

Version 1.1.0

- Support for 128 channels when using REAPER >=v7.0 #244 #254 #267
- Improve import support from third-party tools #259
- Support HRTF switching in Binaural Monitoring plugin #266
- Fix monitoring plugins not properly supporting shared inputs #257 #258
- Apply "version" attribute to ADM as required by ITU-R BS.2076-2 #248 #255
- Performance fix for envelope creation #252
- Update BW64 lib for performance fixes #260
- Allow user to opt-out of update-checking during setup #256
- Warn user of impending FB360 and VISR support deprecation since these plugin suites are no longer maintained #265

Version 1.0.0

- Setup Application included
- Support for ADM "Importance" parameter
- Fix bug in render dialog when using language packs #215
- Experimental Linux build #222
- Silence unused monitoring output channels (prevents pass-through of object audio) #224
- Fix alignment of monitoring meters #206
- Fix blank audioProgrammeLanguage on export #213
- Export uses 2076-2 structures (omitting AudioTrackFormat and AudioStreamFormat)
- MacOS build fixes #220 #221
- Include additional project templates
- Fix bus config when Input plug-ins on wide track #228
- Fix Size param not updating #229
- Fix plugin crash on other DAWs #232
- Support plugin renaming in REAPER #240
- Fix blank Scene when importing ADM with no high-level metadata #242
- Fix parameters not updating in response to other parameter changes after JUCE update
- Fix render dialog controls inadvertently re-enabling
- Support render dialog changes in newer REAPER versions
- Wider REAPER version support (back to 6.11)
- Various performance improvements
- Use more appropriate bus layouts

Version 0.8.0

- Support custom object names rather than using track names #214
- Support sharing of audio assets between objects (avoids asset duplication) #223 #211 #207
- Import process finds and imports orphaned AudioObjects #208
- Fix envelope point creation for blocks using jump position with rtime of 0
- Fix crash when adding DirectSpeakers objects to programmes before their speaker layout is set #209

- Fix rendering crash when using HOA without format set
- Fix rendering crash when using ADM Export Source plugin with unsupported asset types for plugin suite
- Update libadm to 0.14.0
- Fix import of some 2076-2 ADM structures
- Fix import of files with large individual audio assets
- Fix Read-only plugin parameters after JUCE upgrade

Version 0.7.3

- Fix 'no name' items in Scene and associated issues through major refactor #197
- Support new render dialog controls in recent version of REAPER #202
- Address silent crash logged on Windows when closing REAPER #202
- Fix hang on MacOS with multiple export sources on render #202
- Fix sockets left open after render #202
- Fix Scene view orientation mismatch #197
- Improve Scene GUI performance #197
- Correct textbox alignment after JUCE upgrade #197

Version 0.7.2

- Binaural monitoring axis inversion controls - closes #177
- Save binaural monitoring config to file - closes #182
- Patch JUCE so Windows can detect failure to open UDP port - closes #169
- Don't crash if binaural monitoring plugin receives 0.6.0 metadata - closes #180
- Fix potential race condition in weak pointer usage #181
- Use mono mix for export waveform display, hide channel selection in export dialog #185
- Disable renderers when exporting to ADM for improved export speed #185
- Fix resolution of overlapping routings from HOA input plugin #191
- Pushed custom libadm changes upstream and updated submodule #189

Version 0.7.1

- Updated JUCE framework to 6.1.5 #171, fixes arm64/macos crash on unhandled keydown events #174
- Disabled interaction panel for non-object types in Scene #173
- Prevent potential out-of-bounds array access on removal of right-most programme in scene #175
- Fix crash when pressing backspace on HOA combobox #172

Version 0.7.0

- Added Binaural Monitoring and HOA Input plugins #156
- Improved default install target locations #4 #79 #95
- Fixed bug that made adding items after moving a programme fail. #5

- Added unique plugin uids and FX category for better DAW compatibility #10
- Added REAPER project upgrade tool #11 #136
- Properly persist parameters when saving/restoring a session #17
- Fixed bug where bypassed parameters were exported to ADM #52
- Improved support for building via Xcode project #53 #66
- Fixed crash on exit in Debug mode #54
- Fixed bug where exported block boundaries were not always contiguous #55
- UI Improvements #56 #114
- Fixed parameter update data race #57
- Export will now set jumpPosition flag where appropriate #62
- Moved some operations off audio thread #64 #68
- Fixed bug where changed parameters might not cause DAW to prompt to save changes #67
- Properly account for tail length when exporting #71
- Fixed bug where changes were not taking place when switching programmes #76
- Fixed bug where 'no name' items could appear in scene #78
- Added support for more speaker layouts in DirectSpeaker plugin #89 #90 #109 #112 #127
- Fixed crash when using ADM extension with a REAPER language pack #91
- Added 2+7+0 monitoring plugin #108
- Removed redundant metadata updates #111 #113 #135 #142 #145
- Fixed memory leak when changing speaker layout #116
- Fixed combo box initialisation issues #118
- Version information now show in plugins and extension #120
- Added support for ADM with two character language codes #121
- Fixed crash due to recursive mutex locking #133
- Fixed issue where scene would remove incorrect items #87
- Preliminary arm64 support for Apple Silicon #137 #148
- Use patched BW64 library #149
- Support ITU-R BS.2076-2 structures and time formats #151
- Fix automation points ordering issue on import #153
- Various CI improvements

0.6.0

- Initial beta release

Installation

The EPS is designed for REAPER 64-bit, on a 64-bit OS (MacOS, Windows or Linux (experimental))

Automatic Installation

For MacOS or Windows, the easiest way to install the software is to use the included Setup application.

1. Install REAPER if you don't already have it.
2. Extract the release package (Windows only - Mac will install directly from the DMG).
3. Ensure REAPER is not running.
4. Run the `Setup EAR Production Suite` application in the package and follow on-screen instructions.

Manual Installation

You may install the EPS manually if you prefer (note that this is the only option for Linux currently).

1. Install REAPER if you don't already have it.
2. Ensure REAPER is not running.
3. From the release package, copy the **VST plug-ins** from the `VST3` directory of the package into your common VST folder.
   - Windows: `C:\Program Files\Common Files\VST3\`
   - MacOS: `~/Library/Audio/Plug-Ins/VST3/`
   - Linux: `~/.vst3/`
4. From the release package, copy the REAPER ADM **Extension** from the `UserPlugins` directory of the package into the REAPER UserPlugins folder. Ensure you include the `ADMPresets` subdirectory.
   - Windows: `C:\Users\(username)\AppData\Roaming\REAPER\UserPlugins\`
     Note: If you have a previous version of the REAPER Extension installed to `C:\Program Files\REAPER (x64)\Plugins\reaper_adm.dll`, then this should be deleted on installation of the latest version.
   - MacOS: `~/Library/Application Support/REAPER/UserPlugins/`
   - Linux: `~/.config/REAPER/UserPlugins/`
5. (Optional) From the release package, copy the `Tools` and `Templates` directories of the package into an `EAR Production Suite` directory in the relevant location listed below. This is the folder used by the "Browse tools and templates..." function of the EPS.
   - Windows: `C:\Users\(username)\AppData\Roaming\EAR Production Suite\`
   - MacOS: `~/Library/Application Support/EAR Production Suite/`
   - Linux: `~/.config/EAR Production Suite/`

Confirming Installation and Troubleshooting

REAPER Extension

Open REAPER and select `Extensions` from the menu bar. Under this menu should be a new option labelled `EAR Production Suite`. This confirms that the extension was installed and loaded successfully. Check the version number of the extension by going to `Extensions > EAR Production Suite > About EAR Production Suite`.

If the extension is not present and you are using Windows, it might be necessary to download and install the Visual C++ redistributable ("vc_redist.x64.exe") from Microsoft.

VST Plug-ins

Open REAPER and select a blank FX slot on a track to open the plug-in selection dialog. The EAR Production Suite plug-ins should now be listed in the dialog. For all plug-ins, the version number is stated in the bottom right-hand corner of the GUIs.

If any plug-ins are missing, you can force REAPER to update its plug-in lists by going to `Options > Preferences > Plug-Ins > VST` and clicking `Rescan`.

How to use (short version)

Import ADM Files

1. From the REAPER menu bar, select `File > Create Project from ADM file > Create from ADM using EAR` and choose the file to import.
2. Wait while all ADM elements are being created as tracks and automation curves along with metadata input plug-ins for each object or channel bed. There will be also tracks created with the "EAR Scene" plug-in and with a monitoring plug-in.
3. Enjoy :)

Create from scratch

1. Add an "EAR Object" Plug-in for each audio object track or an "EAR DirectSpeakers" Plug-in for a channel bed. Disable Master Send on the track. Make sure to increase the track mapping parameter value +1 for each new audio object input plug-in (or + the number of your channel bed). So the first audio object track in the REAPER project should be one, the next two, ...
2. Create a new track for the "EAR Scene" plug-in and add it there. Change the bus size to 64 and disable Master Send on the track.
3. Connect all audio objects tracks to the "EAR Scene" track as "Receives" in the I/O option. Make sure to choose the correct bus size (i.e. Mono).

4. Create a new track for the EAR Monitoring Plug-in and add it there. Change the bus size to 64.
5. Connect the Scene track to the Monitoring track as "Receives" in the I/O options.
6. Add the hardware output for the Monitoring track in the I/O options or allow it to send via Master.
7. Enter and author your ADM parameters in Object, DirectSpeakers and Scene Plug-ins. **Please note that the Scene Plug-in is steering what you hear. So any items which are not added to a programme there, will not be rendered!**
8. Enjoy :)

Start with project template

We have provided a project template and several example projects in the download package. To begin with the simple template;

1. Open the templates in REAPER
2. You will find a number of tracks with plug-ins for further usage
   - Two object tracks
   - One channel-based track
   - One EAR Scene bus
   - Two EAR Monitoring buses, one for Stereo monitoring and one for 5.1
3. The Scene Plug-in has already two audio programmes, one called "English" and one "German"
4. All metadata connections between the plug-ins and I/O routings are set. You can start by importing your audio files into the tracks.
5. Switch between the different renderings by exclusive-soloing (CMD+Alt+Click (MacOS) / Ctrl+Alt+Click (Win)) the monitoring tracks.

The other projects provide examples of a broader range of use cases and some test audio so you can try the example projects straight away.

How to use (long version)

Have a look at this video where these points are explained:

- Introduction
- Tutorial 1: Understanding the EAR Production Suite Plug-ins
- Tutorial 2: Creating an ADM Project from scratch with the EAR Production Suite Plug-ins
- Tutorial 3: Using an Existing ADM File with the EAR Production Suite Plug-ins
- Tutorial 4: Using Third-Party Spatial Audio Plug-ins with the ADM Export Source Plug-in
- Tutorial 5: Using Non-Object Audio with the ADM Export Source Plug-in

Watch the video

Please note: The tutorial video covers manual installation of the EPS. With v1.0.0+, it is must easier to use the included Setup application. Additionally, the video advises to install the REAPER extension to the REAPER directory of `Program Files` on Windows. Although this will be functional, it is now advised to install to your user directory instead. Please see the installation instructions in this file.

Use of Binaural Monitoring plug-in

The Binaural Monitoring plug-in can be used in exactly the same way as the existing Monitoring plug-ins for loudspeakers; simply place the Binaural Monitoring plug-in on a new 64-channel track and route all 64 channels of the Scene plug-in track to it.

The Binaural Monitoring plug-in supports 3DoF (three degrees-of-freedom). That is, the plug-in will respond to listener orientation changes. The plug-in provides Yaw, Pitch and Roll controls to define head orientation. These can be driven automatically using head-trackers which generate OSC. It is compatible with OSC message formats used by other third-party spatial audio plug-ins, including SPARTA/COMPASS, IEM, 3D Tune-In Toolkit, Ambix plug-ins, AudioLab SALTE, and Mach1 Monitor. Therefore, any head-tracker which is compatible with any of those plug-ins should also be compatible with the EAR Production Suite Binaural Monitoring plug-in. Below is a complete list of OSC paths observed. Note that you will need to ensure the Binaural Monitoring plug-in is listening for messages on the correct port using the control within the user interface, and enabled using the switch control.

- **/yaw *y*, /pitch *p*, /roll *r*** - Euler in Degrees, as used by SPARTA/COMPASS
- **/ypr *y p r*** - Euler in Degrees, as used by SPARTA/COMPASS
- **/hedrot/yaw *y*, /hedrot/pitch *p*, /hedrot/roll *r*** - Euler in Degrees, as used by HedRot
- **/rotation *p y r*** - Euler in Degrees, as used by Matthias Kronlachner's Ambix plug-ins
- **/rendering/htrpy *r p y*** - Euler in Degrees, as used by AudioLab SALTE
- **/orientation *y p r*** - Euler in Degrees, as used by Mach1 Monitor
- **/3DTI-OSC/receiver/pry *p r y*** - Euler in Radians, as used by 3D Tune-In Toolkit
- **/quaternion *w y z x*** - Quaternions, as used by SPARTA/COMPASS
- **/SceneRotator/quaternions *w x y z*** - Quaternions, as used by IEM
- **/quaternions *w y z x*** - Quaternions, as used by Unity
- **/head_pose** *a b c d* ***p y r*** - Euler in Degrees, as used by Matthias Kronlachner's Ambix plug-ins (note that the first 4 parameters are ignored in this case.)

The nvsonic Head Tracker provides a cheap, compatible and tested head-tracker

which can output all of the above formats, and can therefore drive the Binaural Monitoring plug-in.

What's still missing

- No support for Binaural and Matrix typeDefinition.
- No support for "nested" Objects - on import, ADM Programmes are currently flattened to a single tier of Objects.
- Only one instance of EAR Scene should run on a machine at any time.
- ...

Issues

Before submitting a new report in Issues, please check if your problem or feature request is already known.