

## Setting up two output groups with one pair of speakers per group for Hauptwerk 5

We are going to set up two audio output groups, the Front Group and Rear Group, each with a pair of stereo speakers. We are going to assign the ranks of a virtual organ so that some ranks play through the front speakers and others through the rear speakers. The subwoofer is connected in-line with the speakers we are using for the Front Group. (This means that only low frequency audio output from the ranks assigned to the Front Group will sound through the subwoofer.) This arrangement may be used for a sample set (virtual organ) which has separate front and rear audio samples (surround sample sets) or for a sample set where it is appropriate for some divisions to play through the front speakers and others through the rear speakers or indeed where only the Front Group of speakers are used..

We shall set this output configuration on preset 7.

We can use the preset for any organs we wish; for each instrument we would need to (only) assign the sample set ranks to the appropriate bus groups, Front Group and Rear Group (see step 7 onwards) – we could chose to use only one of the bus groups if that was more appropriate.

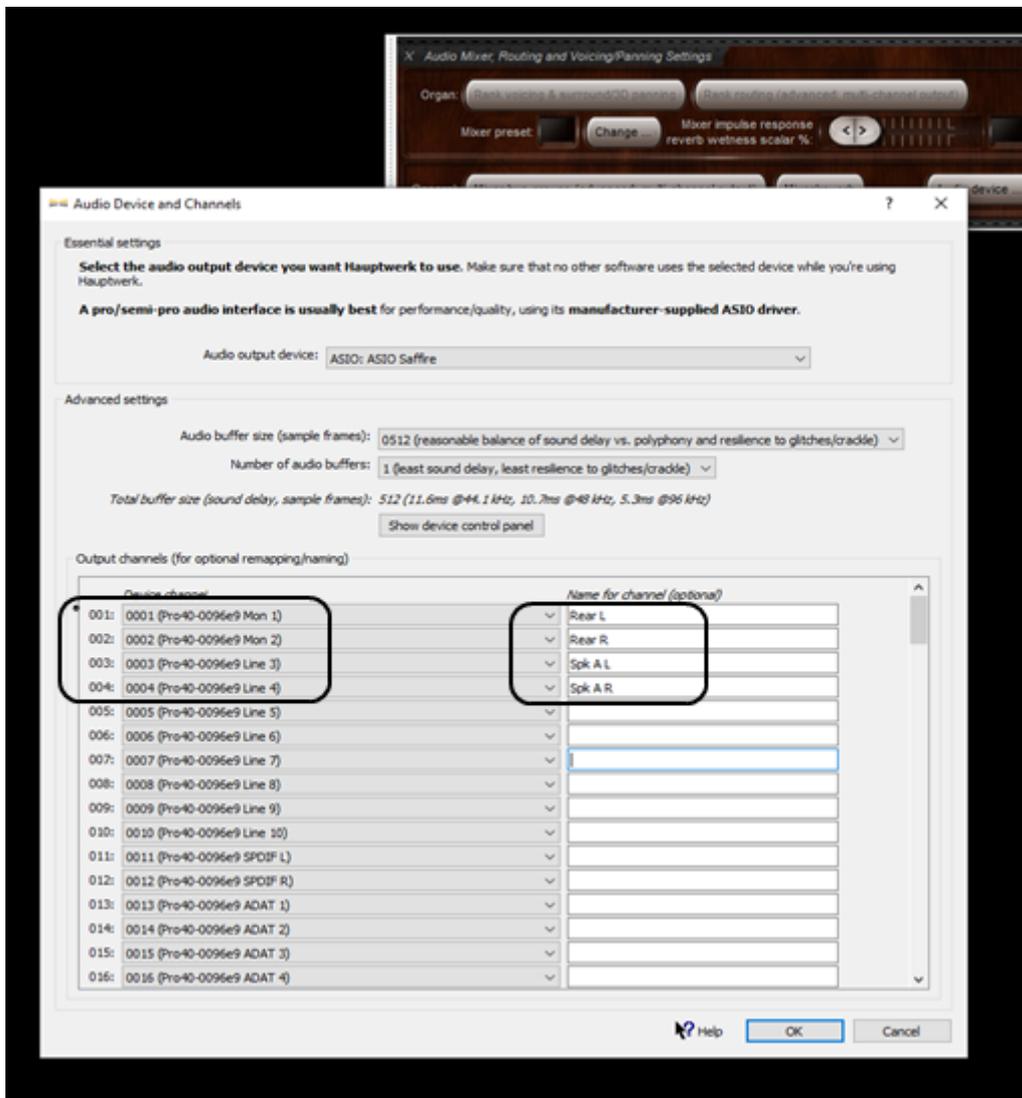
0. Load an organ which will use the Front and rear speakers from separate ranks.
1. Open the *Audio Mixer, Routing and Voicing/Panning Settings* large control panel.  
Set the mixer preset to 7 (press the *Change...* button to change the preset).



2. Click on the *Audio device...* button.

We give names to the audio device channels presented to Hauptwerk by the operating system for our audio interface unit.

Device channels 001 & 002 connect to the pair of stereo speakers we wish to use for the Rear Group, and device channels 003 & 004 connect to the pair of stereo speakers we wish to use for the Front Group.



Click on *OK*.

- On the *Audio Mixer, Routing and Voicing/Panning Settings* large control panel click on the *Mixer/reverb* button.

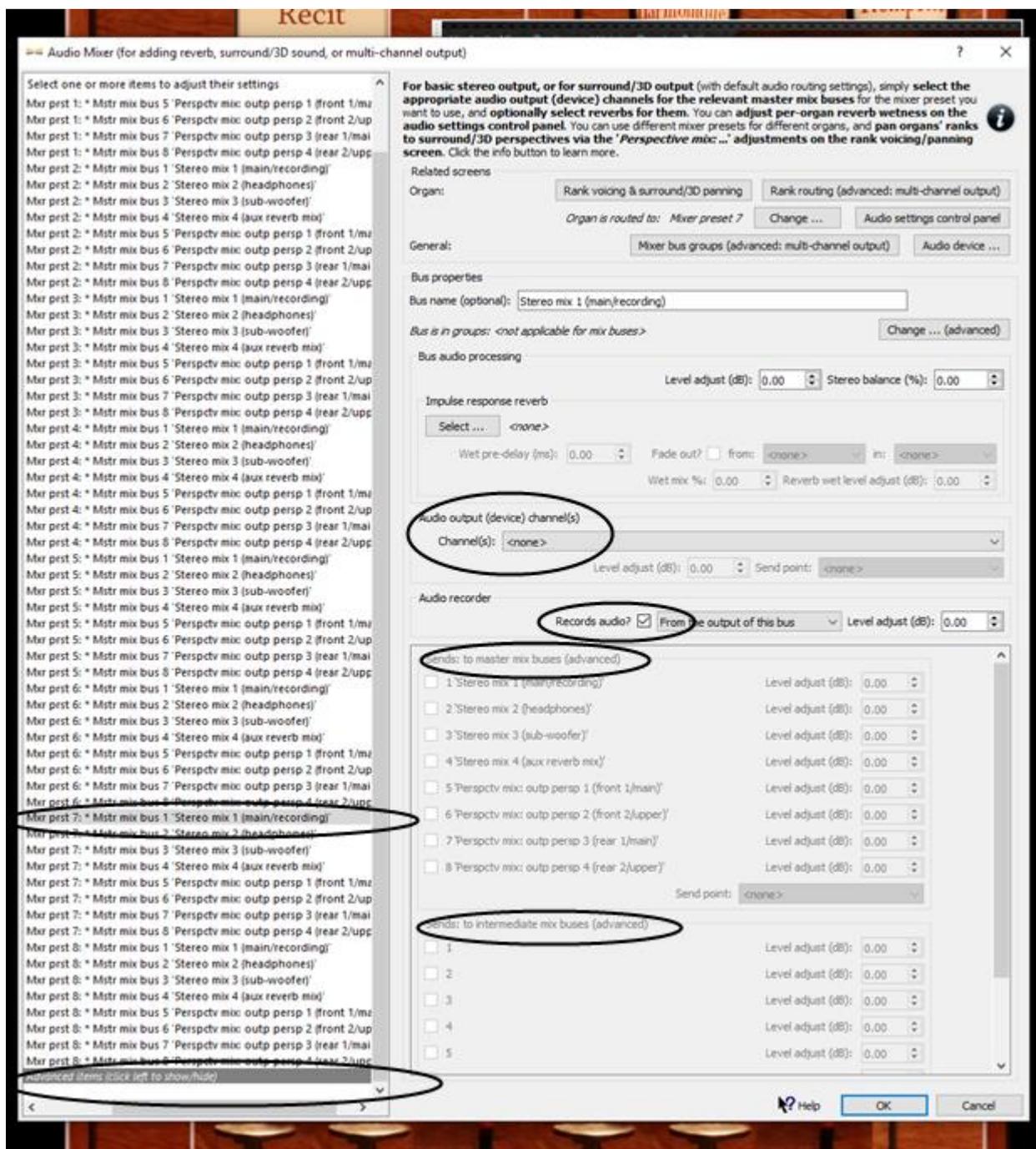


The Audio/Mixer panel will open.

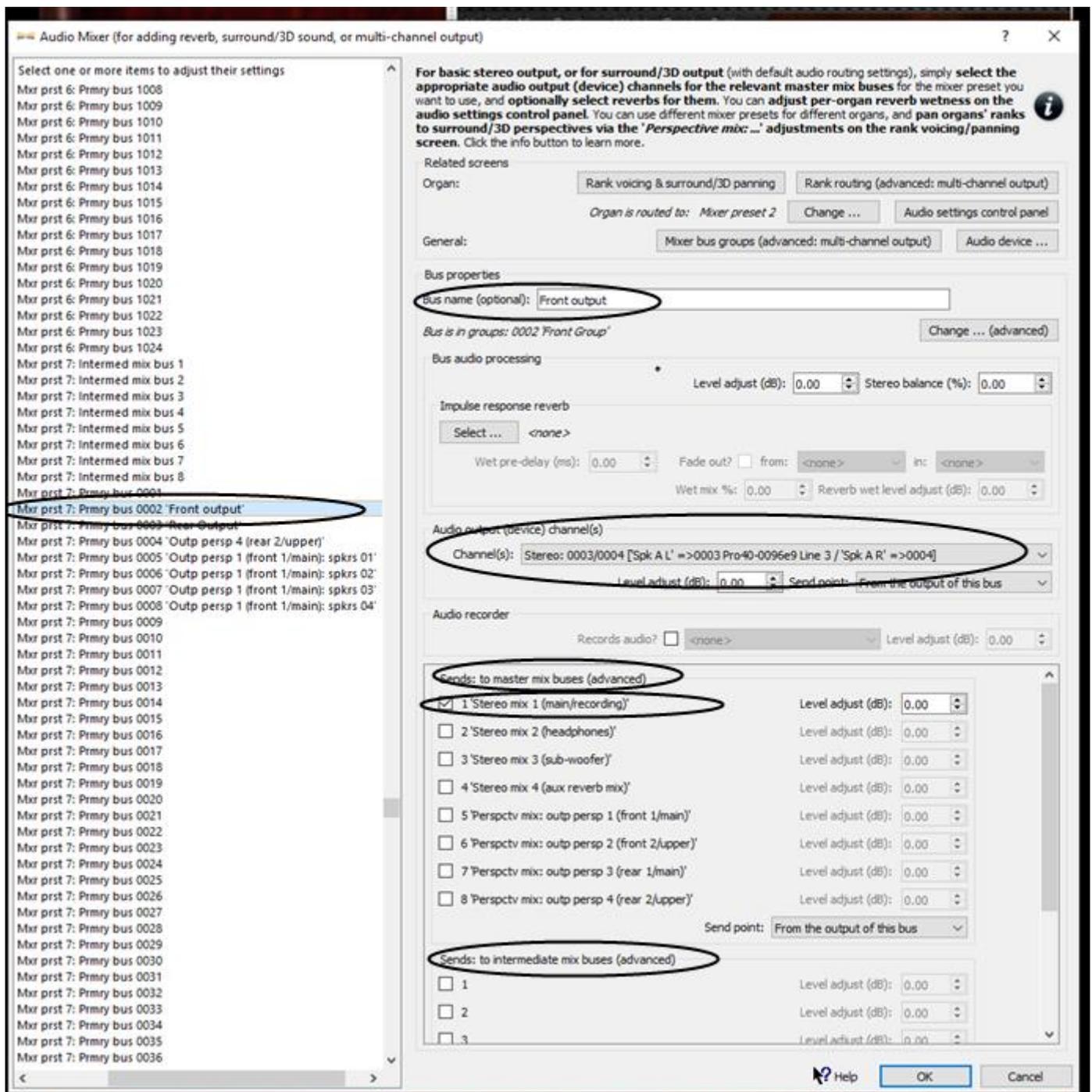
Select *Mxr prst 7: Mstr mix bus 1 "stereo mix 1 (main/recording)* in the left-hand panel and configure this to be identical to the right-hand panel as shown below. Ensure that

- the *Audio output (device) channel(s), Channel(s)* is set to *<none>*
- the *Audio recorder, Records audio* box is ticked
- none of the *Sends: to master mix buses (advanced)* and *Sends: to intermediate mix buses (advanced)* are ticked.

This ensures that audio output sent to *Mst mix Bus 1 for preset 7* only records the audio, it does not send it to a physical output device or send it on to any other mix bus.

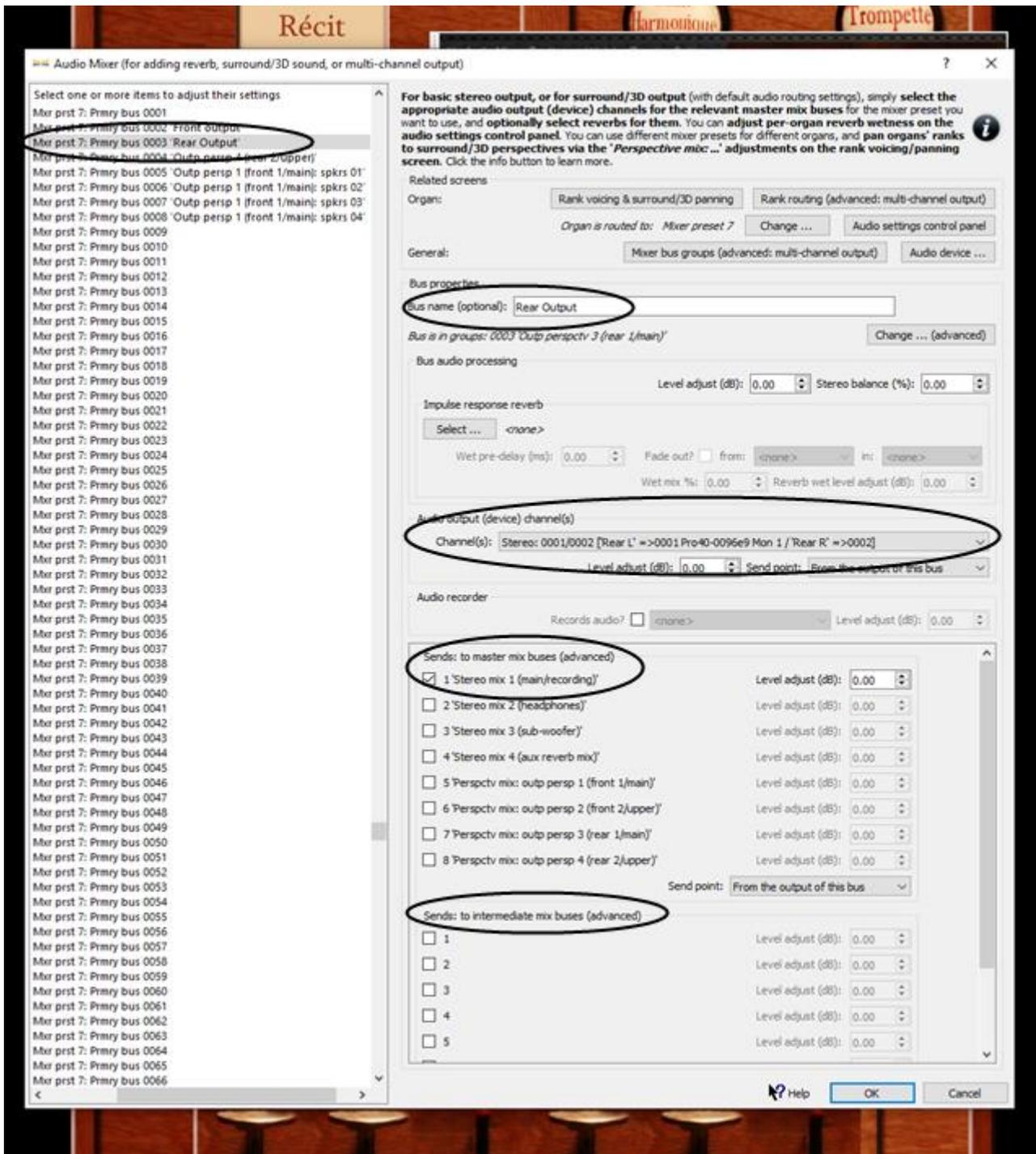


4. Now scroll down to the highlighted line **Advanced item click left to show/hide**. Click to reveal the advanced items.
5. Scroll down to *Mxr prst 7: Prmry bus 0002* and select it. Configure the details for this bus as shown in the right-hand panel shown below. Particularly
  - Complete the *Bus name* with *Front Output*
  - Set the *Audio output (device) channel(s), Channel(s)* item with the name of the name of the audio output for the front output speakers (from the drop-down list), *Spk A L / Spk A R*.
  - Ensure that the *Sends to master mix bus (advanced) 001* is ticked and that all the others are not ticked;
  - Ensure that none of the *Sends to intermediate mix bus (advanced)* is ticked.



6. Scroll down to *Mxr prst 7: Pmry bus 0003* and select it. Configure the details for this bus as shown in the right-hand panel below. Particularly

- Complete the *Bus name* with *Rear Output*
- Set the *Audio output (device) channel(s)*, *Channel(s)* item with the name of the name of the audio output for the rear output speakers (from the drop-down list), *Rear L / Rear R*.
- Ensure that the *Sends to master mix bus (advanced) 001* is ticked and that all the others are not ticked;
- Ensure that none of the *Sends to intermediate mix bus (advanced)* is ticked.



Click *Ok*.

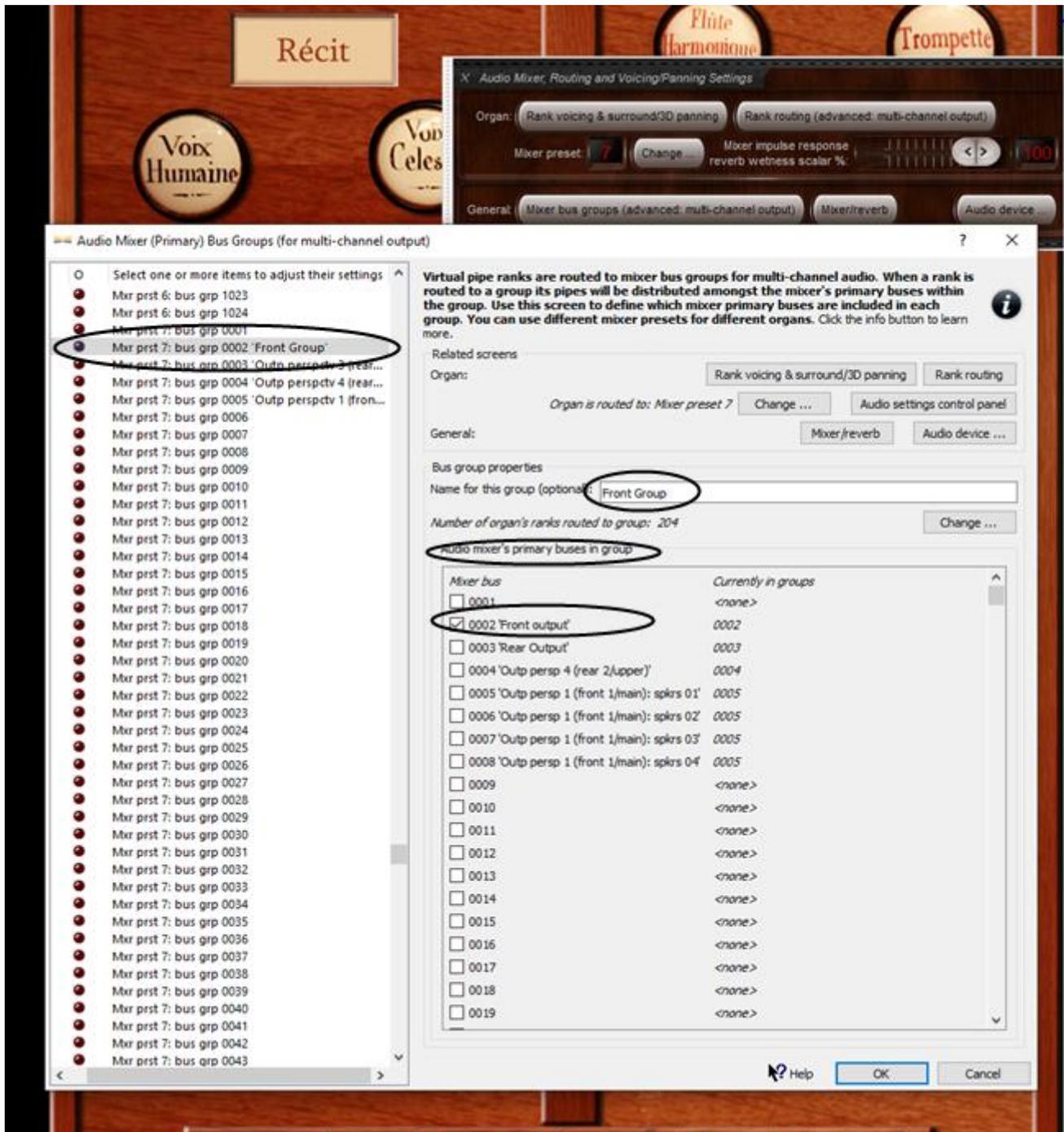
7. On the *Audio Mixer, Routing and Voicing/Panning Settings* large control panel click on the *Mixer bus groups...* button.



The Mixer bus groups control panel will open.

8. Select *Mxr prst 7 bus grp 0002*. Configure the bus group with the details given in the right-hand panel. Particularly:

- Complete the *Name for the group* with the name *Front Group*
- Ensure that the *Audio mixer's primary buses in group*, *Mixer bus 0002* is the only one ticked. All the other must not be ticked.



9. Select *Mxr prst 7 bus grp 0003*. Configure the bus group with the details given in the right-hand panel. Particularly:

- Complete the *Name for the group* with the name *Rear Group*
- Ensure that the *Audio mixer's primary buses in group*, *Mixer bus 0003* is the only one ticked. All the other must not be ticked.

- Select one or more items to adjust their settings ^
- Mxr prst 6: bus grp 0997
- Mxr prst 6: bus grp 0998
- Mxr prst 6: bus grp 0999
- Mxr prst 6: bus grp 1000
- Mxr prst 6: bus grp 1001
- Mxr prst 6: bus grp 1002
- Mxr prst 6: bus grp 1003
- Mxr prst 6: bus grp 1004
- Mxr prst 6: bus grp 1005
- Mxr prst 6: bus grp 1006
- Mxr prst 6: bus grp 1007
- Mxr prst 6: bus grp 1008
- Mxr prst 6: bus grp 1009
- Mxr prst 6: bus grp 1010
- Mxr prst 6: bus grp 1011
- Mxr prst 6: bus grp 1012
- Mxr prst 6: bus grp 1013
- Mxr prst 6: bus grp 1014
- Mxr prst 6: bus grp 1015
- Mxr prst 6: bus grp 1016
- Mxr prst 6: bus grp 1017
- Mxr prst 6: bus grp 1018
- Mxr prst 6: bus grp 1019
- Mxr prst 6: bus grp 1020
- Mxr prst 6: bus grp 1021
- Mxr prst 6: bus grp 1022
- Mxr prst 6: bus grp 1023
- Mxr prst 6: bus grp 1024
- Mxr prst 7: bus grp 0001 'None'
- Mxr prst 7: bus grp 0002 'Front Group'
- Mxr prst 7: bus grp 0003 'Rear Group'**
- Mxr prst 7: bus grp 0004 'Outp perspctv 4 (rear...
- Mxr prst 7: bus grp 0005 'Outp perspctv 1 (fron...
- Mxr prst 7: bus grp 0006
- Mxr prst 7: bus grp 0007
- Mxr prst 7: bus grp 0008
- Mxr prst 7: bus grp 0009
- Mxr prst 7: bus grp 0010
- Mxr prst 7: bus grp 0011
- Mxr prst 7: bus grp 0012
- Mxr prst 7: bus grp 0013
- Mxr prst 7: bus grp 0014
- Mxr prst 7: bus grp 0015
- Mxr prst 7: bus grp 0016
- Mxr prst 7: bus grp 0017
- Mxr prst 7: bus grp 0018

Virtual pipe ranks are routed to mixer bus groups for multi-channel audio. When a rank is routed to a group its pipes will be distributed amongst the mixer's primary buses within the group. Use this screen to define which mixer primary buses are included in each group. You can use different mixer presets for different organs. Click the info button to learn more.



Related screens

Organ: Rank voicing & surround/3D panning Rank routing

Organ is routed to: Mixer preset 2 Change ... Audio settings control panel

General: Mixer/reverb Audio device ...

Bus group properties

Name for this group (optional): Rear Group

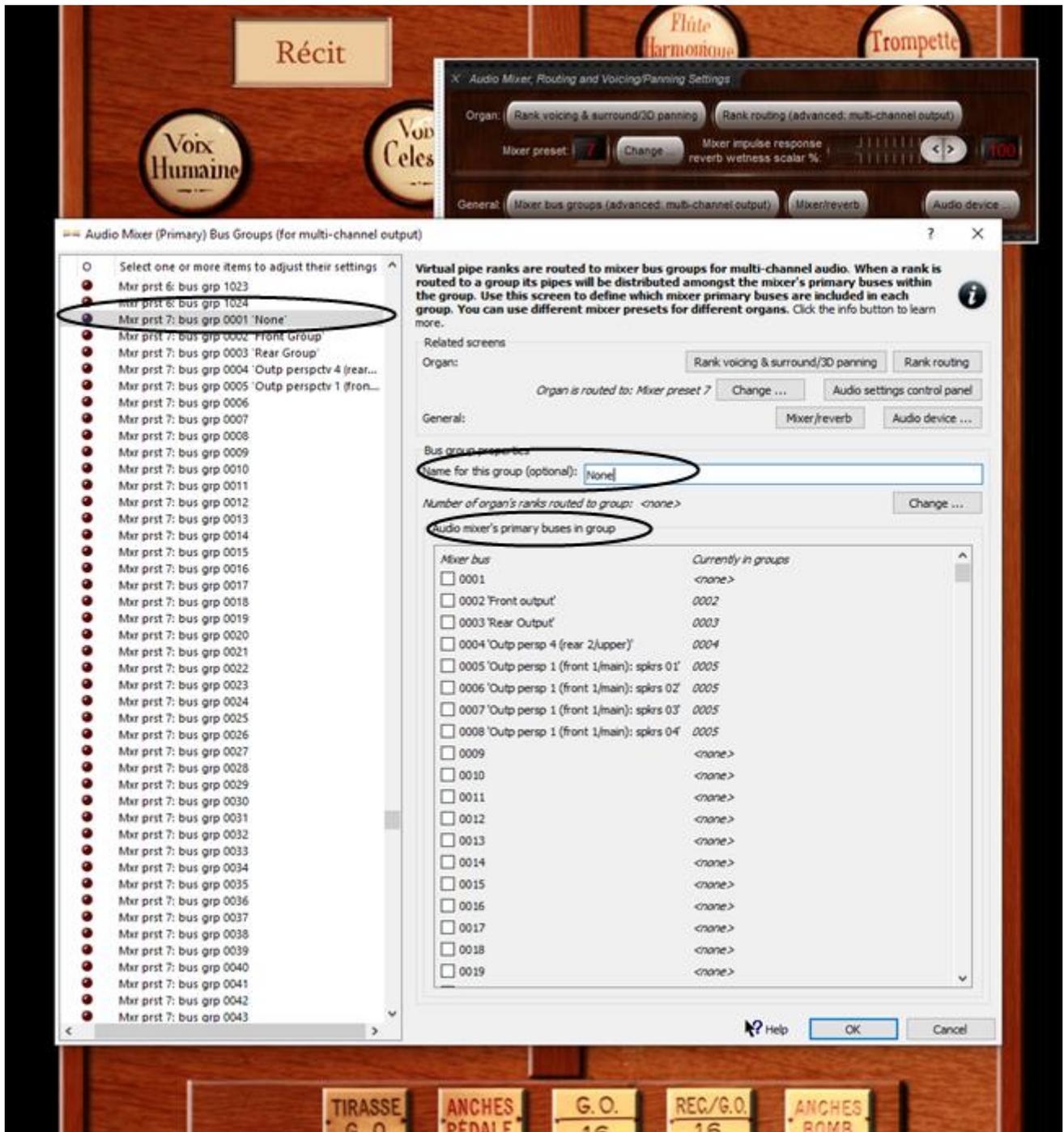
Number of organ's ranks routed to group: 18 Change ...

Audio mixer's primary buses in group

Mixer bus	Currently in groups
<input type="checkbox"/> 0001	<none>
<input type="checkbox"/> 0002 'Front output'	0002
<input checked="" type="checkbox"/> 0003 'Rear Output'	0003
<input type="checkbox"/> 0004 'Outp persp 4 (rear 2/upper)'	0004
<input type="checkbox"/> 0005 'Outp persp 1 (front 1/main): spkrs 01'	0005
<input type="checkbox"/> 0006 'Outp persp 1 (front 1/main): spkrs 02'	0005
<input type="checkbox"/> 0007 'Outp persp 1 (front 1/main): spkrs 03'	0005
<input type="checkbox"/> 0008 'Outp persp 1 (front 1/main): spkrs 04'	0005
<input type="checkbox"/> 0009	<none>
<input type="checkbox"/> 0010	<none>
<input type="checkbox"/> 0011	<none>
<input type="checkbox"/> 0012	<none>
<input type="checkbox"/> 0013	<none>
<input type="checkbox"/> 0014	<none>
<input type="checkbox"/> 0015	<none>
<input type="checkbox"/> 0016	<none>
<input type="checkbox"/> 0017	<none>
<input type="checkbox"/> 0018	<none>
<input type="checkbox"/> 0019	<none>
<input type="checkbox"/> 0020	<none>

10. Select *Mxr prst 7 bus grp 0001*. Configure the bus group with the details given in the right-hand panel. Particularly:

- Complete the *Name for the group* with the name *None*
- Ensure that none of the *Audio mixer's primary buses in group*, are ticked.



Click OK.

At this point we have configured preset 7 with two bus groups, Front Group and Rear Group and which connect through the audio mixers primary buses to the Front and Rear speakers (respectively). For recording the sound from both groups is sent to the Hauptwerk audio recorder via master mixer bus 1.

We now need to connect the audio from the sample set to the bus groups.

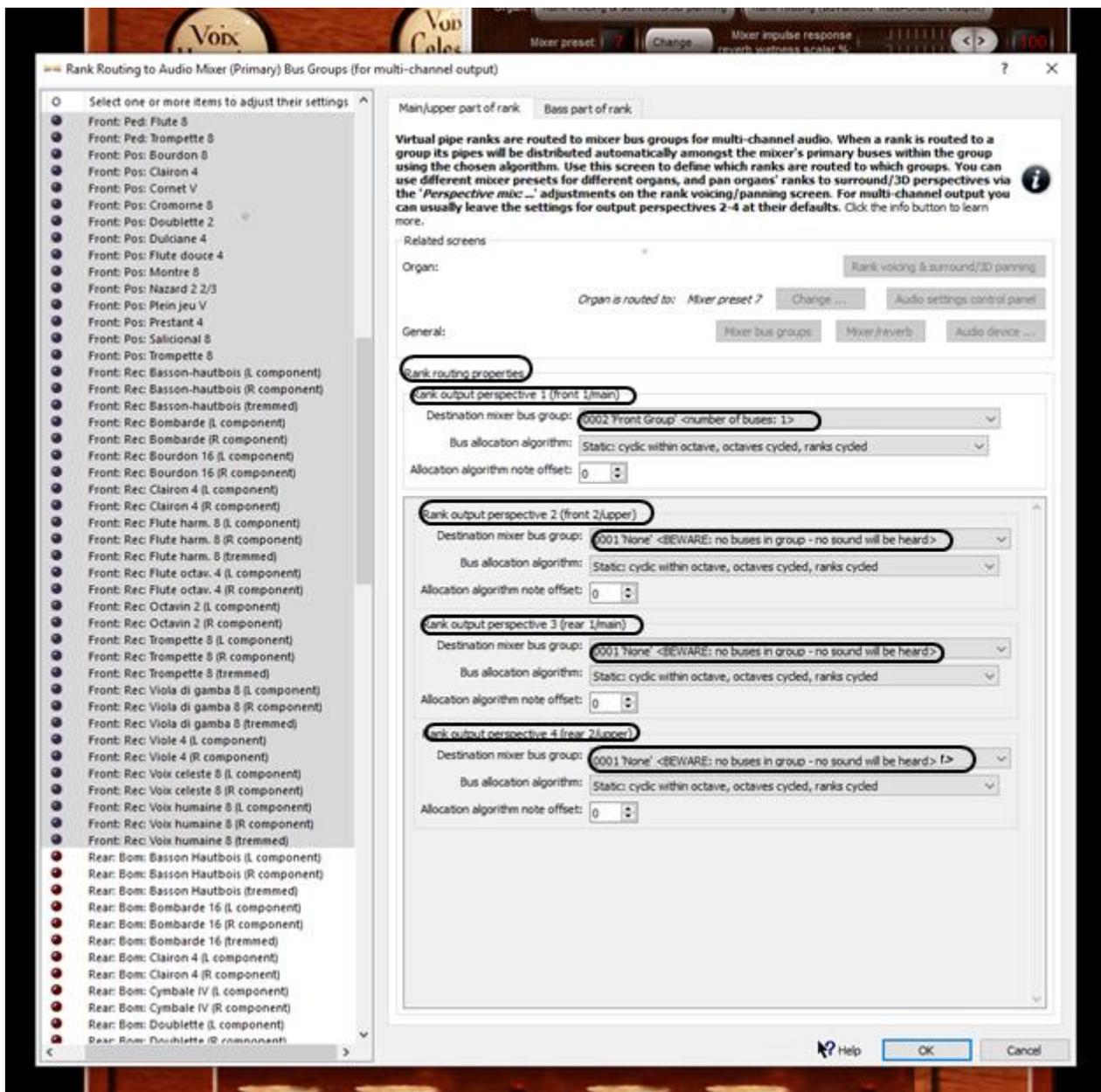
11. Click on the *Rank routing (advanced multi-channel output)* button, of the *Audio Mixer, Routing and Voicing/Panning settings* control panel.



12. The *Rank routing (advanced multi-channel output)* screen will appear. Select the ranks of the instrument which you want to sound through the Front speakers and complete the right-hand panel as shown below. (You can select multiple ranks at the same time using the shift key.)

Particularly ensure that:

- For *Rank routing properties*, *Rank output perspective 1 (front1/main)* that the *Destination mixer bus group* is set to the *Front Group* (use the dropdown box to select). The *Bus allocation algorithm* is set to *Static: cycle within octave, octaves cycled ranks cycled*.
- For all other *Rank routing properties*, *Rank output perspectives* that the *Destination mixer bus group* is set to the *None* (use the dropdown box to select).



13 Select the ranks of the instrument which you want to sound through the Rear speakers and complete the right-hand panel as shown below. Particularly ensure that:

- For *Rank routing properties*, *Rank output perspective 1 (front1/main)* that the *Destination mixer bus group* is set to the *Rear Group* (use the dropdown box to select). The *Bus allocation algorithm* is set to *Static: cycle within octave, octaves cycled ranks cycled*.
- For all other *Rank routing properties*, *Rank output perspectives* that the *Destination mixer bus group* is set to the *None* (use the dropdown box to select).

- Select one or more items to adjust their settings
- Rear: Pos: Clairon 4
- Rear: Pos: Cornet V
- Rear: Pos: Cromorne 8
- Rear: Pos: Doublette 2
- Rear: Pos: Dulciane 4
- Rear: Pos: Flute douce 4
- Rear: Pos: Montre 8
- Rear: Pos: Nazard 2 2/3
- Rear: Pos: Plein jeu V
- Rear: Pos: Prestant 4
- Rear: Pos: Salicional 8
- Rear: Pos: Trompette 8
- Rear: Rec: Basson-hautbois (L component)
- Rear: Rec: Basson-hautbois (R component)
- Rear: Rec: Basson-hautbois (tremmed)
- Rear: Rec: Bombarde (L component)
- Rear: Rec: Bombarde (R component)
- Rear: Rec: Bourdon 16 (L component)
- Rear: Rec: Bourdon 16 (R component)
- Rear: Rec: Clairon 4 (L component)
- Rear: Rec: Clairon 4 (R component)
- Rear: Rec: Flute harm. 8 (L component)
- Rear: Rec: Flute harm. 8 (R component)
- Rear: Rec: Flute harm. 8 (tremmed)
- Rear: Rec: Flute harm. 4 (L component)
- Rear: Rec: Flute harm. 4 (R component)
- Rear: Rec: Octavin 2 (L component)
- Rear: Rec: Octavin 2 (R component)
- Rear: Rec: Trompette 8 (L component)
- Rear: Rec: Trompette 8 (R component)
- Rear: Rec: Trompette 8 (tremmed)
- Rear: Rec: Viola di gamba 8 (L component)
- Rear: Rec: Viola di gamba 8 (R component)
- Rear: Rec: Viola di gamba 8 (tremmed)
- Rear: Rec: Violle 4 (L component)
- Rear: Rec: Violle 4 (R component)
- Rear: Rec: Voix celeste 8 (L component)
- Rear: Rec: Voix celeste 8 (R component)
- Rear: Rec: Voix humaine 8 (R component)
- Rear: Rec: Voix humaine 8 (tremmed)
- Special: BlowerNoise
- Special: DrawStop-Off noise
- Special: DrawStop-On noise
- Special: TrackerMan\_1 Key-Off noise
- Special: TrackerMan\_1 Key-On noise
- Special: TrackerMan\_2 Key-Off noise
- Special: TrackerMan\_2 Key-On noise
- Special: TrackerMan\_3 Key-Off noise
- Special: TrackerMan\_3 Key-On noise
- Special: TrackerMan\_4 Key-Off noise
- Special: TrackerMan\_4 Key-On noise
- Special: TrackerPed\_0 Key-Off noise
- Special: TrackerPed\_0 Key-On noise
- Special: Tremulant noise

Main/Upper part of rank

Bass part of rank

Virtual pipe ranks are routed to mixer bus groups for multi-channel audio. When a rank is routed to a group its pipes will be distributed automatically amongst the mixer's primary buses within the group using the chosen algorithm. Use this screen to define which ranks are routed to which groups. You can use different mixer presets for different organs, and pan organs' ranks to surround/3D perspectives via the 'Perspective mix: ...' adjustments on the rank voicing/panning screen. For multi-channel output you can usually leave the settings for output perspectives 2-4 at their defaults. Click the info button to learn more.

Related screens

Organ:

Rank voicing & surround/3D panning

Organ is routed to: Mixer preset 7

Change ...

Audio settings control panel

General:

Mixer bus groups

Mixer/reverb

Audio device ...

Rank routing properties

Rank output perspective 1 (front 1/main)

Destination mixer bus group: 0003 Hear group <number of buses: 1>

Bus allocation algorithm: Static: cyclic within octave, octaves cycled, ranks cycled

Allocation algorithm note offset: 0

Rank output perspective 2 (front 2/upper)

Destination mixer bus group: 0001 None <BEWARE: no buses in group - no sound will be heard>

Bus allocation algorithm: Static: cyclic within octave, octaves cycled, ranks cycled

Allocation algorithm note offset: 0

Rank output perspective 3 (rear 1/main)

Destination mixer bus group: 0001 None <BEWARE: no buses in group - no sound will be heard>

Bus allocation algorithm: Static: cyclic within octave, octaves cycled, ranks cycled

Allocation algorithm note offset: 0

Rank output perspective 4 (rear 2/upper)

Destination mixer bus group: 0001 None <BEWARE: no buses in group - no sound will be heard>

Bus allocation algorithm: Static: cyclic within octave, octaves cycled, ranks cycled

Allocation algorithm note offset: 0

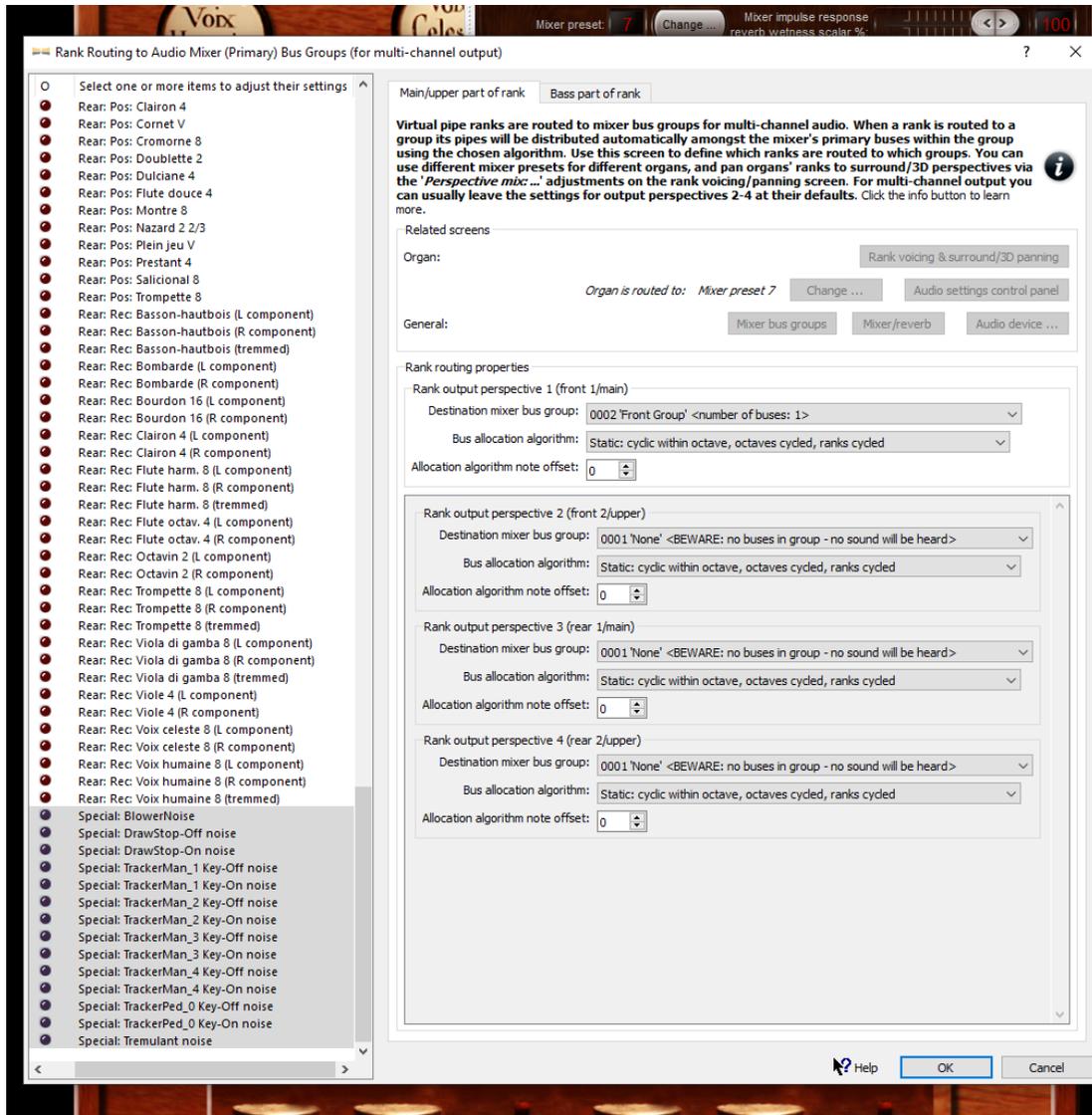
Help

OK

Cancel

14. Select the “Special” ranks of the instrument which you want to sound through the Front speakers and complete the right-hand panel as shown below. Particularly ensure that:

- For *Rank routing properties*, *Rank output perspective 1 (front1/main)* that the *Destination mixer bus group* is set to the *Front Group* (use the dropdown box to select). The *Bus allocation algorithm* is set to *Static: cycle within octave, octaves cycled ranks cycled*
- For all other *Rank routing properties*, *Rank output perspectives* that the *Destination mixer bus group* is set to the *None* (use the dropdown box to select).



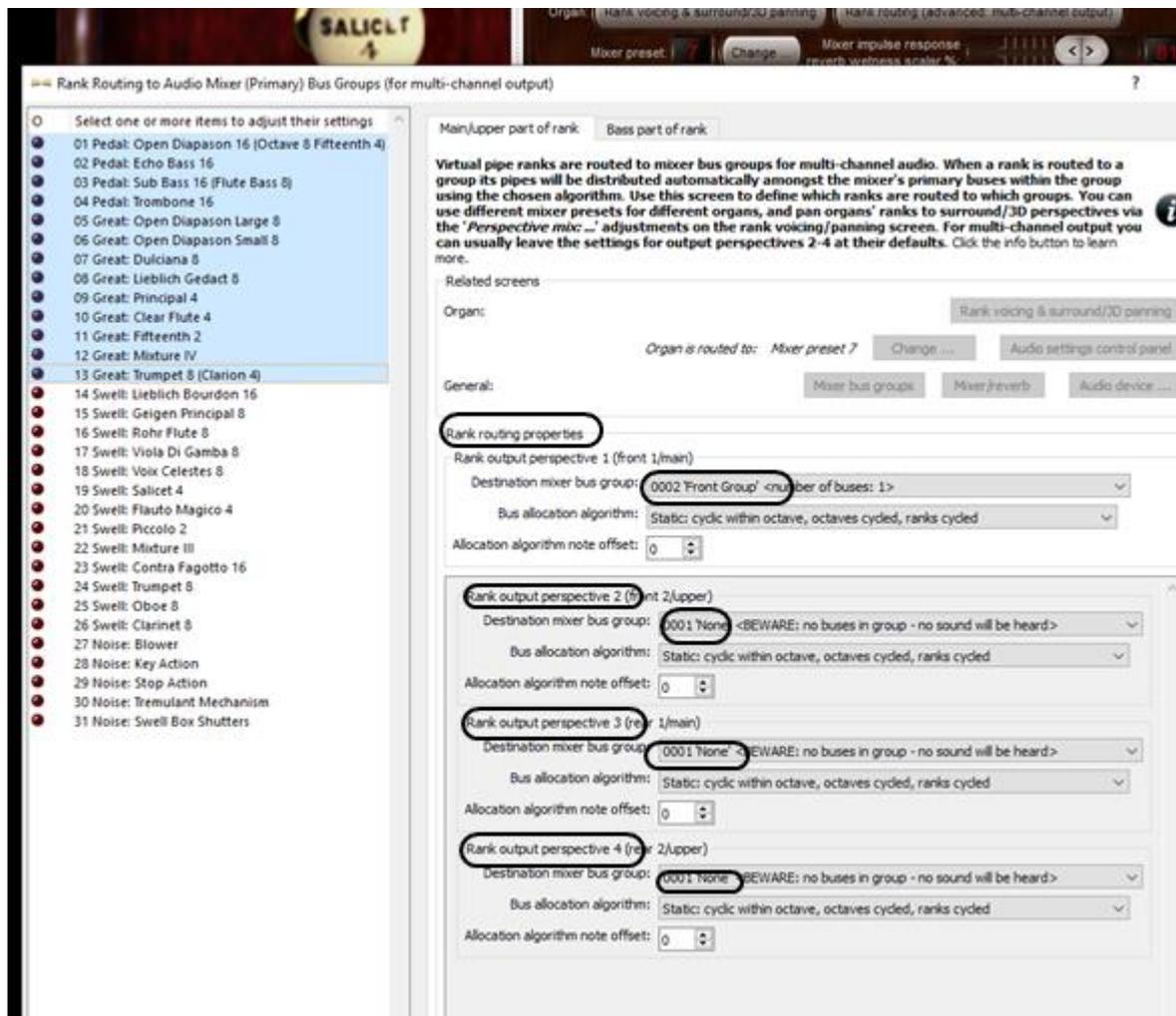
Click **OK**.

The organ should now play as configured with the virtual ranks sounding through the front and rear speakers as desired.

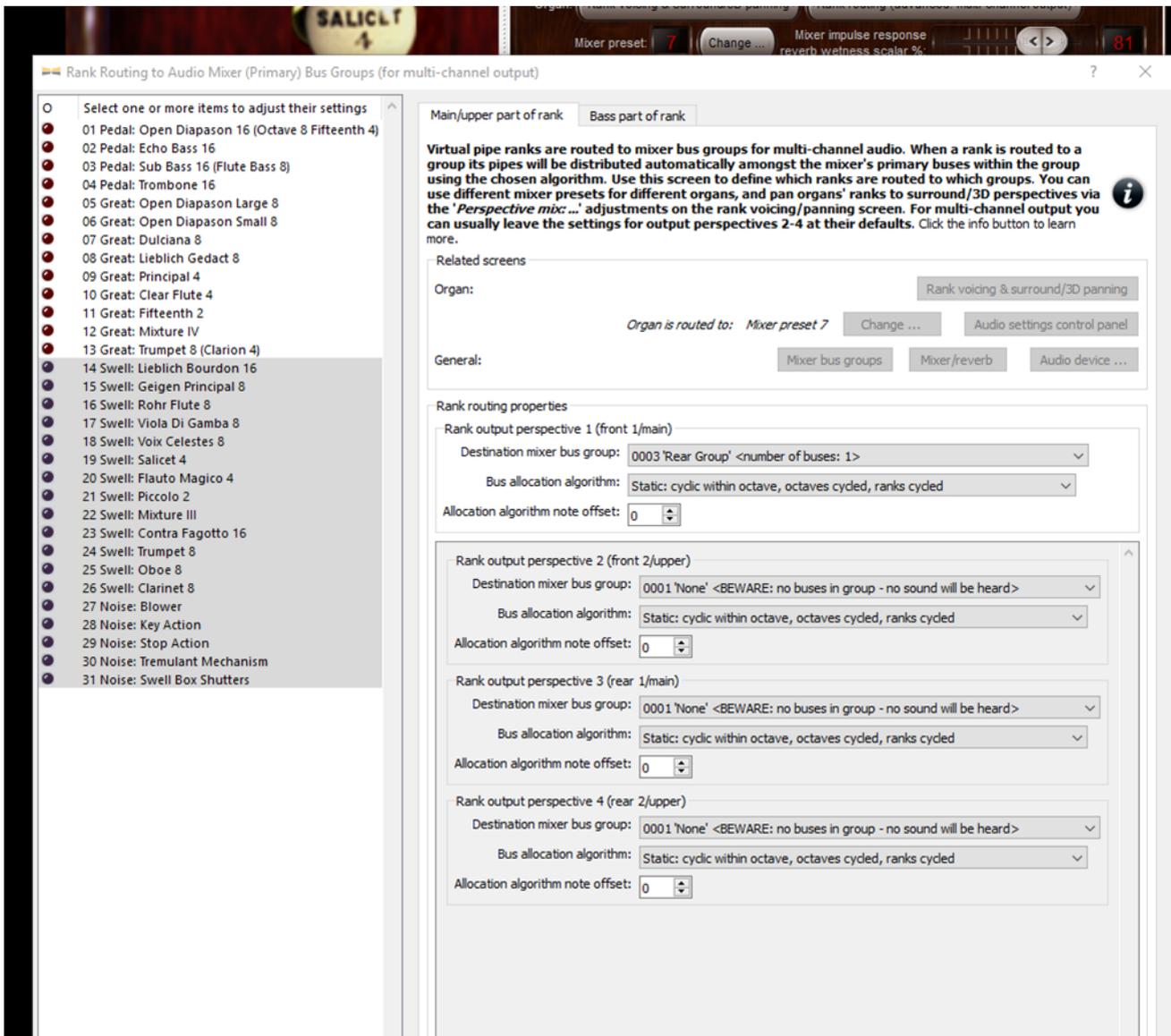
## Trying this configuration out with St Anne's

Load the St Anne's organ. Open the *Audio Mixer, Routing and Voicing...* large control panel. Select Mixer Preset 7.

Click on the *Rank Routing...* button. Assign the Great and Pedal ranks to the Front Speakers as shown below. NB ensure that *Rank Output perspectives 2,3 and 4* are assigned to the *Destination Mixer bus group NONE*.



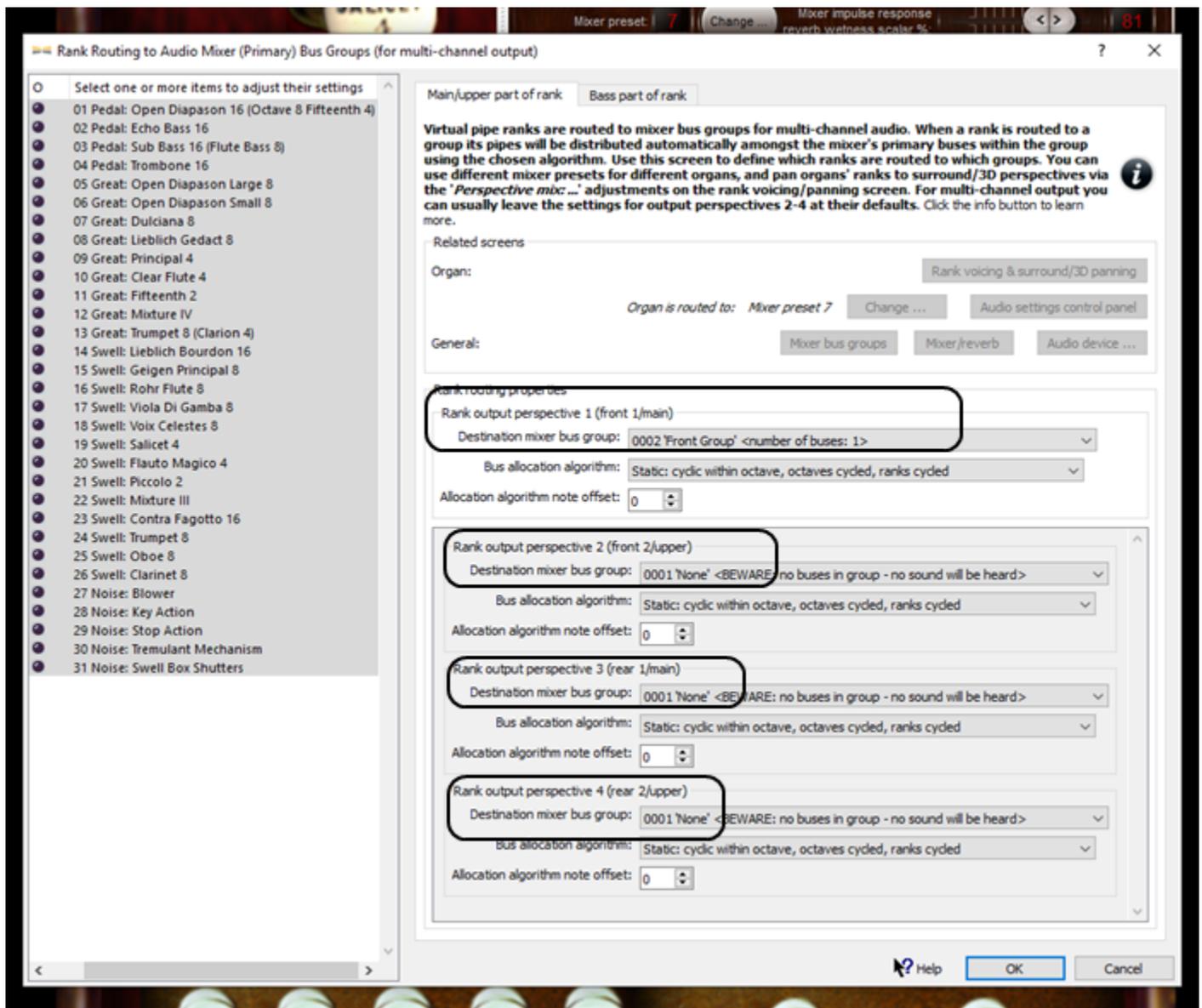
Similarly assign the Swell ranks and noises to the Rear Group. Again make sure that the output perspectives 2,3, and 4 are assigned to the mixer bus group *none*.



Click OK.

The organ should now play with the Great and Pedal sounding through the Front Speakers and the Swell (and noises) through the Rear Speakers.

If we only wanted to use the front speakers, we would assign the *Front Group* to the *Rank output perspective 1* and the bus group *None* to Rank output perspectives 2, 3 and 4.



## How does this work?

Deep in the sound engine within Hauptwerk, whenever a virtual pipe is played a sample (wave file) is replayed and its sound is sent through four outputs routes:

1. Rank output perspective 1 (front 1/main),
2. Rank output perspective 2 (front 2/upper),
3. Rank output perspective 3 (rear 1/main), and
4. Rank output perspective 4 (rear 2/upper).

Each of these four outputs may be connected to mixer bus (and so eventually to actual output devices) to produce sound from the organ.

Beginning at **step 11** the outputs from each rank of the virtual organ are routed to a particular Mixer Bus Group. At **step 12** we assigned *Rank output perspective 1 (front 1/main)* for the front ranks of the sample set to a Mixer Bus Group name *Front Group*. We also assigned the other Rank output perspectives (2,3 and 4) to the Mixer Bus Group named *None*.

A Mixer Bus Group is a collection of Mixer Primary buses, and in **step 8** we set up the Mixer Bus Group named *Front Group* to be a collection of Mixer Primary buses containing *Primary Bus 0002 Front Output* (in this case the collection only had one member). The Mixer Bus Group named *None* was set up at **step 10** to include no Primary Mixer Buses (It was empty).

Audio is sent into the primary bus (from the Hauptwerk audio engine) which sends it out to an audio output (device) channel and / or to a Master Mix Bus and / or to an Intermediate mix bus. At **step 5** we set up *Primary Bus 0002 Front Output* so that it sent the audio signal it received on to the physical stereo output device we named *Spk A L / Spk A R* and to Master Mix Bus 1. The equipment attached to the specified audio output (device) channel, amplifiers and speakers, will play the sound received by *Primary Bus 002 Front Output*. Note: we gave names to the physical output devices at **step 2**.

The *Primary Bus 0002 Front Output* also sends the audio signal to *Master Mix Bus 1* (named "*Stereo mix 1 (main/recording)*"). At **step 3**, *Master Mix Bus 1* (named "*Stereo mix 1 (main/recording)*") was configured to send the audio signal on to the Hauptwerk audio recorder.

At **step 13** some ranks of the virtual organ were set to send their output from *Rank output perspective 1 (front 1/main)* to a Mixer Bus Group named *Rear Group* and their other Rank output perspectives (2,3&4) to the group *None*. At **step 10** the *Rear Group* mixer bus group was set up to include only the Mixer Primary bus containing *Primary Bus 0003 Rear Output*. At **step 9** *Primary Bus 0003 Rear Output* was set up to send the audio signal it received on to the physical stereo output device we named *Rear L / Rear R* and to Master Mix Bus 1. The equipment attached to the specified audio output (device) channel, amplifiers and speakers, will play the sound received by *Primary Bus 003 Rear Output*.

The audio received by *Primary Bus 0003 Rear Output* will also be sent to *Master Mix Bus 1* and this together with the signal received by *Master Mix Bus 1* from *Primary Bus 002 Front Output* will be recorded by the Hauptwerk audio recorder (so the recording includes the output from both front and rear ranks of the instrument).

Audio output from *Rank output perspectives 2,3 & 4* was assigned to the bus group *None* which did not include any Primary Buses and so that audio was not be send on to any element in the audio system. Note: By default, the amplitude of the Rank output perspectives 2,3 & 4 is set to 0% in the audio system. This can be adjusted using the *Rank voicing & surround/3D panning* control panel accessible from the *Audio Mixer, Routing and voicing/panning settings* panel (see **step 1**).

**Iain Stinson**  
**January 2020.**