ReaClassical
Open Source Classical Music Editing Tools

Covering ReaClassical v23.15

Tested on REAPER v6.75

Preliminaries

First up, it is important to note that if you already own REAPER then the world of classical editing including source-destination editing (aka 3-and-4-point editing), crossfade editing and more are available at no extra cost to you via freely available Lua scripts. There's no need to spend any of your hard-earned money on a classical-based app that is essentially a modified REAPER install. Neither do you need Sequoia, Pyramix or SaDiE in order to make editing precise and efficient. As a classical engineer myself, I can say with certainty that what I am about to share with you covers all my recording, editing and mastering needs. Your mileage may vary and I'd love to hear from you if there are functions you feel are missing. There's an easy install option below as well a step-by-step manual approach.

What you need

Just The Scripts and Plugins?

Import my index.xml into ReaPack and search for 'ReaClassical' for the scripts, theme, project templates and jsfx collections. Note that this does *not* give you the full benefits of ReaClassical which include keyboard shortcuts, custom toolbar etc. However, it's an easy way to start if you are already familiar with ReaPack and SWS and want to check out source-destination editing etc.

Easy Complete Portable Installation (recommended)

1. Follow the installation instructions here. In short, if you are on Linux, use this script, on MacOS, this script, or on Windows, this executable to take care of completely setting up ReaClassical from scratch (including the downloading REAPER and setting up as a portable install). Simply run where you would like the folder to be created.

2. Start REAPER

3. Sync ReaPack to get the very latest ReaClassical scripts

Resource Folder Installation for Existing REAPER Install (also recommended)

1. If you are satisfied with ReaClassical and wish to replace your existing REAPER settings, download the Resource Folder Base, unzip and replace your current resource path (after making a backup). Add the appropriate ReaPack and SWS userplugins by downloading from my UserPlugins Github subfolder, unzipping and adding to the UserPlugins subfolder inside the new resource path. Restart REAPER and you will have the full ReaClassical experience.

Manual Installation (ideally for research only or if you already have a heavily-customized REAPER setup and wish to add ReaClassical)

- REAPER (obviously)

- SWS Extension, ReaPack

- ReaClassical metapackage (includes ReaClassical default project template)[1]

- key map file & keyboard shortcut guide from my Github repository[2]

- Optional: custom toolbar and icon set from my Github repository

So, the first thing is to install REAPER from https://www.reaper.fm/download.php. I'll let you figure that out yourself. Next, install SWS Extension and ReaPack from https://www.sws-extension.org/ and https://reapack.com/ respectively into the UserPlugins subfolder inside the REAPER resource path. Once that's done, start/restart REAPER. You'll then want to download the following from inside of ReaPack (scripts I consider optional are in italics):

- ReaClassical
  (by importing my index.xml into ReaPack then searching for 'ReaClassical')

- ReaClassical PDF Guide (search ReaPack for 'pdf')

- Various ReaClassical JSFX plugins (search ReaPack for 'ReaClassical')

- *JS reascript API (juliansader)*

- *Various_functions (MPL)*

- *Generate CUE from project markers (MPL)*

- *RCInflator (Oxford)*

Now, you need to choose one of the key map files from the manual install archive (I recommend the complete one if you want the full experience!). It's worth stating here in the main text my warning about backing up your own REAPER configuration before importing mine in case you want to get back to where you were.

ReaClassical Custom Toolbar

In order to install the toolbar, place the ReaClassical.ReaperMenu in MenuSets (inside your REAPER resource path). Next unzip the icons in Data/toolbar_icons (again, inside your resource path).

In REAPER, right-click on an empty part of the main toolbar and select toolbar 1 (either open or float it). Select Import/Export in the top right corner and select the ReaClassical.ReaperMenu file. You should then see menu items and associated icons! See figure 1.

Figure 1: ReaClassical custom toolbar

---

[1]This is entirely optional, but it might save you a little time. In this document I go through step-by-step how to set up in any case.

[2]https://github.com/chmaha/ReaClassical N.B. Before proceeding, I recommend doing a backup of your current key map. When importing my key map into your installation of REAPER some of your shortcuts will no doubt be overwritten.

Figure 2: "Ripple editing per-track", "Item edit grouping" and "move envelope points with media items" engaged...

From left to right, we have: Whole project view ('), Create (or Sync) Source Groups (F8), Classical Take Record Toggle (F9), Duplicate Folder (\), Prepare Takes (T), Toggle for choosing 3-point edit behaviour (F3), Destination IN and OUT markers (1, 2), Source IN and OUT markers (3, 4), Delete S-D markers (Ctrl+Delete), S-D Edit (5), Delete With Ripple (Backspace), Delete Leaving Silence (Ctrl+Backspace), the Fade Editor View (F) and, finally, Create CD Markers (Y).

Things to do after installing

Main arrange window

- UNCHECK Auto-crossfade, grid lines (optional), snap[3] buttons
- CHECK Ripple editing per-track (as opposed to ripple edit all tracks), Item edit grouping, move envelope points with media items. See figure 2

Preferences

Some of these options are essential for the scripts to work as expected. Others are just recommended.

Project > Media Item Defaults

- ENABLE Overlap and crossfade items when splitting, length: 0:00.010
- ENABLE Overlap and crossfade media when finalizing razor edits

Appearance > Peaks/Waveforms

- UNCHECK Draw faint peaks in folder tracks

Appearance > Fades/Crossfades

- ENABLE When editing crossfades with the mouse, use crossfade editor theme colours

Appearance > Media Item Positioning

- CHANGE Offset by... percent of item height to 100[4]
- CHECK Draw as opaque

Editing Behaviour

- SET Locked item ripple editing behaviour to "Locked items are unaffected by ripple"[5]

---

[3]We will prepare some snap settings later for adding CD markers but for now we don't want dragging etc to be constrained.

[4]In REAPER versions prior to 6.54, these options don't exist. Instead, under *Appearances*, you need to change *Maximum number of lanes, when showing overlapping items* to 2

[5]Technically not necessary as it is now checked and set at the start of ripple-capable functions.

Figure 3: Setting mute overlay mode

Editing Behaviour > Mouse Modifiers

- CHANGE Razor edit area left drag default to "Move areas, disabling ripple edit"

Project Settings

- CHANGE Video > Frame rate to 75[6]

- CHANGE Render resample mode to r8brain free (highest quality, fast)

Theme Tweak

- Using the "Theme development: Show theme tweak/configuration window" action, search for "mute" and change the alpha blend to 0.00. See figure 3.

At this point it might be a good idea to Save as default project settings as well as make a classical template (if you didn't download mine) so that you don't have to do this setup more than once.

Classical Workflows

Creating Folder tracks

Horizontal Recording/Editing

For horizontal recording and editing, create a single folder with your various channels (main pair, aux pair, spots etc) using the *ReaClassical_Create Folder* script (F7). you don't have to do any more setup because essentially you already have one mixer set for all the various takes. With vertical recording/editing we need to be a bit more creative.

Vertical Recording/Editing

A typical scenario: You have vertically recorded, or vertically prepared, multiple takes of a concerto movement with 10 channels. You realize half-way through editing that you want the soloist's microphone to be brought up in volume a little and also panned slightly more to the right to match the position in the main stereo pair. Under normal circumstances moving one pan knob or fader would only affect that one channel. The ideal situation would be that changing a value on one channel would affect every other take in the same way, making comparing source material uniform in volume and panning.

---

[6]The number of frames per second for red-book CDs.

For vertical recording and editing, start with an empty project and run *ReaClassical_Create source groups (vertical)* script. It will prompt you to enter how many tracks you'd like per folder. Then it creates all the source groups. Easy! You can also choose to manually create a single folder and afterwards run the same script. This time it just creates the additional source groups. The script creates 6 source groups based off the destination/master folder, links the volume, panning, polarity, mute, automation trim and hides everything in the mixer save for the first folder group. In other words, you can simultaneously control volume, panning, polarity and automation across all takes. It also sets up media item and razor editing grouped by folder. If you need more than the 6 source groups, simply create them on the fly with the *duplicate folder (no items)* script.

Routing and FX: If you want to make any changes to routing or FX, apply them to the first folder (the destination) and then simply run the *ReaClassical_Create source groups (vertical)* script again and it will automatically sync the source group routing and FX to the destination. All items and edits will remain untouched.

Recording

I don't have too much to say here other than suggest that you follow the various guides already out there on the internet. Hopefully you are already familiar with how to set up your equipment[7], set audio device settings, record arm and the like. If not, take some time now as it will really pay off in the long run. Some quick tips: record into 24-bit WAV files (the default) and aim for -12dB or so peaks[8] versus trying to get as close to 0dB as you can. Document your takes either using the built-in REAPER project notes or SWS Notes which can be attached to items, tracks, markers etc. I personally prefer item notes on the main microphone pair. It's a very useful tool to have docked at the bottom of the screen.

I set *SWS/AW: Toggle auto group newly recorded items* as a global startup action to save time especially if using a vertical take system. It's probably quite obvious but toggling on this action automatically groups tracks that are recorded at the same time.

I include a "duplicate folder (no items)" script (via backslash shortcut) for a quick way to add more empty folders (and their children) from your first recording set (in case you enjoy vertical take management (see below under Editing). My personal preference is to either to just run the recorder for the whole session or stop and start for each new take but continuing in a linear fashion along the timeline. However, if you want to record takes vertically in preparation for editing that way, I've included a handy "classical take record" script that also works perfectly in horizontal mode too. Position your play cursor, click on a folder track then press the shortcut (F9) to record and press the same again to stop. The script automatically moves to the next folder with the cursor at the same start position so you can immediately press F9 again. If not present, a new folder is created. Note that the tracks shown in the mixer are filtered based on which tracks are currently recording.

I always make some dedicated time post-recording to get a lay of the land, tidy up the digital notes I took during the session and perform a backup on an external drive as soon as possible.[9]

Editing

Marking the edits

This is best done using a physical, photocopied[10] score by the conductor or lead musician. I advocate for a "T" system[11] where a large T is inserted into the score at the intended edit point. Either side of the T stem, and under the crossbar, the outgoing and incoming take numbers are written. A wavy crossbar indicates some leeway for where the edit point can be placed. Further notes can be attached underneath the T such as directions for tightening the gap etc. See figure 4.

---

[7]For live concerts (i.e. critical one take), I actually prefer to use a SoundDevices MixPre II unit.

[8]You can record a lot lower and still be above the 16-bit noise floor but this isn't the document to go into it in detail.

[9]Note that with REAPER it is also possible to record to a second drive as an invisible backup while on location.

[10]Or printed public domain score where possible.

[11]As described by Frank Lockwood at https://www.lockwoodars.com/

Figure 4: Identifying edit locations on a score

Introduction to the various editing workflows

Here we talk about the meat and potatoes of the classical editing workflows. Workflows (plural) because I have included different approaches to suit as many tastes as possible within the confines of the REAPER application. I will explain each in detail after this brief introduction. I personally have always enjoyed doing my S/D editing within the one project window but if you use Paweł Łyżwa's (ply) scripts you shuttle back and forth between two project tabs: one for your source material and one for your destination material. In the single-window workflow you have multiple ways of proceeding. First you have all your takes lined up in a row horizontally and you place your source in and out markers, destination in and out markers then press a keyboard shortcut to achieve your 3 or 4-point edit. The second way is to set up your takes vertically and then either use the same marker system to make your edits or use razor edits (my preferred method when working vertically). Whichever option you choose, you will then end up in the crossfade editor view which uses a custom two-lane view with classical crossfade script to make precise edits really easy in REAPER. I don't often use the fade editor dialog that comes with REAPER even though I make it appear as part of the script.

Preparing your recorded takes for classical editing

Whichever method you end up choosing you need to prepare your takes in an appropriate way. I strongly recommend using folder tracks for everything (especially given the vertical workflows rely on the presence of such folders). The folder track itself should hold the first of the audio files which for me is invariably the main microphone pair (stereo). If you recorded mono L & R for your main pair (for example via a portable recorder such as a SoundDevices of Zoom unit), instead place all your tracks as children leaving the folder track itself empty.

Whether working horizontally or vertically, you can use the *Prepare Takes* script. It is intelligent enough to figure out which workflow you are using. Just press the shortcut (my own preference is T)[12]. Super simple! Every set of items comprising a take has changed colour, is now grouped, folder tracks are grouped (or re-grouped) for razor editing and imported/recorded take names removed. See figure 5. For horizontally laid-out takes, each complete take is coloured with a different random colour. For vertically laid-out takes, each folder's items are given a different random colour. This way, however you work, it's easy to see where edits have come from. If you imported or recorded all your files in child tracks, the script will additionally copy all items from each first child track into the folder track and mute them to act as a visual guide track. You will receive a pop-up message if this is the case.

[12]From now on, you can assume that all shortcuts mentioned are all the ones included in my key map.

Figure 5: Five takes of a single movement (with tracks comprised of main pair, aux pair, vocal spot and cello spot) given random colours and grouped

Figure 6: Prepared vertical takes of a single piece after running the *Prepare Takes* script

When child tracks are hidden via the D and E shortcuts, this gives the engineer the ability to edit multi-microphone recordings as if they were a simple stereo (or mono) track (see below).

That's it! So, with that introduction and preparation done, let's dive into each option in more detail.

Single-window S/D editing (horizontal)

As mentioned earlier, this is my own favourite method. You set your in-out points using special coloured labelled markers I created with shortcuts 1 and 2 (Destination) and 3 and 4 (Source). See figure 8. Simply press the shortcut 5 to make the 3 or 4-point edit. You'll also notice that because you prepared the various takes with colours (and grouping), it is really easy to see which takes compose your final edited tracks. It's worth pointing out that my S/D and classical crossfade scripts place the default short 10ms crossfade immediately before the entry and exit points of the pasted audio. In practice this means that if you visually set a marker (or edit cursor in the case of the classical crossfade function) immediately before a transient, said transient will sound post-crossfade which is what we generally desire. Often, given this important detail, I don't even need to visit the crossfade editor view.

A note on listening to takes

For horizontal editing, you should use the usual transport shortcuts (spacebar to start and stop playback, for example). For vertical editing, it is highly recommended to use the Audition (A) script to quickly solo only the folder (or track) you are interested in hearing. Note that similar to the *Classical Take Record* function, the tracks shown in the mixer are filtered based on what is being auditioned.
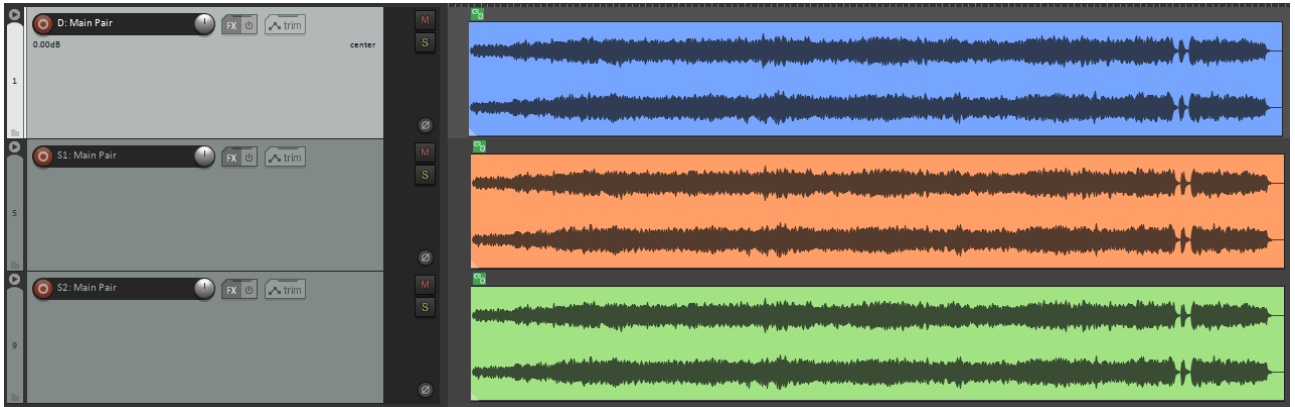
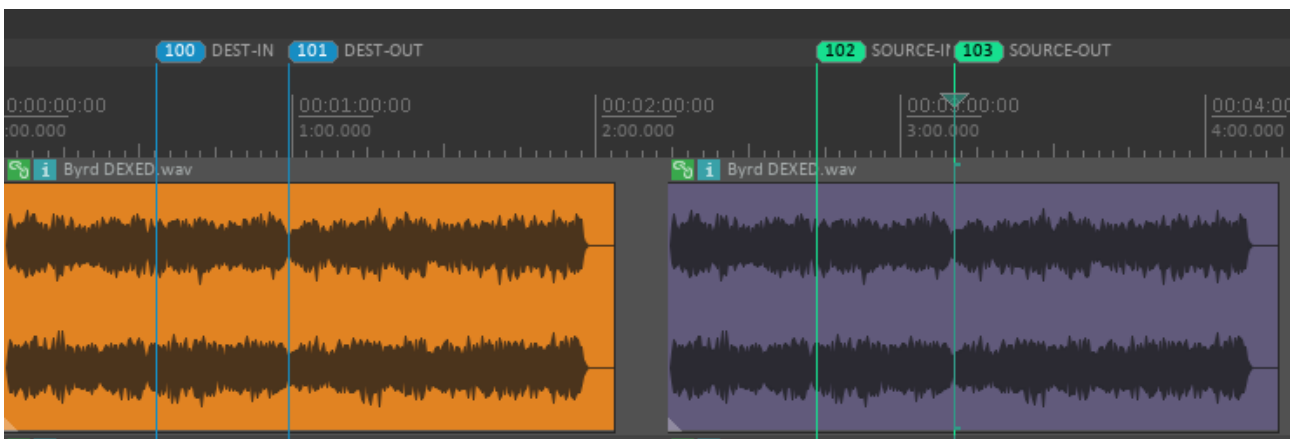Figure 7: The same project with hidden (super-collapsed) child tracks.

Figure 8: The source and destination markers in action

```
peakseuges o
no_meter_reclbl 1
tcp_heights 0 25 50 64    ; supercollapsed, collapsed, small(norecarm), recarm size
tcp_folderindent 0
```

Figure 9: Supercollapsed value should be set to 0 in rtconfig.txt

Single-window S/D editing (vertical)

You will have already prepared the audio as discussed above for vertical editing. In this setup, you will use the same source-destination shortcuts as for the single-window horizontal takes workflow (1, 2, 3, 4) and the same *ReaClassical_S-D Edit* script (5). Make sure you have the source folder selected as you are creating the source IN and OUT markers. This adds the folder number as a prefix to the source marker labels. The various functions will then use this label to know which folder to copy from. This is really useful if you undo the edit in order to tweak the markers by dragging them. It doesn't matter if you select other folders/tracks. In the event you use two different folders for the source IN and OUT markers, the functions will prefer the source IN label.

The downside to this workflow is that the source and destination markers can get in each other's way visually if the takes aren't somewhat staggered but the process still works as expected.

Using Folder tracks and hidden children

Using the shortcuts D (display children) and E (ensconce children) you can work with multi-microphone recordings with ease. See figure 7. Please note that this involves setting tcp_height supercollapsed value to 0 in rtconfig.txt inside the theme zip. See figure 9. For information on how to unpack the theme see https://youtu.be/4MD5IcVGl4I?t=347.

For your convenience, in my ReaPack repository I include the default REAPER v6 theme but with this change as well as the mute overlay alpha set to 0.00 (installed via the main ReaClassical metapackage).

Because the tracks supercollapse state is set to 0 height versus actually hiding them via the track manager, the S/D scripts continue to work as expected (because they rely on selecting the rest of the items in the group). There is also a function to duplicate folders (and their child tracks) for either recording new takes or organizing your editing environment post-recording.

Reminder: In order for this to visually look appealing, please uncheck "Draw faint peaks in folder tracks" under Appearance > Peaks/Waveforms.

3-point edits (Insert and Replace)

You can complete 3-point editing either using "insert" or "replace" methods with just the destination IN marker set (and both source markers!). "Insert" 3-point edits ripple pastes the source material at the destination IN marker and "Replace" 3-point edits replaces the destination material with the length of the material between the two source markers. As usual, short equal-power crossfades are created at all edit points.

To choose between "insert" or "replace" 3-point edits, toggle the ReaClassical_3-point edit replace.lua script to ON for "replace" and OFF "insert". Even better: use the custom classical toolbar as described above or F3 shortcut.

Insert with Timestretching

Using the *ReaClassical_Insert with timestretching* script (F4), you can complete a 4-point edit where the material between the source markers is timestretched to fit the length of time between the destination markers. This is really useful when the source material has to fit the destination span exactly, for example when working with visual cues. The timestretch algorithm used will be the one set in REAPER project settings.

Assembly Line Editing with a 3-point edit

Sometimes you don't necessarily have a best overall take and it is desirable to build the perfect performance linearly, section by section, measure by measure. In this case, use a 3-point edit (probably set to "insert"). A standard 3-point insert edit will happen and the destination IN marker will jump to the end of the pasted item, ready for the next edit. This means that in order to compile further sections, you now only need to set the source markers.

Delete With Ripple / Delete Leaving Silence

While perhaps not used as often as 3- and 4-point edits, I have created two scripts for deletion of material. Delete & Ripple (Backspace) will delete the material between source IN and OUT markers and ripple material to the right backwards with a short crossfade. Delete Silence (Ctrl+Backspace) will also delete but maintain the silence without rippling backwards.

Single-window S/D editing (vertical using razor edits)

Because of the potential for visual overlap of markers, I much prefer the REAPER razor edit functionality for vertical take work. It works a lot like the process shown in this Pyramix video:

https://www.youtube.com/watch?v=wQXwnvITQCQ

While Pyramix also has additional source-destination marker workflows, I couldn't help but feel that for professional ensembles that manage a high degree of tempo regularity between takes, this method can be extremely efficient. This isn't the document to introduce REAPER razor edits as there are plenty of resources online if you do a simple search but here we are only concerning ourselves with creation of the razor area across all our pairs and spot mics (REAPER's default shortcut is the rather uninspiring Alt+Right drag) but thankfully it can become the default editing mode by running the action Swap arrange view... or selecting it under Preferences > Editing Behaviour > Mouse Modifiers > Context: Arrange View (phew!). It's probably worth having a shortcut set up, to be honest.

Enhanced razor editing with hidden children (see "Using Folder tracks and hidden children" above)

For a perfect classical razor editing experience, v22.12.4+ uses REAPER's native media/razor track grouping feature (requires REAPER v6.72+).

NOTE: As of REAPER v6.57, you can maintain the ripple-per-track mode and set the mouse modifier for moving razor areas to "move areas, disabling ripple edit". Hopefully you set this up already as part of the "Things to do after installing" section. See figure 11. This way your existing edits ahead of the razor drag will be unaffected by any lateral movement.

OK, so now you have your area selected, simply left drag to move it on top of your destination track(s). You can control drag if you prefer to just copy. Notice that if you set up razor edit preferences as I recommended above, the finalized edits will include crossfades either side and trim material that was previously underneath. It's a carbon copy of the above Pyramix workflow. See figure 10.

Now that you've made your precise edits using S/D workflow or razor editing (no worries if it's a bit rough!), it's time to turn back on the ripple-per-track mode and check things through with a good listen and the help of the crossfade editor view.

Figure 10: Razor editing with vertically aligned takes using "hidden" child tracks in the sources

Figure 11: Mouse modifier for "Move areas, disabling ripple edit"

Crossfade Editor Mode (F)

While REAPER includes an excellent crossfade editor, it does not reach the same levels as the ones in specialist classical DAWs such as Sequoia and Pyramix. This is mainly due to the inability to see the continued waveforms of the items beyond the crossfade they enter and likewise the previous waveforms of the items that exit the crossfade[13]. The ability to visually align transients and then position the crossfade just before it is absolutely critical (and fun when you have the tools to do it!). So, beyond the standard REAPER crossfade editor what have I provided? Select the left-hand item of a fade, Press F and you are moved into crossfade editor mode. Here, the first track is given full vertical zoom, the two-lanes for overlapping items is enabled and the fade editor toolbox appears (I personally position it to hover over the middle of my mixer. Note also that you are automatically centred on the crossfade and can use the mouse wheel to zoom in and out. Press F again and you exit that mode. If for some reason you accidentally close just the fade toolbox, either open again using action in the action list or, better still, simply close and re-open the fade editor using the F shortcut.

So, now you are in the crossfade editor mode, ensuring one or both items are selected, hover your mouse over a blank area and press Z to automatically mirror extend the waveform view of each item. Essentially, it increases the overlap so you can spot and align the transient you want. My own preferred method of getting the perfect crossfade is to locate the transient I want on the red left item, place the edit cursor just before it, then drag my green right item so that the two transients align. Then I press X (classical crossfade) and I'm done! The crossfade happens at the location of the edit cursor (well, just before it as explained above). See figure 12. I love this method so much that I don't miss Sequoia or Pyramix any more. Here it is in ordered list form:

1. Increase overlap (by hovering mouse in blank area and pressing Z shortcut)

2. Find transient in red left item that you want be edit point

3. Place edit cursor just before it

4. Drag green right item to align transients (this automatically ripples all items, markers and regions)

5. Press X (classical crossfade)

In reality, this process can be just a few seconds to achieve the perfect edit. In the unlikely event you need to undo, either use the standard Ctrl+Z combination or simply extend the overlapping item edges again then create a new classical crossfade.

You can shuttle between crossfades using the Q and W shortcuts. Do **NOT** use the built-in Previous Next buttons on the standard fade dialog box! However, there is still a benefit of having the fade editor dialog in view. You can also tweak the fade using the knobs if you prefer. *Center*, *Start*, *End* and *Length* knobs are particularly useful here to maintain symmetry. Be aware that the *Contents* knobs will not ripple markers. While you could use the auditioning tools in the dialog, I have created something I find quicker and more useful.

Auditioning Crossfades

While the two items involved in the crossfade are selected, try the following:

1. Hover over left item / press A to solo audition the left item from mouse cursor to end of item

2. Hover over right item / press A to solo audition the right item from start of item to mouse cursor

3. Hover in blank space on left item side / press A to solo audition the crossfade from mouse cursor to mirrored position on the other side of the crossfade

4. Hover in blank space on right item side / press A to solo audition the crossfade from mirrored position other side to the mouse cursor

---

[13]If that made no sense and because a picture is worth a thousand words see: https://tinyurl.com/2nh7sxpb. While not the best quality image, you can see the greyed out (non-sounding) waveforms either side of the crossfade.

Figure 12: Part of the crossfade window showing two overlapping items, transients aligned, with the edit cursor at the desired crossfade location just before pressing X shortcut
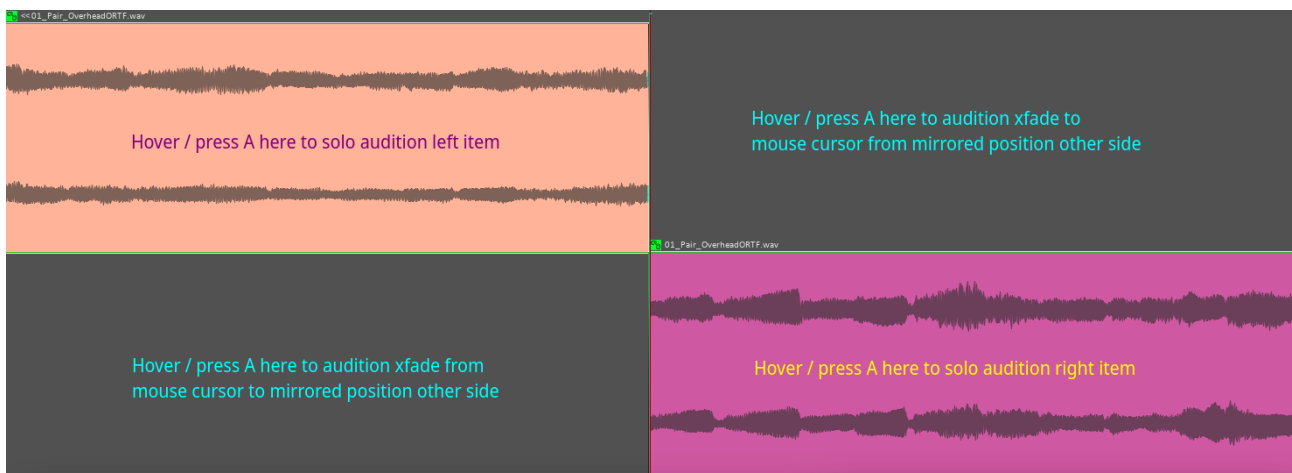
As you'll see, the playback stops using a special marker with *!1016* as the label which is executed as a "stop" command. It is deleted automatically after playback ends. If you try to run the script another time before it has finished, just select "new instance" if you get a pop-up box. You can stack instances and on completion of the latest run, all instances are removed. Better to experience than describe but it works well. You'll also see that the edit cursor returns to the middle of the crossfade to aid in mouse scroll zooming keeping the crossfade centred. The "mirrored position" takes into consideration the overlap of the items so you can have a complicated set of fades and still get an exact mirrored stopping point.

Other Editing Tips

In my key map, I include all sorts of useful shortcuts to use during editing. As mentioned above, in vertical editing workflows, the Audition (via shortcut A) is brilliant for listening to various takes before applying a razor or S/D edit. I can shuttle between items with Q and W (the same keys perform a more advanced role when in crossfade editor mode), shuttle between markers with , and . (the same keys with < and > on them on my UK keyboard), S for splitting a long recorded session into takes, ' (back tick) for zooming out to the

whole project both horizontally and vertically etc. There are plenty more for the mastering end of things so I encourage you to explore. There's no rocket science but simply reasonable single-key shortcuts for scripts and actions that are already in REAPER, SWS, or available via ReaPack. See Appendix C on page 20.

It is worth noting that all regular markers and regions are ripple edited appropriately when using my source-destination editing functions and crossfade editor. I also introduced the *ReaClassical_Lock Toggle* script (K) which temporarily locks all source groups and engages ripple-all-tracks mode to enable you to drag destination items and simultaneously ripple markers and regions in the regular arrange view. This allows vertical source groups to retain their independence yet still give ripple-all-tracks behaviour which is useful for destination album track spacing etc. However, I consider this script deprecated given I strongly feel that the Create CD Markers script is the ultimate way to deal with CD tracks/markers.

Mastering

This has the potential to be a long section but I don't want it to detract from the main event: the S/D or razor editing workflows. A few pointers are in order though. In order to have CD markers that snap to CD frames, now is a great time to enable snapping (to frame) if adding manually. I automatically add the CD/DDP markers and regions via Y shortcut (track and region names are pulled from item take names, markers/regions auto-snap to CD frames, initial 2-second pre-gap, silent roll out and album metadata also added!) . It is 'smart' in the sense that if there's no take name, no marker or region will be created. In other words, press F2 with an item selected to enter track names where markers/regions need to be created. It's perfect for classical releases where a crossfaded item is likely an internal source-destination edit versus a new track. So it's now very quick to export a DDP set, a hi-res WAV/CUE via the MPL script (shortcut C) (included in the ReaClassical resource folders, no need to use a time selection) or a BIN/CUE pair (either select 'regions define tracks' and render the whole project or select "use only # markers" and render by time selection if you don't want the first pregap as actual silence at the start of track 1). And then, of course, you can now quickly generate separate files via rendering all project regions or selected regions using a wildcard formula such as *$regionnumber - $region*. For those who insist on the absolute best resampling the world has to offer, export your WAV+CUE at highest resolution at 32-bit float and use a program like Saracon or FinalCD to get down to 44.1k/16-bit before generating the rest of your files in EZ CD Audio Converter (Windows), Fre:ac (all platforms) or similar[14]. Alternatively, you can bring a long converted 44.1/32-bit float WAV back into a cloned project not forgetting to change the sample rate of the project to match. A lot of engineers use standard TPDF dither but you can always bring your favourite 3rd-party plugin to the party (as long as it is the final plugin on your master chain and your master fader remains at unity).

I used to use the MPL function to export CUE files so I could use an external resampler (such as Saracon, RX, SoX etc) to get to 44.1/16-bit for published files and then create my DDP via a 3rd-party tool such as the DDP Mastering Tools by Andreas Ruge[15]. Now that r8brain free has been introduced as the best quality resampler available in REAPER (I highly recommend double-checking that it is selected when resampling at render time) I feel I can do everything, including DDP[16] creation, without leaving my favourite DAW.

You will hopefully notice I have included various shortcuts for manually creating regions (single or multiple) from items and time selection. Also worth noting is that you can still do some (or all!) of your source-destination editing with your track markers in place as the S/D markers have IDs far higher than any classical CD would have and are automatically deleted after a successful edit. As long as you have your ripple-per-track mode engaged, all your existing marker placements and carefully crafted edits will remain intact.

Not necessarily obvious to new REAPER users are the special =START and =END markers (make your markers in the usual way and label them accordingly) that constrain the length of the project. Rather than rely on extended silence at the end of items or time selections, the =END marker is a great way to ensure you have the exact amount of lead-out you want at the end of the disc. Positioning both special markers is great way to generate files for multi-disc releases without having to rely on multiple projects.

---

[14]I've heard it's best to generate all your lossy files from the 44.1/16-bit in order to maintain some quality control over the process.

[15]http://ddp.andreasruge.de/

[16]At least in 2022, people, me included, still seem to find value in having a physical classical disc to hand with accompanying booklet and beautiful artwork.

Figure 13: RCInflator in all its generic JSFX glory

In terms of loudness, I personally aim for about -18 LUFS Integrated for my classical albums though it can be as high as -16 LUFS and as low as -20 LUFS. The new loudness JSFX meter in REAPER along with the normalization of loudness and true-peak limiting in the render dialog are priceless. It's another reason I couldn't go back to the big classical DAWs at this point.

Under prerequisites, I included the optional RCInflator[17] (See figure 13) which is a clone of the Sonnox Inflator that I had a hand in bringing into this world with its current capabilities of being able to null test, almost perfectly, against the Sonnox version[18]. I have a soft spot for it on a master but, again, there are plenty of guides on how best to use it in production. More recently, I have introduced collections of jsfx effects that are 'mastering grade' quality which are again available in my ReaPack respository by searching for 'ReaClassical'.

Closing thoughts

I hope you enjoy the ability to do serious classical editing on REAPER and that my efforts go some way to making things better, easier and more efficient. If you find any oddities with the scripts, please add your thoughts to the dedicated thread on the forums and/or create an issue or start a discussion on my Github repository located at https://github.com/chmaha/ReaClassical. I'm very happy to hear about potential improvements/additions.

Thanks

I am appreciative of the collective contributions of the REAPER community with regards the early source-destination actions (Pelleke, in particular), MPL, X-Raym, BirdBird, RCJacH, Sai'ke, Meo-Ada Mespotine, cfillion and many more. Finally, many thanks to Justin and Schwa for such an amazingly versatile DAW.

---

[17]I was the OP on the thread https://forum.cockos.com/showthread.php?t=256286 as well as producing various files to aid in the nulling of the two plugins. I also matched the default values and ranges to those of the Sonnox but otherwise had no hand in the actual coding of the plugin.

[18]To the tune of differences down at -144dB or something similar.

Appendix A: Descriptions of ReaClassical Scripts (in a quasi-workflow order)

Preliminary Note: I include the default shortcut keys if using my portable install or resource folder base. You can also use the custom toolbar via the mouse.

Create Folder (F7)

Description: A quick way to create a folder group with as many tracks as you need.

Notes: Use on a completely empty project. I would use this if you are planning to use a horizontal approach to source-destination editing (i.e. the various takes are laid out from left to right) or if you want a quick way to set up a mixing/mastering track set with a single take. The script automatically sets up the tracks for group media and razor-editing.

Create Source Groups (vertical) (F8)

Description: A multi-use script to 1) set up destination and source groups with as many tracks as you need, 2) to create source groups from an existing destination folder group (for example, created with F7 shortcut) and, for in the middle of editing, 3) to sync routing and fx between destination (the top folder) and source groups.

Notes: Whether you start with an empty project or use an existing folder group, the end result will be the same. Folders and tracks grouped according to pan, mute, editing, phase, trim and fader. So, for example, the second track of each group will all respond to a fader movement. This is essential for being able to audition different source groups with the same settings. Note also that running the script engages an intelligent mixer view where only the soloed group is shown in the mixer. You can see this in action by using the Audition (A) script which auditions audio at the mouse cursor. Watch as the mixer view changes which tracks are visible.

Hide and Show child tracks (D and E)

Description: Hide child tracks to save screen estate and for working with multi-channel takes as if working with just stereo.

Notes: Select a folder track and press D to hide the children or E to show them. All S-D and razor editing functions work perfectly while folder groups are collapsed. This recreates a popular way of working with classical music takes in Pyramix.

Classical Take Record (F9)

Description: A one-button shortcut for stopping and starting recording of takes.

Notes: To use, highlight a folder, position the edit cursor and press F9. Press again to stop the recording. To immediately start a new take, simply press F9 again. Note that the next folder is selected and that the cursor returns to the original position for easy lining up of takes. If you run out of source groups, the script will automatically create a new one.

Duplicate Folder (no items) (\)

Description: Create a duplicate without media items of the highlighted folder.

Notes: Now that Classical Take Record (F9) automatically creates new folders if needed, this script does not need to be used when recording material. However, if importing pre-recorded takes and you need more source groups to accommodate the material, this is still very useful.

Audition (A)

Description: Mouse-driven auditioning of folders or individual tracks that uses intelligent mixer views.

Notes: Simply hover the mouse over an area of the project and press A to begin auditioning the audio. Hover over a folder track to hear the complete mix or a single track within a folder for listening to individual instrument or sections. Again, it is good to note that when auditioning begins, the mixer updates intelligently, decluttering the view for ease of meter monitoring etc.

Whole Project View (')

Description: Zoom toggle to show the whole project horizontally and vertically.

Notes: Very useful for a birdseye view of your project so you can navigate to another section. If there are multiple folders, the script collapses them. If fewer than two folders, the script respects the current folder view.

Prepare Takes (T)

Description: Intelligently prepares recorded or imported takes for source-destination editing.

Notes: With a single folder group (or individual tracks), the shortcut will auto-color and group takes from left to right. With a vertical workflow consisting of a destination group and multiple source groups, the script will auto-color top to bottom and group folder items left to right. Essentially in either setup, takes are given different colors and all items associated with a take grouped for editing. If you don't like the colors, run the script again until you are happy! WARNING: After you have started making S-D edits, it is advisable not to use the script afterwards as strange grouping can occur due to existing crossfades. In a future version of the script, there will be a guard against this. The script also allows for takes that don't start or end exactly at the same time (this can happen if you receive pre-edited materials). The end result is if you drag one item of a take group, every other item will move in sync.

Source-Destination Markers (1, 2, 3, 4)

Description: Add source-destination markers ready for making the edit.

Notes: 1,2 = destination IN/OUT; 3,4 = Source IN/OUT. Inbetween the destination markers is where the edit will actually happen. Inbetween the source markers is where the material is taken from. Use all four markers for 4-point editing. Use destination IN and both source markers for 3-point editing. Very important and useful to note is that the source marker labels reflect which source group was highlighted when the markers were placed. In other words, to create source markers, first select the item in the chosen folder track and then use the 3 & 4 shortcuts. This means that when the actual edit is made (using shortcut 5) it doesn't matter what is highlighted at the time. Obviously this is only useful if using a vertical take system approach.

3-point insert/replace (F3)

Description: Toggle between *insert* and *replace* modes for 3-point editing.

Notes: When using a destination IN marker and both source markers the material between the source markers is either inserted (rippling all material to the right of the edit point) or replaced (no rippling). To make any source-destination edit (3- or 4-point) use shortcut 5.

S-D Edit (5)

Description: Make the source-destination edit (3- and 4-point editing)

Notes: Once you have placed your S-D markers (either all 4 or just destination IN and both source markers) press shortcut 5 to make the edit. Whatever the number of markers you used, the edit will be crossfaded using a short equal power fade (you can change this in REAPER options under *Media Item Defaults*) and when using 4 markers, the S-D markers removed ready for the next edit. When using 3 markers, the destination IN marker is retained and moved to the end of the edit so you can do assembly-style editing with ease (with 3-point mode set to *Insert*). The edits are perfectly crossfaded and the user only needs to focus on the selection of source material. For any S-D edit you can, of course, undo the action and return to the previous state.

Insert with Timestretching (F4)

Description: Makes the source material fit the the space in between the destination markers using time-stretching vs rippling later material.

Notes: Requires placing all four S-D markers. This is less useful for classical music editing but perhaps very useful for video work where replacement material has to fit exactly into the time used by the original.

Delete with Ripple (Backspace)

Description: Deletes material between the source markers, rippling all later material.

Notes: This only affects the folder group that was highlighted when the source markers were placed which will almost always be the destination group (the top folder in the project).

Delete Leaving Silence (Ctrl + Backspace)

Description: Deletes material between the source markers, no rippling of later material.

Notes: This is similar to *Delete with Ripple* but instead leaves a gap where the original source material existed.

Delete all S-D Markers (Ctrl + Del)

Description: Deletes source and destination markers.

Notes: Useful if you want to abandon a S-D edit, however, there's also no problem leaving the markers for another time given that shortcuts 1-4 replace any existing version of the marker. Also when running *Create CD Markers* script all markers are deleted in any case.

Classical Crossfade Editor (F)

Description: Opens a custom two-line crossfade editor view for precise finessing of S-D edits.

Notes: To enter the crossfade view, select the lefthand item of a crossfaded item pair. The user is then presented with a zoomed-in view of the edit. Red is always the left item, green the right. For safety reasons, all items from the left red item to the beginning of the project are locked to avoid inadvertently messing with an existing fade. To immediately audition, use the A shortcut in one of four areas. Hover the mouse in either of the blank areas (no media item) in the top left or bottom right of the view to audition the script from that location to the mirrored location on the other side of the edit. Note how easy it is to quickly set an audition length! Or, hover the mouse on the first item and press A to just audition the material into the fade. Hover and press A on the outgoing item to only hear the material out of the fade.

NEW: To actually finesse the edit, ensure at least one of the crossfaded items is selected. Then hover your mouse in a blank area (similar to the above fade editor audition tool process) and press Z. You'll notice that the waves mirror extend to the mouse position to allow for easy lining up of the material. Place the edit cursor at an appropriate edit point on the left red item (i.e. just before a transient) then simply move the right green item to align and then press X. Audition again, Z to expand again. You can quickly move to the previous or next item (with all coloring and locking automatically happening behind the scenes) by pressing Q or W. Or, simply press F to exit the fade view (it goes without saying that the original colors of the project items are restored).

Note also that while in crossfade editor view any edits usefully only affect the destination group.

Edit Classical Crossfade (Z)

Description: Expand the crossfade for editing while in the crossfade editor view.

Notes: This shortcut will only work while in crossfade editor view. If you attempt to use it in other situations, you will receive a helpful message. As described above, when either one or both items are highlighted, hover your mouse in a blank area and press Z . You'll notice that the waveforms are mirror extended to allow for easy lining up of the material. Simply put the edit cursor just before a transient on the red item, move the green right item to align, and then press X.

Classical Crossfade (X)

Description: Create a 'classical' crossfade either in regular project view or crossfade editor mode.

Notes: While in the project view, drag an item (or grouped items) over another, move the edit cursor where you want the edit to happen and press X. Given the availability of S-D edit functionality and group razor-editing, this script is less useful in this context. However, it is essential in the crossfade editor mode for making the edit.

Create CD Markers (Y)

Description: Auto-generation of CD/DDP markers and UPC/ISRC codes for efficient DDP, bin/cue and individual file exporting.

Notes: This might be the biggest time-saving script in the ReaClassical system. It works as follows: 1) Edit gaps between items until you are happy 2) Add take names only to items that will become CD track starts 3) Run the script via shortcut Y and you will be asked to enter various information including UPC/ISRC (optional) and CD metadata. Done! Note that ISRC codes are auto-generated per track based on the numbers you enter.

You can add audio to the initial pregap (easter egg track) by not giving the first item (or crossfaded items) a take name. The script will assume that this is supposed to be hidden and generate the initial pregap length accordingly. All album metadata is placed just after the final item and inside a 7-second rollout (so that CD players in cars don't immediately cycle back to the first track without a little breathing room). In addition to markers, regions are also generated for easy exporting of individual tracks. If you need a countdown into a track, simply add a ! marker at the required spot. It is worth repeating at this point that you should only give names to items that are track starts. If you skip an item, the script rightly assumes it is part of the previous track.

I feel that once you try this CD/DDP marker generation workflow, it is difficult to ever go back to other ways of working. The key thing to think about is that the markers are trivially easy to recreate if you change a gap between items or even rearrange the order of tracks. Just run the script again. The key is the workflow: all marker generation is automatically based on item positioning and naming. Plus, all metadata and ISRC is saved into the project file so once entered you don't have to ever type it in again unless you need to make changes.

Hopefully you agree that this way of working with CD/DDP layout is a game-changer, a real time-saver and simply a better way of thinking about this portion of the mastering process.

Lock Toggle (K)

Description: Lock every source group (leaving the destination group free for editing in ripple-all mode)

Notes: This script is a candidate for deprecation but I will leave in place for now. It was useful before the new *Create CD Markers* script came into being as a way to engage ripple-all mode without disturbing source group items, thereby allowing moving of destination material along with CD markers in the final stages of the mastering process. There is no doubt that I much prefer working with the newer script. At the very least, the lock button on the custom toolbar will likely be replaced by a *Create CD Markers* action at some point.

Appendix B: ReaClassical Keyboard Shortcuts

Navigation

Home	Project Start
End	Project End
'	Whole Project View
Q	Previous Item / previous crossfade (when in crossfade editor view)
W	Next Item / next crossfade (when in crossfade editor view)
,	Previous Marker
.	Next Marker
TAB	Move to item peak value (SWS)

Folder & Source Group Preparation

F7	Create Folder (prompts for number of tracks)
F8	Create Source Groups (vertical)(from scratch or from existing folder) / Sync Routing/FX
\	Duplicate Folder (no items)

Recording & Take Management

F9	Classical Take Record
T	Prepare Takes

Editing

A	Audition (folder or track) at mouse position
D	Display child tracks
E	Ensconce (hide) child tracks
S	Split item
J	Join (glue) item
G	Group items
U	Ungroup items
I	Swap marquee and razor edit modifiers
F	Open ReaClassical Fade Editor
X	Create a classical crossfade
Z	Extent crossfaded items for editing (when in ReaClassical Fade Editor view)
K	Lock Toggle
V	Toggle per-track ripple editing

S-D Editing

1	Add Destination IN marker
2	Add Destination OUT marker (without does 3-point edit)

3	Add Source IN marker
4	Add Source OUT marker
5	Make S/D Edit
ctrl+Del	Delete all S-D Markers
bksp	Delete with ripple (between 2 source markers)
ctrl+bksp	Delete Leaving Silence (between 2 source markers)
F3	3-point Insert/Replace toggle
F4	Insert with time-stretching (All 4 S-D markers)

Mastering

Y	Automatically generate DDP markers from items
M	Add Marker
N	Add/Edit Marker...
L	Marker List (SWS)
;	Regions from items (SWS)
'	Region from items
#	Region from selection
/	Selection to item(s)
C	Generate CUE from project CD markers
R	Render

Miscellaneous

H	Open ReaClassical help system (currently the PDF guide)
O	Options (Preferences)
P	Project Settings
B	Batch file converter
Ctrl+U	Check for REAPER updates (using REAPER update utility lua)

Appendix C: Recommended cross-platform free mastering-grade plugins for classical work

First stop: Reaplugs, with particular mention of *ReaLimit* which I consider one of the best free transparent limiter available. You could easily mix and master a whole album using only these fine plugins. Others include:

EQ:

- **RCEQ** (ReaClassical EQ, available in ReaPack via my repository). Uses DSP from airwindows 'Baxandall' and Stillwell's RBJ Highpass/Lowpass Filters for broad-strokes EQing.

- **ReEQ** https://forum.cockos.com/showthread.php?t=213501. An amazing Fabfilter Pro-Q clone for detailed EQ work. Also comes with ReSpectrum which is an excellent analyzer.

Compression:

- **RCComp** (ReaClassical compressor, available in my repository). Uses DSP from Express Bus Compressor by Stillwell. Default settings and ranges tuned to classical music with auto release. Use as an insert.

- **RCParallelK** (ReaClassical parallel 'Katz' compressor, available in my repository). Also uses DSP from Express Bus Compressor by Stillwell to recreate the Bob Katz 'transparent' parallel compression settings. There's only a make-up gain slider as everything else is baked in (-50dB threshold, 2.5:1 ratio, 1ms attack, peak detection mode). Use on a compressor bus and adjust gain slider to taste (with the compressor signal somewhere between -15dB and -5dB lower than dry signal according to Katz).

Limiter:

- **RCLimiter** (ReaClassical limiter, available in my repository). Uses DSP from Smooth Limiter by Geraint Luff with added 4x oversampling code. Defaults are tuned to classical music with true-peak and lookahead functionality. Adjust the release to taste.

Reverb:

- **Convolution:** Convology XT (also runs perfectly at time of writing via yabridge on Linux) coupled with the Samplicity Bricasti M7 impulses. There are other free convolution plugins to use but, whatever the plugin choice, the Bricasti impulses in true stereo are fantastic and sound almost identical to the presets of the well-regarded Liquidsonics Seventh Heaven Professional.

- **Algorithmic:** For free and open source options try my RCVerb or Enover which uses zita-rev1 DSP. For paid options, ValhallaDSP Room and Vintage Verb, Fabfilter Pro-R, Voxengo Sobor, Acon Digital Verberate 2 and Sonible smart:reverb are all excellent non-ilok options for classical music and work seamlessly via yabridge on Linux. Note that the Liquidsonics offerings do not require a physical iLok so can also be used on Linux via yabridge and iLok Cloud activation if you are feeling brave.

Restoration:

- **Bertom Denoiser Classic**https://www.bertomaudio.com/. **Denoiser Pro** ($25) allows for individual per-band thresholds and includes an adaptive mode.

- **RCDeEss Standard** (ReaClassical de-esser, available in my repository). Uses DSP from airwindows DeEss.

- **RCDeEss Advanced** (ReaClassical advanced de-esser, available in my repository). Uses DSP from airwindows DeBess.

Utilities:

- **RCGain** (ReaClassical gain plugin, available in my repository). Uses DSP from airwindows PurestGain. Useful before or after plugins in lieu of a native channel trim knob.

- **JS Loudness Meter Peak/RMS/LUFS** (Cockos) (included with REAPER).

- **RCDither** (ReaClassical dither plugin, available in my repository). Uses DSP from airwindows Not-Just-Another-Dither (Monitoring version) here called *Avant-garde*. This just might be the world's finest dither. There's a dropdown to select between 16-bit and 24-bit.

Other free Mastering-grade Plugins

- **Orpheus** (ReaClassical analog console emulation, available in my repository as six plugins and a project template). Uses DSP from airwindows Console8. Basically, put the channel ones on every regular channel, the Sub|Aux pair on any aux sends or submixes, and the Bus pair on your final stereo bus. Add any and all plugins in between the pair and gainstage as you would on an analog console. Follow the golden rules: 1) All Channels and AUX must route to a Submix, 2) All submixes must route to the final stereo bus, and 3) Gainstage using Orpheus Out faders (and other gain controls inside the pair) keeping REAPER faders at unity. The point, I think, is to build up a chain of pairs so that the analog goodness accumulates (much like with a real analog console). It is also more complicated to explain than do in practice. If in doubt, use the project template!

- **Eurydice** (ReaClassical digital console + project template, available in my repository). Uses DSP from airwindows PurestConsole2. No controls. Place Eurydice Channel at the end of every channel and Eurydice Bus at the start of every bus. Then add a Eurydice channel at the end of each bus and a Eurydice bus at the start of the final 2-bus. The idea is for things to encode then decode so Channel >> Bus >> Channel >> Bus. Keep all REAPER faders at unity and use RCGain or similar to gain-stage. The more tracks summing to one place, the bigger the effect although it will probably still be subtle.

- **Cora** (aka Persephone, continuing with the Greek myth theme) (ReaClassical analog stage, available in my repository) is like putting your audio through the optimal analog circuitry. DSP is from airwindows Interstage. It uses interleaved IIR and slew limiting. It's subtle and you can place wherever you like, even multiple copies throughout your project.

- **Supersonic** (ReaClassical supersonic filter, available in my repository). Uses DSP from airwindows Hypersonic, Ultrasonic, Ultrasonic Medium and Ultrasonic Lite all rolled into the one plugin. Place anywhere in your project and what comes next will be free of nonlinearities (aka aliasing be gone!). Useful by itself or in combination with the console systems.

- **MagicFairyDust** (ReaClassical analog console flavour and drive, available in my repository). Uses DSP from airwindows Channel9. Essentially you get three types of analog console that resemble Neve, API and SSL consoles with a saturation drive to give you more of the analog feel. If using Orpheus in your setup, place after the final Bus Out plugin.

- **Lyra** (ReaClassical 'glue' compressor, available in my repository). Uses DSP from airwindows ButterComp2. It's an ultra-smooth four-interleaved-compressors-in-one / loudness range (LRA) reducer. I think it's one of the best 'glue' compressors for the final stereo bus for soundtracks and other "hybrid" classical sounds.

- **Pascal** (ReaClassical compressor, available in my repository). Uses DSP from airwindows Pressure5. It's hard to describe (especially the PawClaw and Mewiness controls) so best to experiment and use your ears.

- **Oxonia** (ReaClassical SSL-style compressor, available in my repository). Uses DSP from airwindows Logical4. Acts like a hardware final 2-bus compressor. Note that with appropriate settings it can be totally transparent but can also be made to do some strange things.

- **Magnétique** (ReaClassical tape emulation, available in my repository). Uses DSP from airwindows ToTape6. Add an instance to every audio channel or just to the final stereo bus for a more subtle effect. Flutter is set to 0 by default for mastering purposes.

- **Sillons** (ReaClassical vinyl emulation, available in my repository). Uses DSP from airwindows ToVinyl4. Perhaps useful for hearing how your master would sound on Vinyl or perhaps as a post-production effect.

- **MuTube** (ReaClassical Vari-mu compressor, available in my repository). Uses DSP from airwindows VariMu. A vari-mu compressor that competes with a hardware box (apparently).

- **Port-and-Lemon** (ReaClassical combined compressor and gate, available in my repository). Uses DSP from airwindows 'dynamics'. A combined compressor (compress = squeeze = lemon) and gate (= port). A perfect *cocktail* for controlling your mix.

- **Titan** (ReaClassical capacitor simulation, available in my repository). Named after Barium Titanate ($BaTiO_3$) which is apparently the material basis for a particular line of Murata capacitors. The plugin uses DSP from airwindows Capacitor2. Analog goodness based on the way real capacitors work. The Non-linearity slider allows subtle to extreme distortion.

- **Aurora** (ReaClassical treble energy retro vibe, available in my repository). Named after the goddess of the dawn and the polar lights. Uses DSP from airwindows "Dubly" but I changed the label of the slider to give more of a descriptive flavor as well as make it a percentage (one tires of 0-to-1 after a while). Adjust the Ionization slider to taste. 50% is a good starting point for a subtle retro effect. Keep pushing it and you get more excitement in the atmosphere.

- **Eris** (ReaClassical focussed distortion, available in my repository). Named after the goddess of discord, Eris is your ticket to five airwindows distortion algorithms: Density, Drive, Spiral, Mojo and Dyno. But because it is using DSP from airwindows "Focus", the idea is that it uses Fletcher Munson loudness curves to help you limit the distortion to the most sensitive parts of the spectrum via the Focus slider (if you want to). Push the distortion with the Boost slider. With the Output slider at 0, you can hear which sounds are getting through either side of the Focus curve and it allows you to automate and bring in the distortion or do a static mix to taste. An overall dry/wet slider rounds off the set. A veritable toy chest of distortion from subtle to obvious so definitely give it a whirl.

- **ELSA: Extremely Light Saturation Applier** (ReaClassical saturator, available in my repository). Uses DSP from airwindows PurestDrive. Extremely subtle even at 100% with saturation down 20dB from the original signal. A pleasing side effect of the plugin is to nicely round high frequency input from microphones. In addition to subtle saturation, you could therefore also try this before reaching for your usual low-pass filter.

- **SAW: Seriously Amazing Widener** (ReaClassical stereo widener, available in my repository). Uses DSP from airwindows Srsly2. A take on the Hughes SRS Widener hardware box.

- **More Dithers** (all available in my ReaPack repo):

  - **Six-Dither Sid** (6 dithers in one!). Avant-garde (from RCDither), Twilight and Nintendo. Uses DSP from airwindows monitoring 1,2 & 3. Nintendo is particularly good when using Orpheus for a console mix/master.

  - **Xonnos** (3 dithers in one). For those wanting more dithers (who doesn't?), I present Xonnos dither (no prizes for guessing how I came up with the name). It's three airwindows "Paul" dithers rolled into one jsfx. But, there's something that doesn't exist in airwindows world: a 16-bit version of DoublePaul (here called Xonnos Double). This is for anyone who loves regular triangular dither but wants something recommended by Paul Frindle of Sony Oxford / SSL fame: single-pole high-pass dither. "Single" is as described by Paul, "double" is similar but noise profile pushed even higher as enjoyed by a mastering engineer who goes by the name of "Bob" (apparently). "Wide" works by making the random noise statistically more likely to be heard on the sides (thereby avoiding noise that threatens to be mono).

  - **Stan** (using DSP from airwindows StudioTan)

  - **ReelDither** (a noise floor with the sound of reel-to-reel)

  - **GroovyDither** (a noise floor with the the sound of vinyl crackle)

  - **WTFDither** (Wipe-The-Floor!) which is a standard triangular dither.

  - Standalone versions of Twilight and Nintendo