



# defining 5.1

**DOUG MITCHELL** talks with designers and engineers about the aesthetic and technical elements that go into the production of multi-channel audio.

**M**ulti-channel music production is becoming an ever more popular issue in professional audio. In order to get a grasp on what it takes to outfit a studio to record and monitor in 5.1, I spoke with a number of professionals to get their input. The aim of this article is not only to discuss the design of the studio and the monitoring, but also the aesthetic elements that contribute to multi-channel mixes.

## 5.1 From The Ground Up

First of all, what does it take to design a room for 5.1 surround sound? I spoke with Michael Cronin of Michael Cronin Acoustic Construction, Horacio Malvino of MBR Design Group, Peter Grøenese of studio bau ton and Russ Berger of Russ Berger Design Group to get their input. According to Michael Cronin, "First of all, I think the main thing is the size — the dimension of the room — that's really the main consideration. If you're looking to build from the ground up or to retrofit, those are really two totally different animals. The ground up idea is obviously always the best way to go, however this is also the most unlikely considering existing facilities. When you go ground up, you can build exactly to the specifications that are required for 5.1 mixing. You have a lot more control over proper dimensions and low-frequency response. Whichever way you look at it, the main consideration for today, however, is that stereo is still the best part of every studio and will be for many years to come. I'm still making that the main emphasis. A room that is versatile can be good, but even if you have the best sounding 5.1 room, how often you get to use it is another view."

With regard to monitoring in a 5.1 environment, Peter Grøenese commented, "What I think the main

Typically, the more you can build in the right place, the better. What we have done is try to have the same type of speakers in all of the rooms."

Size and ergonomics are also a consideration, as indicated by Horacio Malvino: "Sometimes I am able to work with the room geometry, but almost always we have to compromise on the position of the surrounds. Usually it means they wind up over a door or are in the way. Also, there are physical space considerations.



Michael Cronin of Michael Cronin Acoustic Construction.



## defining 5.1

► in the surrounds. Well, I say the picture, movie or artistic material dictates what you do, not any kind of rule or technical thing. From a music standpoint, you don't have an image unless you're doing a video. The image becomes the acoustic space you want to create. They've been doing this in stereo for some time. I don't know what all the controversy is about as far as what to put in the center channel and what to put in the surrounds. My feeling is that engineers just need to start mixing in 5.1 and do so from an artistic standpoint rather than a technical standpoint."

Speaking of guidelines, there is the additional concern for the physical placement of the surround speakers in the room. This issue was

addressed by Michael Cronin: "I think most people are following the Dolby specifications, however, I think if you ask any number of engineers you get different answers. Chuck Ainlay will say one thing about what he likes and George Massenburg will say another. I think a lot of it becomes a preference. It's all within reason and, if it's your room, what makes it comfortable for you is the key. These are all guidelines actually, but nothing is set in stone."

Additional problems are presented when attempting to do 5.1 recordings live. Grammy Award-winning producer and engineer John Eagle related: "Most of the actual recording that we do when we're laying down tracks for an eventual 5.1 mix are monitored in stereo at the

session. All I do is that early in the game during the playback or during a break time, my assistant and I will go back and check a portion of each track we haven't monitored already just to make sure nothing funny is going on. And then we just sort of forget about it for the rest of the take.



Engineer, Toby Wright.

The producers I deal with have become so stereo imbued over the years that anything new like this just kind of throws them for a loop. Now the only place where we monitor in surround sound routinely is up at Skywalker Ranch. We do a lot of recording up there on the



Re-recording mixer, Gary Summers.

big scoring stage. That control room is really wired for film work, which means you can monitor in 5.1 on multiple loudspeakers, which gives you really spacious sound."

### Conclusion

It should be apparent that there is little agreement



# 1024 four channels of perfect preamp

2Hz to 100kHz within  $\pm 0.1$ dB

Distortion under 1ppm (0.0001%)

EIN: -140dBV @40dB gain

10 Volts for 24 Bit

Zero  
Distortion  
Technology

Test it all you like  
but judge it with your ears

The proof is in  
the performance

Listen! It's not there

# Earthworks Earthworks



## defining 5.1

### ➤ **Retrofitting For 5.1**

The other consideration is the possibility of retrofitting a room that was originally designed for stereo. Redesigning a room that was originally designed for stereo can present many problems, according to Michael Cronin: "When you're retrofitting a room, I think the biggest mistake people make is not taking into consideration the dimension of the room — what they are actually going to reproduce at the end of the day. You have to consider how the room will load up. You have to consider the sound pressure level the room was originally designed for and what you're trying to recreate now. They are obviously two very different things."

On the same subject, Peter Grueneisen commented: "Now you have sound firing from all directions. You have to consider the reflections not only from the back walls, but now also from the front walls. So it does change things a lot. All of our rooms have all been kind of hybrids — they were never originally designed to handle 5.1. For example, there's a classic way of designing rooms with a live end and dead end, with sound focused only in one direction — right toward the recording engineer. With 5.1 monitoring, this does change our perspective. We have had the opportunity to redo some rooms for 5.1 that we set up approximately five years ago. We have a reflection-free zone for stereo that will not exist for



Russ Berger of RBDG.

5.1 automatically. So, it's definitely a concern when we cannot go from ground up. In the new studios that we set up from ground zero, when we can make changes, we have to check for a wider range of things than we have to for a stereo room."

Other studio designers have faced the same situation of retrofitting rooms originally designed for stereo. Russ Berger recently redesigned Downstream Sound in Portland Oregon. He commented: "The original studios have

in the control rooms, a soffit was added and the tripping at the rear of the room was reworked. A center channel speaker and mount was added to the front wall along with provision for left and right surround speaker arrays."

### **Monitoring The Mix**

Now, once a room is designed and built, the most important thing of course is to monitor the mixes correctly and do so in a way that will translate to the end user. To get a handle on what it takes to accurately monitor a 5.1 mix, I talked with a number of engineers who work in the 5.1 realm. Chuck Ainlay has done a number of mixes for the DTS Entertainment Label including Vince Gill and Trisha Yearwood. Ainlay commented: "Obviously I went through a lot of temporary set-ups doing the initial things I did for DTS when no one had studios or facilities set up for doing 5.1. That's what encouraged me to get involved in a studio. Interestingly, I

room that works for 5.1. Not all control rooms work really well."

Toby Wright just finished mixing a new 5.1 release of Alice in Chains, which will come out this fall. His preference for monitoring was to simulate a real-world environment: "For the Alice in Chains upcoming 5.1 release, I used Yamaha NS-10s all around. I didn't use any bass management — I actually don't believe in it. The systems in peoples' homes take care of bass management; I don't have to do it in the studio. However, I do use the LFE channel to supplement things like kick and toms and so forth. Initially, when mixing the release I was experimenting



Engineer, Chuck Ainlay



Cronin-designed Cortee-Day studio in Nashville.

never had any real ambition to be a studio owner, but I also thought there was a necessity for facilities that were set up to handle 5.1. That's why I became a partner with Soundstage in the Backstage room in Nashville."

The choice of how to monitor a mix in 5.1 is rather complex. There are no firm standards for how this should be accomplished. However, many of the people I spoke with had their own biases as to how it is best accomplished. Ainlay indicated his preference for midfield monitoring: "I'm a firm believer in midfield monitoring for 5.1 — I think soffit-mounted 5.1 monitoring would have its place, kind of the way soffit monitors have their place in any studio as more of a hype

with the way bass would be handled. So, in the process of mixing, I burned a DTS disc of the material I was working on and brought it to my house, and it was boomy as all get out. I guess in that respect I had been using the subwoofer like they do in the movies. I didn't think it would play on any system in the world, and it sounded horrible on mine. So I backed off of that."

With respect to whether or not midfield or soffit-mounted monitors should be used in a 5.1 environment, Peter Grueneisen commented: "We've done both types of design. We don't have a preference in general. For example, at Sony in Japan, we did rooms with both types of systems. The big mix room has soffit-mounted



## defining 5.1

That creates an acoustical and ergonomic problem. On the other hand, with freestanding midfields, you have a lot more flexibility with respect to positioning. People can come in and change where the speakers are located. Obviously, that is not possible with built-in speakers, but they are out of the way if they're



Peter Grueneisen of studio boucton.

built in. I think a good compromise is to have a big, nice built-in system permanently, and then also have the ability to bring in near or midfield monitors and place them where you want. This way the engineer can go back and forth between the systems to check the mix."

Not everyone agrees that 5.1 is even a good music mixing format. Horatio Malvicino commented: "My experience with surround has been kind of awkward because a monitoring environment for music, to me, still sounds kind of weird. When my friend called me to listen to his mix of Celine Dion about a year ago at the Hit Factory in Miami, the room was not set up for 5.1. Unfortunately, when they were playing the mixes back, I thought it sounded really weird. You know, this whole thing about using the center channel and what goes there and what goes to the surrounds, it all doesn't seem to make sense for music. It works for film, certainly, but I don't think it works for music. There is not really a standard for speaker placement. Some people subscribe to the convention of having your main left and right at plus and minus 30 degrees and the surrounds at plus and minus 110

environment, but I just don't find it working well for music."

Perhaps as indicated earlier by Toby Wright, bass management is essential in doing 5.1 monitoring. Dave Amlen of Sound on Sound Recording in New York further emphasized this: "When we designed the room we set it up with large main monitors that are configured for stereo work. We actually bounced around the idea of setting up matching surround monitors, but everyone and their brother seems to have an opinion as to where to place the speakers, so we said, 'oh, this is going to be great. We'll put these large wonderful monitors in the wall and people are going to say they shouldn't be here'. I said, 'you know, nobody really knows what they're doing on this, so let them figure it out. In the meantime, this is how we're going to do it'. There was a learning curve in using the room, but once everyone figured out what was going on, it was pretty much great. Every room has its own unique sonic imprint and, until you've actually been in the room for a while and have gotten used to it, you're never quite sure what it's doing. You know what you're hearing, but you don't actually know how that's going to sound in the real world. Every room in the world is like this. Very few rooms are identical. And the three rooms I have here are substantially different in geometry."

### Production Standards

The other question concerning 5.1 mixing and monitoring is what standards should be followed for the production of the track. Certainly some of these standards have been adopted from the film sound community. Veteran re-recording mixer Gary Summers commented: "At Skywalker we have been recording multi-channel orchestral recordings and scores for motion pictures since

the mid 1980s. So, it's not really new as far as music recording for motion pictures, but it has had an influence on pop and music-only releases. I've seen a lot of articles on this, and certainly 5.1



MBR-designed DEAK studios in Monterey, Mexico.

mixing has become the buzz in the industry. It seems a lot of people are asking what the standards, specifications and rules are for 5.1 mixing. My response to that is there are no rules. Maybe there is a specification or there may be a standard set-up, but as they know, even for music recording they just get the best, most accurate monitor system they're comfortable and familiar with and mix the music against that. They can't replicate the average home theater system anyway. So, it's all a guess. What you do is put a system together that you're comfortable with, that is accurate and reproduces what you're recording and mixing. Listen to that! In the cinema we have it a little better because there are established standards—THX for motion picture monitoring in the theater, for instance. And even though these standards may not be perfectly adhered to in the real world, they are somewhat replicated in the field. Therefore, we are able to have a basic standard. But for music, I think it's a little different



Dave Amlen of