ECHO Project

AirCage Array

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1. General Comments

The processes described in this document refer largely to the “Presentation” mixes of Hauschka’s “Train Journey”. For the mixes of “Kammersinphonie” the settings are almost identical to the Pass 1 (orchestra) settings of the “Train Journey” mixes, with just a few deviations which I have described. For each piece the mixes are broadly consistent between orchestral configuration versions (traditional/circular), the only differences being the panning of the string spot mics and percussion mics, and these differences have also been documented.

2. Pro Tools Session Structure

My mixing process for this project is heavily influenced by the methods I use for mixing film music for cinematic playback. Two realities of delivering of music to a film dub are 1) in almost all cases there will be an expectation that the music will be delivered as stems - sub-mixes that when combined at unity form the full mix and 2) there will be no mastering stage prior to the stems appearing in the final film mix, or indeed before the film itself is released.
Therefore, I generally apply a degree of mastering processing to the stems at the final, pre-render stage of the mix DAW (always Pro Tools, in my case). This is simple to achieve in a stem printing scenario by using a Master Fader or Aux Channel for each stem. But introducing the internal Dolby Renderer makes this more of a challenge. Ultimately everything must be output to either a single (in this case) 7.1.2 bed or to any objects that have been pre-allocated. So, unwilling to sacrifice my "Stem Pre-Mastering" approach I decided to consider each of the separately recorded "passes" (Pass A - Orchestra, Pass B - Low Percussion, Pass C - High Percussion, Pass D - Prepared Piano Reamp) as my "stems" and created a 7.1.2 bus and aux input for each, all of which were outputted to the bed. I then created two mono busses/aux inputs for the two objects per stem that I intend to use for the .2 height channels (it had been agreed upon by the focus group that we would use objects for the height content and leave the .2 of the bed redundant). I could have combined the resulting eight aux inputs into two and used only two objects for my .2 height channels, but since we weren’t restricted in terms of our object budget I decided to assign each of the mono aux inputs a separate object (11-18), thus giving myself the means to position the height mics differently between stems (NB, for the array-only mixes I maintained a consistent position for the height channels across all passes).

It is worth reiterating that the so-called "stems" will never be rendered as separate mix stems, the approach is simply a means of being able to apply specific processing to common musical elements, post any reverbs, track processing and VCA level rides.

Multi-mono instances of stem processing plugins were inserted on the 7.1.2 stem bed auxes and the settings copied and pasted to mono instances of the plugins inserted on the mono object auxes for the corresponding stem.

3. Array Panning

The mics of the main layer of the array were routed discretely to their corresponding Dolby Atmos bed channel. The two upper layer height mics were assigned to objects using the method outlined above. The default pan settings for these objects, and those used for the array-only mixes are as follows:

Left/right: -100/100
Front/rear: 0
Height: 100

To compensate for the inherent front centricity of my array, in the presentation mixes I panned the height objects for the orchestra pass and prepared piano reamp pass (when used) further towards the rear.

Orchestra:

Left/right: -100/100
Front/rear: -25
Height: 100

Prepared piano reamp:

Left/right: -100/100
Front/rear: -50
Height: 100

4. Balance

Although the following values relating to balance are broadly accurate it should be noted that clip gain was also used to create more detailed balance and perspective shifts. The instances of clip gain use are too numerous to document concisely.

Array Internal Balance (relative to array-only balance)

	Array-Only Balance	Schreker/TJ Pass 1	TJ Pass 2	TJ Pass 3	TJ Pass 4
L	+2.6	0	0	0	0
R	+2.6	0	0	0	0
C	+1.1	0	0	0	0
Lss	+4.1	-0.5	0	0	+2.7
Rss	+5.1	-1.7	0	0	+2.7
Lrs	+4.1	+0.3	0	0	+2.7
Rrs	+4.1	+0.3	0	0	+2.7
Tfl	+2.6	+3.7	0	0	+2.7
Tfr	+2.6	+3.7	0	0	+2.7

All the values in the table above relate to the captured microphone outputs and not the “corrected” audio files that were adjusted after the individual microphones were calibrated and their sensitivities established post the capture day.
The corrected files are the ones included with the results of the ECHO project research database, and hence the true internal balance of the array in my mixes can be calculated using the mic sensitivities published with the data and the values in the table above.

A VCA fader controlled each pass mix group and the levels of these were as follows:

Pass 1 (Orch/Stem A) +3.2dB
Pass 2 (Low Perc/Stem B) +1.6dB
Pass 3 (High Perc/Stem C) +1.4dB
Pass 4 (Reamped Prepared Piano/Stem D) -3.4dB

Spot Mics

Pass 1

Mid LCR

-15dB (relative to array front L), delayed by 9ms

Panning:

centre/side percentage = 100%

front L, C, R

String spot mics

Schreker: MUTE

Hauschka:

Vln1-Vln2-Vla-Vlc; -27dB (relative to array front L), delayed by 9ms
Cb; -34.1dB (relative to array front L), delayed by 9ms

Panning:

centre/side percentage = 100% (unless indicated)

Traditional

	Vln 1	Vln 2	Vla	Vlc	Cbs
Left-Right	-100	-62	62	100	100
Front-Rear	70	70	70	70	70

Circular

	Vln 1	Vln 2	Vla	Vlc	Cbs
Left-Right	-80	80	-35	35	0 (centre 73%)
Front-Rear	-65	-65	-65	-65	67

Cb (dup)

-34.1dB (relative to array front L)

Panning: LFE

Piano

-12.1dB (relative to array front L), delayed by 20ms

Panning:

centre/side percentage = 100%

Left-Right = 0
Front-Rear = -100

Perc 1

All circular mixes: Mute

Hauschka traditional mixes:

+0.9dB (relative to array front L)

Panning:

centre/side percentage = 45/100%

Left-Right = -69
Front-Rear = 100

Schreker traditional mixes:

-8.3dB (relative to array front L)

Panning:

centre/side percentage = 45/100%

Left-Right = -69
Front-Rear = 100

Perc 2

Hauschka circular mix:

-13.4dB (relative to array front L
Panning:

Centre percentage = 100%
side percentage = 60%

Left-Right = 100
Front-Rear = 0

Schreker circular mix: Mute

Hauschka traditional mixes:

+0.6dB (relative to array front L)

Panning:

centre/side percentage = 45/100%

Left-Right = 31
Front-Rear = 100

Schreker traditional mixes:

-8.6dB (relative to array front L)

Panning:

centre/side percentage = 45/100%

Left-Right = 52
Front-Rear = 100

Wind L

-13.1dB (relative to array front L), delayed by 12ms

Panning:

centre/side percentage = 100%

Left-Right = -100
Front-Rear = 70

Wind R

-13.3dB (relative to array front L), delayed by 12ms

Panning:

centre/side percentage = 100%

Left-Right = 100
Front-Rear = 70

Brass L

-19.2dB (relative to array front L), delayed by 12 ms

Panning:

centre/side percentage = 100%

Left-Right = -100
Front-Rear = 70

Brass R

-20dB (relative to array front L), delayed by 12 ms

Panning:

centre/side percentage = 100%

Left-Right = -100
Front-Rear = 70

LFE (used only in Hauschka mvt 2)

Extensive use of clip gain and volume automation

-19.8dB (relative to array front L

Panning:

centre/side percentage = 0%

Left-Right = 0
Front-Rear = 100

-28.4dB sent to LFE

Pass 2 (not used in any Schreker mixes or Hauschka traditional configurations)

Perc 2

-13.3dB (relative to array front L

Panning:

centre/side percentage = 100%

Left-Right = 68
Front-Rear = 59

Perc 2 (dup)

-4.8dB (relative to array front L)

Panning:

centre/side percentage = 100%

Left-Right = 68
Front-Rear = 59

LFE

-18.5dB (relative to array front L)

Panning: LFE

Pass 3 (not used in any Schreker mixes or Hauschka traditional configurations)

Panning positions of the array mics was left-to-right reversed relative to those of the other passes.

Cb (used as a percussion spot mic)

-8.3dB (relative to array front L), delayed by 7ms

Panning:

centre/side percentage = 100%

Left-Right = -100
Front-Rear = 4

Perc 2

+3dB (relative to array front L), delayed by 7ms

Panning:

centre/side percentage = 100%

Left-Right = -100
Front-Rear = -5

Pass 4 (not used in any Schreker mixes)

No spot mics were used

5. Track Processing

Pass 1 (Orchestra)

Cb (dup)

Insert Chain:

Pro-Q 3 (Fab Filter)__Pro Subharmonic (AVID)__R Compressor (Waves)

Perc 2

Insert Chain:

Vintage Warmer (PSP)__BX Subsynth (PA)

LFE

Insert: Pro-Q 3 (Fab Filter)__Pro Subharmonic (AVID)

Pass 2 (Low Percussion)

Perc 2

Insert Chain: Vintage Warmer (PSP)__BX Subsynth (PA)__Vitamin (Waves)

Perc 2 (dup)

Insert: LoAi (Waves)

LFE

Insert: Pro-Q 3 (Fab Filter)__Pro Subharmonic (AVID)

6. Reverbs

To be consistent with a stem-based approach to the mix it is necessary to employ discreet reverbs for each stem. This is achieved by means of multiple buses (sends) and aux inputs (returns). For these mixes I added minimal reverb, using the same reverb plugin settings for each stem to attempt to reinforce the illusion that the recording was made in a single pass. The plugin used was Cinematic Rooms by Liquidsonics (screenshot below). 7.1.2 instances of it were inserted on 7.1.2 aux inputs. Post fade track sends were routed to a 7.1.2 bus which fed the relevant aux input. The sends were all set to FMP (follow main panning). Multi-mono instances of Pro-Q 3 (Fab Filter) were inserted before the reverb plugin.

For the Schreker circular mix I had the string spot mics muted but sending into the reverb buses pre fade and panned to the bus in the mix position i.e. the tracks panned to the rear and with the sends set to FMP. I found this helped to localise the strings behind the listener without having to use the direct spot mics signals, which I felt would have been out of the aesthetic context of the music.

Reverb was added to the orchestra and low percussion layers only.

For the Schreker presentation mixes the reverb time was increased to 2.67s. In all instances the elevation trim was set to -∞

Send Levels

Pass 1 (orchestra)

Array L, C, R, Lss, Rss: -8.7dB
Array Lrs, Rrs: -6.1dB
Mid L, C, R: -6.1
Vln1, Vln2, Vla, Vlc: -14.7dB
Piano: -2.4dB

Pass 2 (low percussion)

Perc 2: -4.8dB
Perc 2 (dup): -0.9dB

7. Stem Aux Processing

Stem A (orchestra)

Insert chain:

Ozone 9 EQ (iZotope)__Oxone 9 Dynamic EQ (iZotope)

Stem B (low percussion)

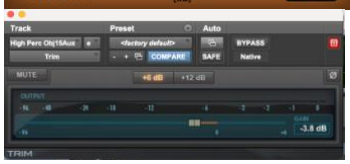
Insert chain:

Vintage Warmer (PSP)__Trim (Avid)

Stem C (high percussion)

Insert chain:

H Comp (Waves)__Pro-Q 3 (Fab Filter)__Vitamin (Waves)__Trim (Avid)

Stem D (prepared piano reamp)

Insert chain

Pro-Q 3 (Fab Filter)__Vertigo VSM-3 (Plugin Alliance)