Protocol for Synthesizing Audio Examples

Draft, July 30th – Walker Williams

**Required Software:**

1. **For all audio examples:**
   1. Sibelius Ultimate (<https://www.avid.com/sibelius)>

*NB: For batch-process exporting of MIDI, PDF, and/or XML files, the “Export Audio Score and Parts” plug-in is recommended. It can be installed through the “File” tab in Sibelius.*

1. **For audio examples to be rendered with East West Libraries:**
   1. Logic Pro X (<https://www.apple.com/ca/logic-pro)>, or any other profeccional DAW (such as Ableton, etc.)
   2. EastWest ComposerCloud (<http://www.soundsonline.com/composercloud>) or access to the following EastWest Libraries individually:
      1. EW Goliath
      2. EW Pianos Steinway Gold D
      3. EW Solo Violin
      4. EW Symphonic Choirs Gold\*
      5. EW Symphonic Orchestra Gold Complete
      6. EW Voices of Opera\*

\*These are for the vocal/choral examples, which may not be possible. This list may expand if I find more instruments that are needed -w

**Generating an Audio and/or MIDI File with Sibelius:**

*These steps are necessary for generating either Sibelius Sounds or East West Libraries audio examples.*

NB: **Editorial additions must be completed before generating audio!** It is recommended to do both editorial additions and audio generation at the same time.

1. Access the Google Drive folder containing the final edited Sibelius files “RDS Archive/RDS Examples/RDS Edited Files” and **download a copy of the Sibelius file** for the example to be synthesized, and open the file with Sibelius Ultimate
2. **Special Considerations:**

*Sibelius will play back nearly all examples accurately by default, however there are certain cases where the Sibelius file will have to be modified in order to play back correctly.*

NB: Many of these modifications will change the appearance of the Sibelius file, so in cases with special considerations make **two copies of the Sibelius file**: one with only the editorial additions (which will not play back correctly), and another with the special additions (which will play back correctly, but **should not be used for any purpose other than audio**).

* 1. Non-existent dynamics:

If specific dynamics for a part do not exist (either no dynamic is notated, as is common in vocal parts, or the previous dynamic is ambiguous, such

as a crescendo), these should be added based on whatever information is

available to ensure proper balance of parts. If these are made invisible, they will not affect the XML or PDF.

* 1. Instrument Choice:

Ensure that the correct instrument is selected for each track. Likely errors include mistaking string section instrument for string solo instruments, or vice versa. Some uncommon instruments may also have been input as standard instruments with manually changed names.

* 1. Special Trills:

Trills with an accidental attached will likely not play back correctly. To ensure a trill plays correctly in Sibelius, open the **information** window for the trill and manually adjust ‘number of semitones’ as necessary.

* 1. String Harmonics:

String harmonics notated with a ° (degree symbol) over the notehead should play correctly. Harmonics notated with a second diamond notehead (including touch-4 or touch-5 harmonics) will **not** play back correctly. There is a sibelius plug-in that will cause the harmonics to play at the correct pitch, but it will not necessarily ensure that the ‘harmonic’ sound is used. The Sibelius Sounds solo string instruments do not have harmonics as an option, so for chamber works, the instrument will need to be switched from the (solo) instrument to the section instrument before each harmonic, and back to the (solo) afterwards.

* 1. Percussion or Non-Standard Instruments:

Depending on how the Sibelius file was transcribed, some percussion

parts or parts for non-standard instruments may not play correctly.

Assuming the Sibelius Sounds have the necessary instruments available,

this is simply a matter of doing an **instrument change** to the correct

instrument.

NB: Ondes Martenot should be played with the **Theremin** instrument, **not** the Ondes Martenot instrument.

For multi-line percussion, it may be necessary to go into Edit Instruments > Edit Instrument… > Edit Staff Type… and change the sounds associated with individual lines on the staff

* 1. Mallet percussion octave:

For examples with octave-transposing mallet percussion (glock, xylophone, crotales, and including celesta), especially in the examples by Schönberg, the accuracy of octave should be double-checked.

* 1. Glissandi:
     1. Sibelius provides several playback options for glissandi, available in the information panel for the glissando line object. The “continuous” option should not be used, even when a continuous glissando is how a human performer would play the passage. “Chromatic” is usually the best option; while somewhat inaccurate, the playback is significantly better than the “continuous” option. For piano glisses, the “white notes” option should be used. For harp glisses, the notes will have to be manually added as a tuplet fitting all the necessary notes into the duration of the glissando.
  2. Gradual tempo change:

If the examples includes any gradual tempo changes (rit., accel., rubato, etc.), there should be a “yes” and explanation in the “Tempo Changes?” column of the Audio Spreadsheet. Export a second version of the audio with the playback of the tempo changes turned off (so that the playback is at a constant tempo, or includes only notated, abrupt tempo changes). This audio file should be uploaded to the appropriate sub-folder of the “Constant Tempo Audio Files” folder in the Google Drive (currently in “RA folders/Walker”).

1. **Ensure that the master volume track in Sibelius is set to 0.0 dB** by pressing M to bring up the mixer, and double click on the slider labelled “MASTER” on the far left. (Some of the Sibelius files have had the master volume adjusted to 0 and will produce no sound on playback or export)
2. **“Proofread” the Sibelius file against the Naxos recording**: listen to the Excerpted Naxos Audio Clip and compare it to the Sibelius playback. There are several types of errors that are particularly likely to go unnoticed until this step, including:
   1. Missing technique indications (mutes, pizzicato, col legno, etc.)
   2. Incorrectly transposing instruments
   3. Wrong instruments (usually involving translation errors from non-english scores)
   4. Incorrect octave transposition
   5. Playback of accidentals that only apply to the immediately following note

Any errors should have been caught during the editorial additions phase, but if errors are found, they will need to be fixed in the master file as well as in the audio. Consult the protocol document for editorial additions (located on Github).

***If the file is to be rendered with Sibelius Sounds:***

1. **Export an audio file** using the following parameters:

*NB: This can be batch-handled with the “Export Audio Score and Parts” plug-in, but it will default to .aiff files on mac computers and it occasionally crashes. I’ve made some adjustments to the code and can use this fairly reliably, but I’m not sure how to move the edited plug-in to another computer. Unless a large number of files need to be processed at once by someone other than me, it’s probably not worth the hassle -ww.*

* 1. Configuration: Sibelius 7 sounds
  2. Playback line: Export from start
  3. Filename: default value (this will be the same filename as the Sibelius file, ending .wav instead of .sib)
  4. **Format WAV** (Sibelius will default to MP3 every time the application is opened)
  5. Bit depth: 16-bit
  6. Sample rate: 44.1 kHz

**Make sure to select the destination folder each time you export an audio file,** it will reset to a default location each time you open a new file.

**Make sure to click the “Export” button**, selecting a destination folder will not save the file, unlike in the MIDI export menu.

*The Sibelius sounds can be used to quickly and easily create synthesized audio examples. The quality of performance is significantly better than general MIDI, but not as good as the results obtained by using the EastWest libraries.*

***If the file is to be rendered with East West Libraries:***

1. **Export the file as MIDI** using the following parameters:

*NB: This can be quite easily batch-handled with the “Export Folder of Scores in Multiple Formats” plug-in.*

* 1. Playback device: General MIDI
  2. MIDI file type: 1
  3. Tick Resolution: 960 PPQN
  4. Export pick-up bars as full bars padded with rests: true

*The EastWest libraries allow for a much more realistic final audio file, but require much more work to render, as well as the additional software.*

1. **Save the edited Sibelius file to an archive location**
2. **Update the Audio Spreadsheet:**
   1. Sibelius audio: ‘yes’
   2. Audio status: ‘Sibelius Audio Complete’

**Generating an Audio File with the East West Libraries:**

*The remaining steps are only necessary for examples to be rendered with East West Libraries. All necessary steps for the Sibelius Sounds file generation have been covered above.*

**Importing the MIDI File into Logic and Setting up the Synthesis:**

1. Open the MIDI file (created in step 8 of “Generating an Audio and/or MIDI File with Sibelius”) with Logic Pro X
2. Delete track 1, which will default to “Steinway Grand Piano” and only contains the MIDI filename, as well as any instrument tracks which contain no notes
3. Move the project end marker to a location approximately 5 seconds after the last note release of the example
4. For each instrument track, change the instrument slot from the Logic default to “Au Instruments > East West > Play > Stereo”
   1. Any audio effect slots activated by default should be deactivated, this may include EQ or other effects depending on which instrument Logic has selected as the default for that track
5. Within each track open the “Play” instrument and select and load the necessary instrument samples\*

\*Which exact samples need to be loaded will depend on the specific example, eg. if the violin instrument contains staccato notes the solo violin Staccato or Spicatto instrument will need to be loaded, but if it only contains legato notes, these will not be needed. If necessary, I can put together a table of which specific samples I’m using where, but these may vary from one example to the next depending on what sounds better in that context. All of that information will be saved individually in each Logic file, though. –ww

**Fine-Tuning the Performance in Logic:**

A lot of this is quite subjective, and involves trying various options which may not be the same from one example to the next. Musicality is enhanced by choosing which samples to use for which articulations/notes, adjusting velocity values, automating the expression and/or modulation data, and adjusting volume and pan to get a balanced mix.

An important step in here is “proofreading” against the Naxos audio of the example, which is especially valuable if the same person is not doing both the Sibelius and East-West examples.

The Logic files can be saved with all this intact, so if the Logic files are made available along with the final audio files, anyone with Logic can open these to see or adjust exactly what was done for a given example. –ww

**Troubleshooting specific issues with EW libraries**:

See the ‘Troubleshooting Audio Synthesis Issues’ document on Github.

**Exporting the Final Audio Example:**

1. Adjust the master volume slider to ensure the audio does not overload (clip)
2. Bounce the project with the following settings:
   1. Destination: PCM
   2. **File Format: Wave**
   3. Resolution: 24 bit
   4. Sample Rate: 44100
   5. File Type: Interleaved
   6. Dithering: None
   7. Ensure the **start** and **end** are set to the project start and project end locations (this may not be the case by default)
   8. Include Audio Tail: False
   9. **Normalize: Overload Protection Only**
3. **If the example has any gradual tempo changes** (rit., accel, etc.), also bounce and archive a copy of the audio with those changes removed, so that the piece plays back at a constant tempo of whatever the initial tempo indication is.
4. **Save the Logic file** (as a package) to an archive location

**Synthesizing Vocal Examples with the East West Libraries:**

*These instructions are meant solely for synthesizing the Voice aspect of Vocal Examples, all other audio in each example should be rendered using the above East West protocol.*

* + - 1. Follow steps 1-5 of “**Importing the MIDI File into Logic and Setting up the Synthesis”** (above) to properly import a MIDI file into your DAW and begin assigning instrument patches to their respective part.

1. As was decided upon earlier in the project, vocal examples will not be rendered using the voice patches, as they are all too unrealistic. To choose an appropriate instrument, listen to the Naxos recording (especially to the timbral quality / balance between voice + the rest of the ensemble) and choose an instrument patch that matches as close as possible with the qualities gleaned from the recording. \*

\* As before, this process is quite subjective. Often, instrument patches will resemble the timbre of the vocal part – with some elements missing. It is helpful in these circumstances to double the voice part on more than one instrument, getting a combined timbre that may more closely match the Naxos recording. - DW

1. Follow steps 1-4 of “**Exporting the Final Audio Example**” (also above) to render a copy of the Vocal Example in .wav format.
2. It is beneficial to render Vocal Examples several times, each with different instrument choices and combinations. This has aided the initial process of colleagues reviewing Vocal audio in order to determine the best fit for a given example. Once a few different versions of an example have been created, the audio should be uploaded with the Suter ID, and the instrument choices in parenthesis after the ID. It should be placed in a subfolder called ‘EW Vocal Examples to Review from \_\_your name\_\_’ in the R.A. folder of another team member working on Audio Synthesis.
3. The team member whose folder the newly created examples are in must now listen to the various renderings, and decide which version they think is the closest to the Naxos recording. Whichever instrument combination was chosen should be labelled on the Suter Vocal Examples spreadsheet: <https://docs.google.com/spreadsheets/d/15OunhXMYjhO1e4qANZCYB2jWhv4p2l6ieNpyR-2YHTU/edit#gid=0>

the colour of the Suter ID should be changed from Gray to Blue indicating that the first round of listening has occurred. Any suggestions, or if no rendering of a given example is satisfactory should be recorded in column D of the spreadsheet.

1. After Dr. Poudrier has listened to the examples, and made comments in column E of the spreadsheet, the example is either: 1. Complete and the colour of the ID should be changed to Green, or 2. Re-rendered with the suggestions of both the colleague and Dr. Poudrier.
2. Completed examples should be uploaded to the ‘TDS Vocal Examples’ in Box.