Using the Yamaha 01V96v2 for live surround sound

1. Introduction

This is a report on using the 01V96 for live musical theatre surround sound. I have done four live gigs involving the surround sound capabilities of the 01V96, but the recent one was the most complicated. I thought a few notes on how to set up the mixer for surround sound, and some of the things to look out for might encourage others to find usages out of the comfort zone of the familiar mixer operations.

Yamaha has done well to shoe-horn the surround sound features from the larger models in the their digital mixer range into the 01V96, but there are a few inelegancies at the interfaces. For example, the 01V96 has a "Surround LR to Stereo" button, not present in its bigger siblings, which disconnects the main stereo outs from the mix output and connects them to the output of busses 1 and 2, the front L and R channels in surround sound. This makes it awkward to run a concurrent mixture of mono, conventional stereo and surround sound channels, which is what was required for the live theatre performance I was running for this production. The surround sound interface was clearly originally designed with the larger joystick-equipped mixers in mind, as some of the dynamic aspects of the surround manipulation do not map well on to the single parameter wheel of the 01V96. However, an interesting series of surround sound effects can nevertheless be achieved.

2. The 01V96 and surround sound setup

The theatre's speakers were arranged as a front pair at ceiling level mounted facing the audience at the rear of the stage, and a second pair again at ceiling level towards the back of the audience seating area facing the stage. The standard Yamaha surround sound modes are 3.1, 5.1 and 6.1, the ".1" in each case referring to a Low-Frequency Effects (LFE) channel, always output via separate mono bus. I did not have cause to use this, but I did need to select a mode that was useable for the array of 4 loudspeakers. I chose the 5.1 mode, which, in addition to the LFE channel, expects a centre front speaker, which the theatre did not have. However, the surround setup on the 01V96 has a Div control that alters the ratio of sound sent to the centre front to L&R front. This can be set to 0 in the surround panning pages of all channels if there is no centre front speaker. The rear channel signals are summed to busses 3 and 4, and taking the default bus-to-omni patching means these appear on omni outs 3 and 4 respectively.

With the Div setting done, I could cable the 01V96 main stereo outs (on XLRs) to the front L & R power amps, and omni outs 3 & 4 to the rear L and R power amps. The bus faders 1 – 4 on the 01V96 master layer control the overall levels applied to each speaker, and need to be balanced up to compensate for different sensitivities and power amp gain tolerances. I tested the speakers using the internal oscillator to generate pink noise, enabling combinations of busses 1 to 4 in turn from the oscillator control screen. Although all 4 speakers and power amps were nominally identical, it was surprising how different the pink noise sounded from each corner of the theatre. With me walking around the audience seating area, I was able to signal to an assistant at the desk to alter the differential levels of each channel to give the best surround coverage over the area. If I were being more correct about this step, I would have used the 01V96 output attenuation page to apply up to 9dB of attenuation to the 3 loudest channels in order to balance the quietest, as this would have meant that the faders in the master layer could all have been set equally.

Many of the channels in the setup for this performance were stereo pairs, including S/PDIF feeds from a laptop, two stereo channels from professional cueing CD players and a pair of on-stage instrument microphones orthogonally capturing the sound from a quartz crystal singing bowl. One of the CD feeds and the stereo bowl pair had to be part of the dynamic rotating sound field presented to the audience during certain numbers in the performance.

The surround sound panning can be set up statically for all mixer channels, but the dynamic panning is restricted to a pair of channels at any one time. This would have presented a problem for the sections of the

performance that needed more than one stereo pair to be panned dynamically, as panning cannot be applied to a bus sub-mix of the required channels. Two aspects of my total channel count came to the rescue: (i) the 5.1 surround sound mode consumes only 6 of the 01V96's 8 busses, leaving 7 & 8 free for conventional bus usage, and (ii) I was only using 16 (mono) channels in total, leaving an ADAT input and output pair free. So I routed the outputs of busses 7 and 8 to two tracks of the spare ADAT output, jumpered the ADAT output round to the spare ADAT input, and set up a dedicated stereo pair of channels fed from that input. These were now my surround sound panning master channels and were fed to the 4 surround sound busses as though they consisted of a simple stereo pair. The additional delay due to an ADAT round-trip was not significant in terms of the dynamic panning effect achieved.

Many of the channels had conventional EQ, dynamics (compression) and effects (mainly reverb, fed via auxes) applied. The EQ and compression presented no additional problems to the surround sound setup, but the returns from the effects processors had to be carefully thought out so that the dry signal did not spin round the sound field leaving the wet effects static.

The final setup step needed was to create a separate scene for each item in the performance, each scene referencing its own input and output patch library entry. The input channels that required dynamic panning for each item were thus routed to the master pan channels for the duration of that item, with others reverting to static pans. Further care was needed in the cases where a CD feed needed to play during a mixer scene change.

3. In operation

As mentioned earlier, the first thing to come to grips with when operating the surround sound is that the 01V96 main stereo fader does nothing, and the main stereo L and R mix goes nowhere. That means that any mixer channel with only the S button highlit in the routing grid is not going to be heard, although it still could be sent to a direct out if required. Also, because the stereo mix is not in use, the main LED level meter to the right of the display is inactive. The result is that the level metering has to be done through the bus metering page of the display, which cannot be displayed at the same time as the metering for the input channels. With a live show, the input metering is important to maintain a continual check on the microphone levels. However, I almost always run live shows with the 01V96 being fed via its ADAT inputs from the digital outputs of an Alesis HD24XR. With the HD24XR's analogue inputs being fed by a rack of external pre-amps, its 24-column display gives me the required input level metering, leaving the 01V96 display free for bus metering, adjusting EQ, setting effects etc.

The amount of preparation paid off, as the show ran without hitches. The audience was treated to the full effect of static surround sound moving up to spinning of certain groups of sounds during some of the performance items. One particular effect I found difficult to get exact was the use of the singing bowl microphones. When the performer was using a pujol (the resonance-exciting stick that is swept slowly round the perimeter of the bowl), I wanted to synchronise the spinning of the sound field with the sweep of the pujol. The parameter wheel on the 01V96 has a fast and slow gearing for dynamic sound panning, but neither of these gears has one rotation of the wheel corresponding to a complete circuit of the sound source. Having to watch the performer with one eye and trying with the other eye to keep the rotating blobs on the surround pan display tracking the on-stage movement was not easy.

4. Conclusion

I hope that this short account of using the 01V96's surround sound features for live performance has made some other members of the Group think of possibilities of using it in a live surround sound situation. Although necessarily geared to the particular requirement I had, I've tried to indicate some problems that face the sound designer, and how these may be overcome.

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