VIRTUAL AUDIENCE

By J Chris Griffin

Reference Manual

j. chris griffin

Revision 1.5

August 2020

Table of Contents

Concept and Introduction

Virtual Audience is meant to satisfy two objectives: to be used as a 'live audience' tool and to satisfy longings to be cheered and loved. OK – it was designed for only one objective…

Seriously though (or not), there are virtual drummers, virtual bassists, virtual guitarists, virtual vocalists, virtual composers, and virtual pianists. What's missing? The AUDIENCE! You can't have a fully artificial experience without the FULL experience being artificial – that's how Virtual Audience was born!

All kidding aside, there have been several occasions where I needed to beef up an existing audience or create the illusion of a live venue. It is tremendously hard to find the right size audience from commercial sample libraries and sound effect recordings. They are either too large (how many stadium cheers do we really need?) too small, or too lame (really? You put 5 people in a room and call that 'applause?').

What is needed is a way to go from 10 people in a room to mid-sized crowds, to performance venues, then to arenas, and finally to full-on stadiums.

From 2006-2008 I recorded live performances in New York City venues that included Bowery Ballroom, Webster Hall, Mercury Lounge, Gramercy Theater, and the McCarren Park Pool (before it was a pool again). If you aren't quite up on the NYC music scene (or are not aware of how Punk Rock matured after Sheffield and London) these premier music halls are for intimate performances by major acts. I'd roll in with 48 tracks of Pro Tools, related equipment and 150 pounds of Mogami cable (carried by particularly unhappy interns). In addition to other mics for the band, four audience microphones captured crowd response – two on each side of the stage (35-50 feet apart) facing the audience, and two at front-of-house in an X/Y pattern facing the crowd behind.

So now I'm loaded up with two years' worth of encore applause, roars, and clapping for some of the coolest acts in the music business. These are the Performance Hall samples. However, Virtual Audience still needs small rooms, arenas and stadiums.

Small Gatherings were recorded using techniques borrowed from cinema. If you want a large crowd but only have 20 extras, film them standing in different parts of a room but keep the camera in the same place, then compile the shots in post. The same thing works in audio. To create the illusion of size, adjust microphone distance to capture different parts of a room, them blend the mics together at mix. In our case, the distant mics are also different performances. This gives the front of the audience (close to the mic), the middle of the audience (without the front or rear) and the rear (without the other two). In this way one can create an audience of several sizes and shapes.

The Arenas were recorded differently. One can't bust up into Barclays Center or Madison Square Garden with a Pro Tools rig. "Oh hi! I'm not actually going to record the band – I'm just recording cheers and applause..." That doesn't go over well. Arena samples are therefore composites of my own recordings taken from different large spaces, including the aforementioned McCarren Park Pool and certain arenas and stadiums in the NYC area (6 major stadiums and 3 major arenas).

I've used these samples privately for several records. Other producers have borrowed them to enhance their own projects and documentaries. After SAW-1 Discovery was released last year it seemed like a good idea to build a Rack Extension around these samples and focus on an engine to emulate crowds of any size. Virtual Audience is the result! I hope you enjoy it and use it well.

All the best to you,

Chris

Overview

Virtual Audience is a sample playback engine containing crowd samples from some of the best venues in New York City. Virtual Audience is designed to emulate a crowd of any size with varying levels of excitement.

With Virtual Audience, you can emulate intimate groups of 9 people or large stadiums of over 40,000 people. After-show chatter is included as well as rhythmic "encore" clapping and cheering. Spontaneous crowd roars and cheers (for when a song ends) create a live audience customized for your application.

Group Tabs are included to simultaneously play congruent samples with one button press. An "ALL" tab is available to trigger each and every sample at the same time for a mind-blowing cheer that is worthy of any football goal - American or otherwise. As with all samples, Midi keys are assigned to Group Tabs for remote keyboard control.

One of the unique features of Virtual Audience is the ability to "go under the hood" and tweak voice parameters for a personal and tailored experience via the "EDIT" tab. This ensures that Virtual Audience will blend with existing crowd recordings (for enhancement) while complementing film and music productions with a perfect audience for mood and scene.

A fully automatable Effects Section includes custom convolution samples built from my own high-end outboard equipment. Delay, High and Low pass filtering and a unique sample-grain pitch shifter are also included for subtle enhancement or completely wild effects.

Master Controls

Virtual Audience's screen presents a minimal interface with essential controls

① Display Tabs
Press the relative switch to display the Home screen, the Advanced window or the FX screen.

② Group Trigger Tabs
Click these tabs to trigger every sample in a relative group at the same time. In all cases, samples within a group are designed to work together. Sometimes it will be easier to use these tabs rather than using both hands to trigger multiple samples. On-screen velocity is fixed at 127. Each tab also corresponds to a dedicated MIDI note (C4 through A4). Midi notes are full-velocity.

③ All-Trigger Tab
Use this tab to trigger all 18 samples in Virtual Audience at the same time. This will present a massive end-of-the-world party-like-it's-1999 celebratory cheer. On-screen velocity is fixed at 127. The All-Trigger tab also corresponds to a dedicated MIDI note from controller keyboards (MIDI note B4).

④ Virtual Piano Keyboard
Allows mouse clicks to trigger individual samples. Velocity is fixed at 127. MIDI input is reflected accordingly (C1 through F3).

⑤ MIDI Input Lamp
Indicates MIDI input activity.

⑥ Volume
Master volume control for Virtual Audience.

⑦ MONO
Sums left and right audio signals into a single monophonic output, perfect for vintage audience effects.

⑧ Compress
Engages the built-in audio compressor to prevent audio overload.

⑨ Patch Browser
Load, display, and save patches in the same way as other Reason devices.

Individual Edit Controls
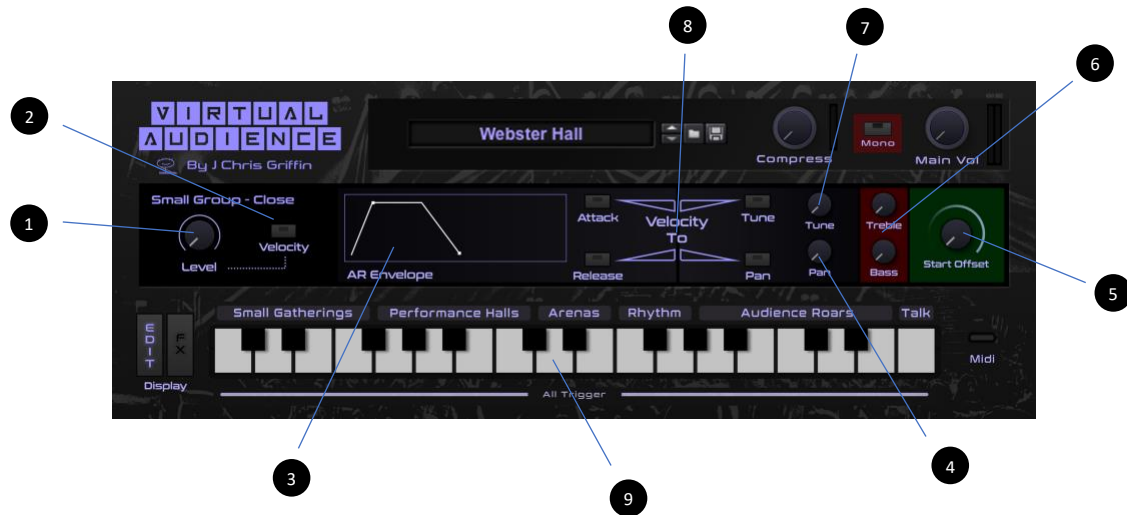
The Advanced window offers in-depth editing of each individual sample. Controls are centered above each key from top to bottom.

1 Level
Controls the relative volume level of each sample.

2 Velocity
Allows velocity to alter volume level for each sample.

3 AR Envelope
Adjusts Attack and Release for related samples. In a few cases the fastest attack may still be too slow due to the natural speed of applause in a particular sample. For these cases, refer to **Sample Offset** below.

4 Pan
Adjusts the position of the related sample in the stereo field.

5 Sample Offset
Adjusts the sample start point of each related sample. Sometimes the natural attack built into the crowd sample is too slow for an application even with **Attack** at 0. Adjusting **Sample Offset** overcomes this problem.

6 Tone Control
Change the response of high frequencies (Treble) or low frequencies (Bass) for each sample.

7 Tune
Tunes the related sample ±12 semitones.

8 Velocity Sensitivity Switches
Enabling these switches allows velocity to alter relative settings for each sample.

9 Keyboard – Edit Selector
In EDIT mode, the on-screen keys display edit parameters for each selected key/sample.

FX Controls

Four effects units can be used at the same time to enhance or shape the sound of Virtual Audience.

1 Reverb

Reverb is an advanced convolution design with custom impulses. Controls are as follows:

Time

Reverb time is generally the length of reverberated sound. Officially, it's the time it takes the reverberated sound to decay 60dB, or one millionth the volume of the original impulse.

Pre Delay

The amount of time between signal input and reverberated sound output. 0 is no pre delay/original. Range is from 0 to 200ms. Use for an initial attack that sounds dry but subsequently gets drenched with reverb.

Type

1 VA Short Reverb

A short-but-thick reverb used in my work to establish a stereo space without much "tail." Designed to stay out of the way while establishing depth. Perfect for thickening up an audience without much "shimmer."

2 Bright Medium

A bright mid-sized hall with medium-long decay. Made from a layer of 2 PCM 96 hardware reverbs (like tubes, just spend the money for a good hardware unit – plugins STILL can't come close) and 5 non-convolution plug-in reverbs, each serving a specific function inside the larger reverberated decay. There are 7 other devices with varying degrees of subtlety making up the final mix. Insane? Absolutely.

3 Dark Long

A darker hall with long decay. Made from the same stack as Bright Medium (on the same day) but tweaked for a longer tail and darker refection.

4 Drop Cave

A reverb sound made for the 'drop' after Chorus 2 of many songs. Made from a different stack (on a different day) after several days of testing and tweaking. It's very dark and very big. However, it's not so big that it overpowers the source. It blooms then gets out of the way nicely.

5 VA Reverb Long

Unlike the Drop Cave impulse, this one actually will overpower the source – in a good way. It blooms and stays present. Gorgeous really…

Damp

Damping (not damp*en*ing – that just makes things wetter) reduces high frequencies in the reverberated decay. It's like a low pass filter for just the reverb but with a shallow slope. Use to remove sizzle and excessive 'splash' from hard attacks as they reverberate. This is a custom damping filter taken directly from SAW-1 Discovery.

Mix (Send)

Volume controls the amount of signal sent to the reverb device. Yes, it's technically a send, but calling it a send didn't seem right (and it didn't look right either). Reverb return is behind-the-scenes and set at 0dB.

LO -

A filter to remove low frequency buildup as reverb decays.

Hi +

Boosts reverberated high frequencies for more "shimmer" and "air."

② Delay

A mono or stereo echo effect to create the illusion of size. Controls are:

Time

Determines Delay time. Range is from 0 to 4 seconds. When SYNC is selected (more below) range is from 1/64th note to a whole note (4/4).

FB (Feedback)

Just as in every other delay on the planet, feedback is basically repeated delays with a smooth decay. If you care to know how it's done, keep reading. If not, just set Feedback to wherever and move on.

Imagine a signal entering a delay device. That signal gets delayed a bit then exits the processor. Take that signal output and split it into two identical signals. Send one signal down the line to wherever it goes (probably the amp and speakers) but take the other and send it right back into the delay unit. Normally if a signal output is re-injected back into its input massive feedback occurs. However, in our case the signal is *delayed,* so massive feedback doesn't occur, it just gets delayed again and sent back out to our split line. Of course, this newly delayed signal has already been around the signal path once, so there's some degradation compared to the original signal. Still with us?

So, here's the newly delayed signal that's been around once and it's entering the device *again*, only now it's been degraded twice and starts to sound different. Repeat *ad infinitum.*

You may be wondering "if the signal is going in and out of the device unchecked – wouldn't it just keep going and keep repeating/degrading forever?" Yes, it will. However, most designers don't see this as a good thing, so they placed a volume control on the signal going back into the delay. That volume control alters the level of signal returning to the delay input. This fed-back signal is now lower in volume, and it comes around and gets lowered *again.* Decay is smooth and predictable with each fed-back generation being softer than the last - until the whole thing reaches zero.

The control marked **Feedback** is this volume control. It's actually an attenuator limiting the signal re-entering delay input. Turn it full-on and it will repeat forever (unless the manufacturer limits full volume – which some do). No feedback means the delay will send signal out only once, then stay silent. You're welcome.
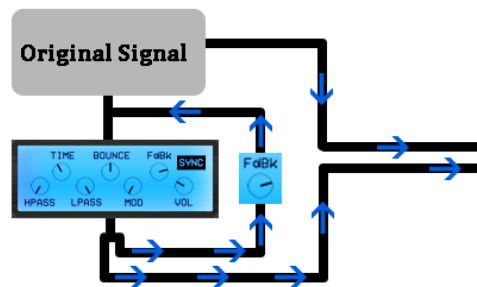
HP

This is a high pass filter just for the delay device (cool right?). Sometimes low frequencies build up when delay is added. A high pass filter solves this problem by letting only higher frequencies through. Super effective on bass instruments.

LP

As with High Pass, there is also a low pass filter just for the delay device. High frequencies don't build up like low ones, but delayed, repeated 'sizzle' of sibilant vocals or bright percussion can be distracting. Filtering these 'sizzle' frequencies out keeps delay from overwhelming the source.

Mod

Sometimes repeated delays get a bit sterile or clinical as feedback decays. Modulation adds a touch of movement by pitch-shifting the signal slightly as it develops.

Mix (Send)

Mix controls the amount of signal sent to the delay. Again, it's technically a send, but in the case of Delay it's a good way to handle things. Delay return is behind-the-scenes and set to 0dB.

SYNC

Delay time can be set in either milliseconds or beats. SYNC determines how time is measured. When SYNC is On, delay is timed to the selected note value, despite tempo changes. When SYNC is OFF, time remains the same (in seconds) regardless of tempo changes. In other words, SYNC On moves with tempo changes, SYNC Off doesn't.

Shift

Bounce controls side-to-side movement of delay and feedback. At 50 delay is monophonic. At 0 the delay bounces evenly from left to right at straight intervals (no swing). 100 is the same except panning is reversed – right to left. A setting of 25 or 75 gives an eighth – dotted eighth bounce. Other settings offer swing or downright crazy. Enjoy!

③ Grain Shift

Shifter is a granular pitch-shifting effect. Audio is broken up into slices or *grains*. These grains are shifted and rearranged in several interesting ways. Controls are:

Density

This sets the grain overlap. Grains can play one after another with space in between or close together with one overlapping another. Density controls the "thickness" of the shifted sound.

Size

The size of the audio slice or grain.

Pitch

This granular effect changes pitch by changing playback speed of individual grains, affecting playback pitch up to 2 octaves.

Feedback

As in a delay unit (see above) Feedback is output signal reinjected into shifter input resulting in repeated echoes and cascade effects.

Mix

Controls blend between dry and affected signal.

4 Filter

This filter section uses both a high pass and low pass filter to shape final output of Virtual Audience. A filter will be useful when emulating audiences from a radio or television set or simulating audiences that are far away.

HP Cutoff

High Pass Cutoff reduces low frequencies and *passes* high frequencies. *Cutoff* determines the frequency where differentiation occurs. Frequency attenuation is 12dB per octave.

LP Cutoff

Low Pass Cutoff is the opposite of HP Cutoff. It reduces *high* frequencies and passes low frequencies. As before, *cutoff* determines the frequency where differentiation occurs.

Resonance

Resonance changes filter timbre. It raises and enhances frequencies at (and slightly around) the cutoff frequency.

Resonance gives a sharper, more pronounced filter "sweep". Higher the resonance values give an aggressive 'bite' to the filter and can be made to self-oscillate slightly if pushed to maximum. This will produce a very distinct cutoff point - quite evident at certain frequencies.
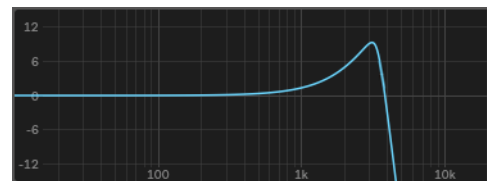
Comb

Without going into too much detail, a comb filter is essentially a delay line added to the HP filter circuit with feedback set on stun. The reason things are kept under control is because the filter pulls low frequencies out, leaving high frequencies that "ring" or echo so fast they create a tone of their own. Flangers utilize a comb filter, so don't be surprised if this sounds somewhat like a super strong flange effect. Experiment with different HP Cutoff frequencies with the Comb effect active.

Slope

There are 2 Low Pass Filter slopes available; 24 and 12 dB/octave. 24 dB/octave filters out most high frequencies above the cutoff point. 12 dB allows more high frequencies to be heard above the cutoff frequency, giving a filtered "roundness" to a sound.

IMPORTANT NOTE ON SAMPLE RATE!!

Keep in mind that sample rate will affect the clarity of high frequencies. This will be especially apparent when using extreme filter settings with high resonance. For instance, a patch that sounds perfect at 44.1kHz will have more filter headroom at 96kHz. The result will be clearer – without so much "crunch" at extreme filter settings. The reverse is also true. A beautiful, clear filter sweep at 88.2 or 96kHz will sound crunchy and perhaps distorted at lower sample rates. This is expected behavior with digital software audio devices and cannot be changed today, next week, or next year.

Yes, there are oversampling and other code techniques to mitigate this change, but PCM filter designs will always be susceptible to sample rate differences due to digital filtering just before the Nyquist frequency. At 44.1kHz, audio frequency filtering begins just after 20.5kHz (so signal can be fully filtered by 22.05kHz – the Nyquist Frequency) and it's right at that point where Low Pass and High Pass exit the range of human hearing (for babies and small children – the rest of us roll off rapidly around 17.5-18k).

The result is double-filtering at 44.1 and 48kHz at precisely the worst point filtering could occur, but good designers deal with it. At 88.2 and 96kHz there is no double-filtering, resulting in an open and clear sound at these higher sample rates.

All factory patches and Combinators were designed to sound best at a sample rate of 44.1kHz.

Performance Controls

There are only two performance controls that naturally affect Virtual Audience: Modwheel and Pitchbend

Pitchbend
Pitch is affected globally by the Pitchbend Wheel. Range is set via the rear panel up to ±12 semitones.
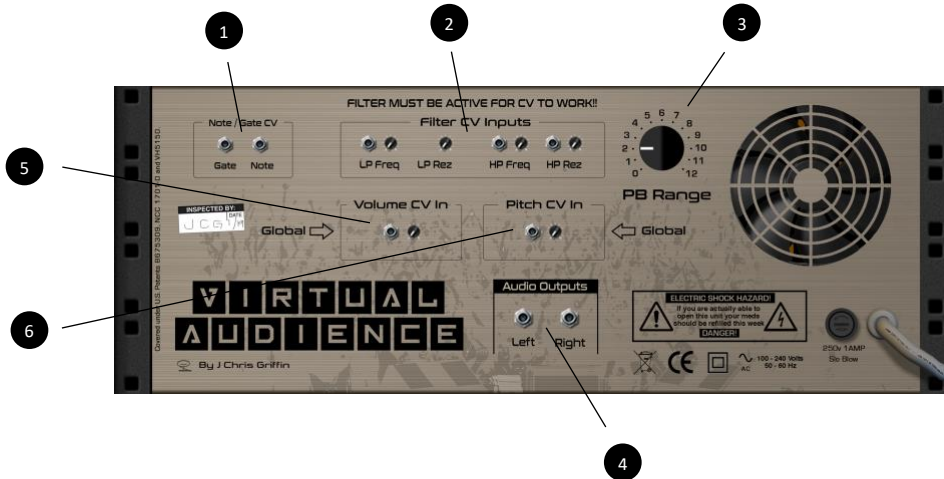
Modwheel
The Modwheel attenuates volume approximately 11dB at full travel.

Rear Panel / Control Voltage

Virtual Audience has CV inputs to expand creative possibilities.

Note/Gate CV
Reason will automatically connect to devices like The Matrix, RPG-8, and other gate/pitch CV devices with these input jacks. Gate is the pulse that opens the synth and triggers envelopes; Note is a continuous stream indicating pitch. The two work together in tandem.

Filter CV Inputs
CV inputs are available for direct control over cutoff and resonance for both Low Pass and High Pass filters.

NOTE: The filter must be active for CV to work.

PB Range
Set global pitch range for the Pitchbend wheel.

Audio Output
The main (and only) audio output for Virtual Audience.

Volume CV In
This input directly controls Global volume level.

Pitch CV In
You guessed it... Control Global pitch with this CV input.

Factory Patch Bank

The only note here is that patches with "ALL TRIG" are designed to be triggered as one event from the All Group button. These scene-specific sounds will work best triggered as one group, not as individual elements.

In some cases, individual elements are muted or altered so that individual triggers produce no sound. This is by design and part of the blend needed to produce a proper "All Group" balance. Enjoy!

Automation and Remote Override

Many Virtual Audience parameters on the front panel can be assigned for automation and remote control, just like other Reason Rack devices.


Assigned automation and remote control is active whether or not a particular control is hidden – it doesn't matter at all. FX parameters can be simultaneously automated and/or controlled remotely just as any Advanced Page parameter can be controlled – regardless of the panel actually displayed.

Automation Assignments
As with any other Reason Rack device, automation is activated by hitting Option/Alt and clicking on a valid knob or button. A new "lane" will present itself in the sequencer dedicated to this assigned control. Simply hit Record on the Reason Transport panel, move the control and BAM! Automation Fascination!

Remote Override Edit Mode
For custom control of Virtual Audience (and every other Reason Rack device) by the knobs and buttons of a connected hardware controller, simply head to the OPTIONS menu within Reason and select REMOTE OVERRIDE EDIT MODE.
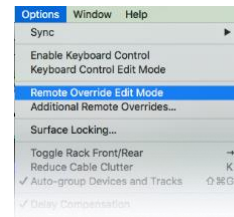
Reason will place an arrow icon over parameters available for remote control. Double-click on the arrow icon. The arrow will change into a lightning bolt icon and Reason will drop a menu asking for input. Once the control has been assigned, the lightning bolt icon turns yellow and is ready for Remote operation.

Special Considerations

Delay Time

Delay Time can be synchronized to tempo or left free-running. This presents an interesting programming dilemma solved by offering two controls under one knob, switched by the SYNC button. This will likely never be a problem but 'could' become a slight issue if switching SYNC on and off as automation occurs. Therefore, make sure to use the correct control.

Think of it this way: Rate with SYNC on is one control, and Rate with SYNC off is another control – both occupying the same space on the GUI. You can see this change occur in real time when switching SYNC on and off and observing the rate knob change position. That's really two controls but in one 'spot' on the GUI. They are named differently as well. Observe:

Delay SYNC is off. The knob is named 'Delay Time.'

Delay SYNC is on. The knob is named 'Delay Time Sync.' Notice the added word 'Sync.' It is a different control.

The Rate knob is named 'Delay Time' when SYNC is off and named 'Delay Time Sync' when SYNC is switched on. Notice the added word 'Sync.' These are two individual controls and have their own parameters for automation and Remote control.
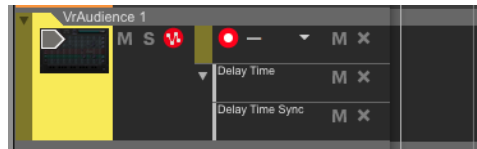
The automation lane considers these two controls separate – because they are!

This also explains why there are two Remote indicators on Delay Time controls.

Maintenance

Virtual Audience is designed to resist air-borne contaminants. Potentiometers and switches are virtually impervious to dust and dirt. From time to time, use a damp cloth to clean the front panel and aluminum enclosure. Then stop drinking.

Rear Fan Maintenance

The internal fan has an air filter that will need quarterly cleaning. Simply remove the rear panel, locate the filter behind the fan and gently remove it. Wash in warm, soapy water until clean. Wait until fully dry before reinstalling. Do not reinstall a wet or damp filter as internal damage can result. Actually, if you've gotten this far, internal damage has already occurred somewhere.

Service

I can guarantee that Virtual Audience will never fail from an internal hardware-related issue. In the unlikely event you require service on your unit, contact us for instructions. We will ask questions concerning your unit and inquire about current medications.

STATEMENT OF ENVIRONMENTAL IMPACT

Virtual Audience incorporates the latest available materials for minimum environmental impact. All circuitry is RoHS compliant, plastics used are nearly instantly biodegradable and no known carcinogenic materials were used in the construction of this device. LCD and fluorescent panels are mercury-free and the aluminum panels chosen for Virtual Audience contain no harmful mining residue. Virtual Audience will no-doubt bring you happiness and pleasure for many years, but the end will inevitably come. Rest secure knowing that this device will *never* harm the environment or contaminate landfill soil as it decays.

Credits and Thanks

Virtual Audience would not be possible without the kind help and dedication of several people.

First, my wife Janet, and our daughter Scotlyn for their understanding and grace as this synth was developed. Many nights were spent working with the laptop instead of hanging with my family. Thank you so much for supporting me and believing in this work. May it be prosperous for us all.

John Engström at Propellerheads has been a cheerleader, coach, confidant and Revealer of Earthly Secrets. I am indebted to him for his care and expertise as Virtual Audience was coded and put together.

Paul Kellet at Ujam for literally rewriting platform specs while I waited. Thanks for a serious amount of help.

Beta team:

Marco Correia
Mike Patton
Philip Meadows
Rui Manata
Marc Laflamme
Nisse Johansson
Navi Retlav
Akos Botos
Adam Fielding
Giles Reaves
Adam McClure
Jeff Mahoney
Brian Findlay