The Mi Casa Magicians

An Interview With The Team Behind 7.1

Gary Reber & Danny Richelieu

As long-time readers of *Widescreen Review* know, I have been deeply involved in advocating high-resolution discrete multi-channel audio for home playback. Over the years since the introduction of quadraphonic discrete recording and matrix playback, I have been a producer and recording engineer and have produced and recorded up to 32 channels of discrete digital audio, mixed down to four-channel reproduction. For three decades I have been an advocate for creating discrete holosonic® (the registered trademark) surround music and motion picture soundtracks. I have sought discussion among surround music recording engineers and motion picture soundtrack engineers, in an effort to agree on the optimum loudspeaker layout that needs to be replicated in the home playback layout. The discrete 7.1-channel capability now being made possible with Dolby® TrueHD and DTS-HD™ Master Audio is a subject that I have written about for 10 years now, and it was a Technology Conference At Sea™ topic on two of the recent Home Theater Cruises™, the proceedings of which I published in *Widescreen Review*. Now that the capability for discrete 7.1-channel is possible with Blu-ray Disc® releases, and new players, A/V receivers, and processors are now being introduced, the time has come to agree on a recording loudspeaker (representing the discrete channels) layout and corresponding home playback layout.

Both Dolby Laboratories and DTS® have standardized on the same 7.1-channel layout that I have advocated for the past 10 years. But things are not that simple, as both companies have added several variations to this default recommended standard. In my own description—the layout I advocate—I recommend frequency dividing the eight channels (equal in response capability to the other seven channels) so that two discrete channels are derived, one to reproduce the Low Frequency (or Enhancement) Effects (LFE), or .1 channel, and the other to reproduce height information, position (positioned?) directly over the sweet spot listening position.

In this On Screen interview with the pioneers of 7.1-channel recording for motion picture soundtracks and New Line Home Video's product developers, you will be intrigued with the discussion and the points of view from the insiders who are creating this new art form.

Gary Reber, *Widescreen Review*: We're at Mi Casa, and we have CEO Robert Margouleff, President and Chief Engineer Brant Biles, and Senior Engineer Holger Thiele. The focus of the work at Mi Casa is…

Brant Biles, Mi Casa Multimedia: ...is repurposing theatrical mixes for DVD presentation in home theatre. That is our primary mission objective here.

Danny Richelieu, *Widescreen Review*: And Blu-ray Disc.

MCM Biles: And…well, when I say DVD, I mean any kind of disc that gets played in the home. But definitely Blu-ray Disc, HD DVD—which as we all know is in its twilight—and standard-definition DVD.

***WSR* Reber:** Is that repurposing in both 5.1-channel and in…

MCM Biles: ...in 6.1—we are still doing 6.1—and in 7.1 as well.

***WSR* Reber:** You create 5.1, 6.1, and 7.1-channel mixes for the home?

Holger Thiele, Mi Casa Multimedia: Usually what we get are 5.1 stems and then we do the forensic work to clean those up, and then we go from a 5.1 to a 6.1 by creating a discrete center surround.

***WSR* Reber:** Now, "stems" is a Hollywood production term that many of our readers won't be familiar with, would you explain?

MCM Biles: "Stems" refer to the individual elements that comprise the final print master or mix, with those elements being dialogue, music, effects, production effects, backgrounds—sometimes referred to as ambiances—and group, which will be in a crowd scene. In *Rush Hour 3*, for instance, there's an assassination attempt at the beginning of the film and everybody's screaming, "Ah, ah, ah!" Actually when they filmed that, nobody in the room was screaming. They were all opening their mouths and wailing their arms around and being very quiet. If they were to scream, they would probably be fired because it leaves the audio mixer zero control over the level of the screams versus the level of the dialogue that they are trying to record. So they bring in what's called a loop group. It can be anywhere from three to 50 people, and you create what's called a group stem that emulates a large crowd.

Robert Margouleff, Mi Casa Multimedia: And each stem that we get is typically 5.1—and then we create 6.1 and 7.1 stems from the 5.1 stem set.

***WSR* Reber:** One other thing we should point out is that ".1" refers to the low-frequency effects or enhancement channel, which is a bandwidth-limited channel. In 7.1 mixes for Blu-ray Disc or HD DVD, that .1 is, in fact, recorded onto a full-frequency channel, or eighth channel.

MCM Biles: If it is DTS-HD Master Audio—which is a lossless compression scheme, meaning what you put in is what you get out—or Dolby TrueHD, that .1, or eighth channel, in a 7.1 configuration—is in fact full frequency.

***WSR* Reber:** Yes, but everyone refers to the LFE channel as .1 because its original concept was to represent approximately 10 percent of the full bandwidth of the audible frequency spectrum. But it has come to be called other things. I've even seen people say, "I have a 6.8 system" because they will have eight subwoofers and multiply .1 by eight, rather than use the actual true definition of .1. All right, so we got that out of the way. The studios that are your clients, optimally, provide you with the full range of discrete stems.

MCM Biles: Correct.

***WSR* Reber:** Of course, that doesn't always happen, and sometimes you don't get all those stems, and you're limited with what you can work with. Is that correct?

MCM Biles: Well, we're limited to the variety of the stem set—how broken out the elements are. For instance, Holger just finished a movie called *The Orphanage*, and we received just dialogue, music, and effects, and that's it. Three 5.1 stems—actually, I believe the dialogue was 5.0, so that's 17 tracks of audio. Then there are films such as the one I'm working on right now, *Harold & Kumar 2: Escape From Guantanamo Bay*, where you've got three tracks of dialogue—left, right, and center—three tracks of Foley—left, right, and center—a 5.0 group stem, mono PFX (production effects), mono Cloth (which is in addition to Foley), a 5.1 hard-effects stem set, a 5.1 additional-effects stem set, a 5.1 music stem set, and a 5.0 background stem set. Now when we get these stems broken out like that—with 36 tracks of audio—it gives us better ability to manipulate the final 6.1 and 7.1 mix and make it more discrete.

MCM Margouleff: The thing to understand is that a home theatre is not the same animal as the theatrical mix. I know there are some people now putting full-frequency monitors in the back of movie theatres, but it's not very typical at this time. Really, the music platform is what we've inherited in home theatre, which is full-frequency monitors at ear level, surrounding you equidistant. So the platform is in many ways much more critical because we're listening not 50 feet or 100 feet from the screen, but 10 to 12 feet from the screen in a full-frequency condition, at ear level. So we get to hear everything, and very often what we hear at Mi Casa, people on the mixing stage don't really hear. Also, it is much more high-frequency limited in the movie theatre—with the X-curve frequency response roll-off—than it is in the home theatre, where we have the fusion of the music platform, television, and the film business, which are all full-frequency mediums.

MCM Biles: And gaming. Let's not forget gaming, it's one of the biggest surround industries out there.

MCM Margouleff: Yeah, and gaming, of course. But this is now a very new platform. But we have already done a few films where we did the DVD mix first, because it's so much more critical, and then reverse-engineered the theatrical stem set off of our DVD stem set.

MCM Biles: Swinging the door the other way, if you will.

***WSR* Reber:** Which is something I wrote about many years ago and advocated that that's how it should be done. Because the primary audience is the home. A recent study stated that the number of young adults going out to the movies has decreased from 13 percent in 1998 to just 3 percent in 2008, while the stay-at-home video viewership has dramatically increased over the same period.

MCM Margouleff: Well, I will tell you, we often get dialogue tracks here that are almost to the point of being embarrassing. I mean, I won't point any fingers at anybody, but sometimes the materials come in here and Holger and Brant will spend 10 days just cleaning the dialogue tracks. They sound fine in the theatre—but when we get the theatrical tracks, it seems they would have been served very well had we had the chance to deal with the dialogue prior to the theatrical mixing. Because the purity of what we hear in here is way, way above what they have in the theatrical mixing stage, and there's also a major difference in cost. In many cases, the picture would be better served to do a near-field mix in a smaller room like this first and then go on the soundstage for three or four days to repurpose the DVD stem sets for the theatrical mix. We're really looking at a very, very different approach to film audio mixing. In many cases, there's a lot of momentum we have to overcome to do that because the inertia of the old way is very prevalent and obviously, people like to preserve their turf.

Robert Margouleff, Brant Biles, and Holger Thiele

MCM Biles: Some of the theatrical mixers seem offended that we would possibly suggest that their undeniably good work is somehow questionable. But we definitely make improvements to it.

MCM Margouleff: But the important thing to also remember is that we have a lot of directors who come and work here. The thing to understand is we're not here to change the movie or to change the artistic content of the movie. What we're here to do is to…

MCM Biles: ...raise it to a new level...

MCM Margouleff: ...and to optimize the medium. With 7.1, in general, I think that we find that we have really sort of reached a place now where the medium no longer affects the message. For example, in the early record days we used to record kick drums super hot and saturate the tape on purpose so that it would be self-limiting, because "the medium was part of the message," quoting Marshall McLuhan. But now we have gotten to a place where the medium far exceeds the needs of the content. So we have a much more free approach to what we can do. And, I might also add, we don't just work on the feature mix, we also work on other elements of the DVD or Blu-ray Disc.

MCM Biles: There are audio commentaries, documentaries, menus, and trailers that also have come through here. We are what you might call the sound police, the guarders of the gate of what goes onto the DVDs that we work on.

MCM Margouleff: A DVD is not only the movie, but it's all the other content, as Brant mentioned. It is the commentaries, it is the documentaries, it is the menu audio, anything audio that goes on the DVD. If you really want to do the right job, part of the right job is to make sure that all of those elements are level-matched. So, for example, if you go from the menus to the content, there's not a huge jump in level.

MCM Biles: And also equalized properly.

MCM Margouleff: Yeah, which really is mastering, in many ways it's analogous to mastering a record, where you level-match one song to the next. But over and above all, if you have Guillermo del Toro here or Brett Ratner here, we are here to service the needs of the director and make sure that the content really serves the story, serves the picture. And we're not here to change people's work, we're here to enhance it and to adapt it to this medium from another medium.

***WSR* Richelieu:** When you get these stems, what are you doing if you're not changing their work?

MCM Biles: The first thing we will do is we take the stems and transfer them into a SADiE [Studio Audio Disc Editor] system that we have—actually we have three of them—and go through and make a qualitative

analysis of the character flaws, as it were, of the individual stem set itself. A lot of times in music stems there will be multitudes of video monitors that directors and composers and the performers are watching, and there will be a nice 15,700-and-some-odd frequency whine that's screaming through from the video refresh rates, that is recorded and represented in the movie. Do you hear it in the theatre? No. Do you hear it in here and in most other homes? Yes. We will go through that, we will correct for that, we will actually filter it out. Sometimes there will be artifacts in music where a guy might bump a music stand in a very low-level scene where you can hear it. They will say, "Well, it's the orchestration, just let it go." But that can be corrected, that can be fixed.

MCM Margouleff: Noise level in general, hiss.

MCM Biles: In dialogue, bad edits between the ADR [Automatic Dialogue Replacement] line and the production line, where the reverb ambiences don't match, where the equalization doesn't match. The theatrical mixers have tried to the best of their ability in the room that they're in to make it a seamless transition, but when you get it on this platform, it's painfully obvious how off they are, and we can actually control and adjust for that. And sometimes they choose to just make a dialogue edit in the production itself, and the reverberation of one word might not trail into the next sentence, and it just kind of jars you because it takes you out of the movie, so we add a little reverb onto that and just smooth it out.

MCM Margouleff: We remove distortion, clicks, pops, fluorescent light hum in the background, generator noise—there are all kinds of things. But often we can save directors a lot of time on the ADR stage—which is not one of their favorite activities, I might point out—and use production dialogue because we can do an awful lot of forensic rescue work here. We have a tool called Retouch from CEDAR Audio, which allows us to remove the noise without removing the dialogue, or the music, or the effects, and actually really go in and really remove distortion, sibilance, over-limiting, fluorescent light, hum in the background, street noise, stuff that really needs to be removed.

MCM Biles: For example, there's a scene in *The Punisher* Extended Cut DVD—which is a movie that Holger worked on—where the director—under no circumstances—wanted to do ADR for this scene where the main antagonist and protagonist are in a room, and the protagonist just figured out that his partner of many years was the one who set him up to be killed, and he gives the protagonist a solution: here's a gun and a bullet, do the right thing. It's a heavy scene, and there was so much noise, just the noise floor of the room itself, that the director thought it was a lost cause, and Holger was able to go in and, quite miraculously, clean up the dialogue. Holger and I have been doing this for years, and every day I'm astounded by some of the things this man pulls off. There's a commercial for you.

MCM Thiele: I had worked on the original release in 2005 or 2004, and then they came back and the only thing they handed me was a production dialogue track and said, "Here, this is the dialogue. Make it work with the movie." So, of course, after doing all the work on the production dialogue, I made suggestions for ADR, and we did a couple ADR lines, but the scene that Brant was pointing out, there was so much noise, but the director, Jonathan Hensleigh, said, "Under no circumstances are we going to redo this scene because I will never get this performance back. So, make it work." So, they appreciate what we can do, but sometimes it's a lot of work. With this tool, Retouch, we can do spot EQing within a mix. Trying to fix things like that could also be a problem of the work flow in the mixing stage. They most likely don't have the time to deal with all of these things. They don't hear it, and then it's not like here where there are one or two engineers working on one movie, they have a dialogue editor, a music editor—they may run eight Pro Tools rigs on a mixing stage, plus three mixers, plus hundreds of other people working there. So to stop everything and just fix this little bit of noise, they might as well just forget it.

MCM Biles: Yeah, it's time versus money in theatrical mixing. With *Harold & Kamur*, I'm doing this Choose Your Own Adventure where there's 28 minutes of additional footage that I've just been handed raw production dialogue tracks. When I pulled it out, I thought, "Oh, wow, now I see what these theatrical mixers are having to deal with and what they are compensating for." So they're pretty much taking it 80 percent of the way, and we take it that extra 20.

***WSR* Reber:** I want to come back to the X-curve. So when you get the stems, do they have any frequency processing in them, or are they flat?

MCM Biles: They are flat from the stage as we get them. Whether someone has processed…

MCM Margouleff: What EQing they have done to those stems is on there.

MCM Biles: Yeah.

***WSR* Richelieu:** And you won't know what EQing has been done?

MCM Margouleff: No, whatever it is, it's what we hear.

MCM Thiele: And that's what we work with. We're not remixing the movie, we're remastering for a different playback system.

***WSR* Reber:** I understand, but in theatrical, they take those stems and they do a final mix and they apply EQ. That's what I'm talking about, you're getting them, pre-EQ. You're not getting that final where they put in the X-curve EQ and all that. That's my point.

MCM Margouleff: Correct.

***WSR* Reber:** So basically, you're dealing with a flat-frequency response like you would in music rather than off a theatrical stage…

MCM Biles: Now, see, I've got to say something here. There have been times when we have taken these stem elements and we also get a copy of their print master, and we have put the stems together and put them at unity gain and flipped them out of phase with the print master, and you end up with nothing. So to say that there's additional EQ on the print master that doesn't exist in the stem sets, is not correct.

***WSR* Reber:** Not always.

MCM Biles: If there's some special process—I mean there might be, it's probably film dependent, depending upon who is the lead mixer—as to what goes on the theatrical mix.

***WSR* Reber:** Right, but they can be overly bright, because that was the whole point of the THX® Re-EQ—to deal with that added brightness that is inherent in the theatrical mix and reduce the brightness in the consumer's home with a button that would…

MCM Margouleff: Yeah, the dumb-down button.

MCM Biles: Basically, the X-curve starts at 2 kHz and drops 3 dB/octave, so you're 3 dB down at 4 kHz, 6 dB down at 8 kHz, etc.

***WSR* Reber:** Right, and what you're doing is making a mix that you don't need to do any of that.

MCM Margouleff: Yeah, and what we do is not just a general fix-everything button, which is some sort of generalized approximation of what they think it should sound like to imitate the playback in a movie theatre. We don't want to imitate the playback in a movie theatre. This is not a movie theatre, it's a home theatre, it's a different platform altogether. And very basically, the THX Re-EQ process on receivers and preamps is basically a dumb-down button. It dumbs down the top end so it sounds like a movie theatre. When we finish with the mix here at The Casa, it sounds equal to or better than the original, because it is full frequency and we don't dumb the mix down to sort of make it sound like a theatrical mix. It's not a theatrical mix, it's a home theatre mix.

MCM Thiele: On New Line DVDs they put a little information blurb in there letting the user know that no additional equalization is required because it has been mastered for the home theatre playback.

3/13

Brant Biles Working With The DTS-HD™ Master Audio Encoder.

MCM Biles: You know, we're sitting here in a room in Studio A, where we're surrounded by Genelec loudspeakers—and Geithains in Studio B, and once again Genelecs upstairs in Studio C—but on the front end of these monitors is $2,500 to $5,000 per channel of equalization. And our rooms are tuned by Bob Hodas, who comes in every other month and makes sure that the response is flat and that our EQ curves are correct so that what we're listening to here is as true as it can be.

***WSR* Reber:** Exactly, and you're also dealing in this facility with a real living room-sized area. This is what you'd expect in someone's home. Well, I don't know if the spouse factor would approve of all this stuff, but still, the room size is pretty much right on.

MCM Biles: It all depends upon the spouse.

***WSR* Reber:** Yeah, exactly. But has THX commented on your work at all because, you know, they're a big proponent of…

MCM Margouleff: No, we really have very little to do with them. I've met a few of them on the Home Theater Cruise—somebody on the last Home Theater Cruise I was on, which was not last year but the year before. But we really haven't had any real meaningful interaction with them at all.

MCM Biles: I will say that when we put in the first two, and now three rooms that we have here, THX came to us and said, "You should to pay us $10,000 for our small-room certification." And I said, "Excuse me? I think THX should pay me $10,000 to put their logo by the door of our studios." You know, THX is a minimum standard of gear and room acoustics.

MCM Margouleff: And I underline the word "minimum."

MCM Biles: And everything in this room exceeds well above and beyond the THX standard.

***WSR* Reber:** Yes, I agree. Now let's talk about configurations first, because in my writings over the years I've been advocating this specific setup, at least for the main loudspeaker array at ear level, which is six slices of pie equiangular to the sweet spot. There's only one true absolute sweet spot.

MCM Biles: Actually, now it's eight pieces of pie.

***WSR* Reber:** Yes, eight, because there is a center channel, but six are exactly equiangular relative to the sweet spot. So six equiangular slices, with the front slice cut in half by the center channel.

MCM Biles: I like to think of it as the Star of David plus a center.

***WSR* Reber:** That works. Now, on two of the Home Theater Cruises, we tried to deal with this whole issue of setup and placement so that the creative community could tell us, the consumer, how to properly set up our room if you choose to have an optimum playback situation and duplicate exactly what the creative community is delivering on the disc. And you know what happened there, it was total chaos, no one could precisely agree.

MCM Margouleff: Well, what happened basically is we had a Siamese twin. One part of the twin was a bunch of music engineers, and the other part of the twin was the movie guys—of which I think we were the only ones there to talk about movies. But the music guys are always trying to figure out their own standards. And all those engineers say, "Well, we're going to have our own music standard." I say, "Guys, the film community's had the standard for years. This really works. Why don't you co-opt so everyone stays together." But they went on their own with SA-CD and DVD-Audio and this system and that system, and they couldn't decide on the monitor placement when the monitor placement was already decided by the film community. So basically, there's just very little communication. There was always a major disconnect between the film world and television world until the advent of home theatre. Television was always big picture, little loudspeakers, but the theatrical motion picture was always more advanced. It still uses big orchestras and a lot of audio, and still utilizes the platform to the fullest with sound effects and dialogue. It is the most demanding on any sound system. And I think the problem we had on the cruise was the guys who came aboard—who are really great major audio engineers, who I have the deepest respect for because that's, after all, where Brant and I came from—were still striving to come up with their own set of standards in their own world, and they're very reluctant to co-opt anything to stand with one standard. I mean, this whole thing with HD DVD and Blu-ray Disc is just very indicative of the kind of mentality that we face.

MCM Biles: I was there as well, and I remember it a little differently. I think we all said 5.1, stop there. Stop at 5.1. You know, you're now asking for 6.1 and height channels and all these alternate mixing formats, and they were actually trying to put an end to this snowballing of technology and various algorithms of loudspeaker setups and different parameters that is getting confusing, which I, on that level, definitely agree with. We work in home theatre audio on a daily basis, and right now, hooking up a Blu-ray Disc player to an A/V receiver and trying to get 7.1 lossless audio to decode properly is a nightmare! I mean, I've given up on decoding inside the player, I don't know what that's all about. I still have yet to see that actually happen. It's confusing to me, it's confusing to Holger, it's confusing to everybody I know, and we WORK in this industry.

***WSR* Reber:** Well, we'll come back to that, but the only thing I can say about this is that there's never been really a home theatrical standard except for the number of channels.

MCM Biles: Right.

***WSR* Reber:** There's been no communication with how to set up the loudspeaker configuration in the home. Configurations of loudspeakers have never been settled upon or recommended or agreed upon as an industry standard, and that's what I was trying to achieve on the Home Theater Cruise is how to do that along with the multichannel music.

MCM Biles: Well, I think here's the problem with that, Gary. I think a lot of people are afraid to actually stick their necks out and say, "This is how it should be done."

***WSR* Reber:** Why is that? That doesn't

4/13

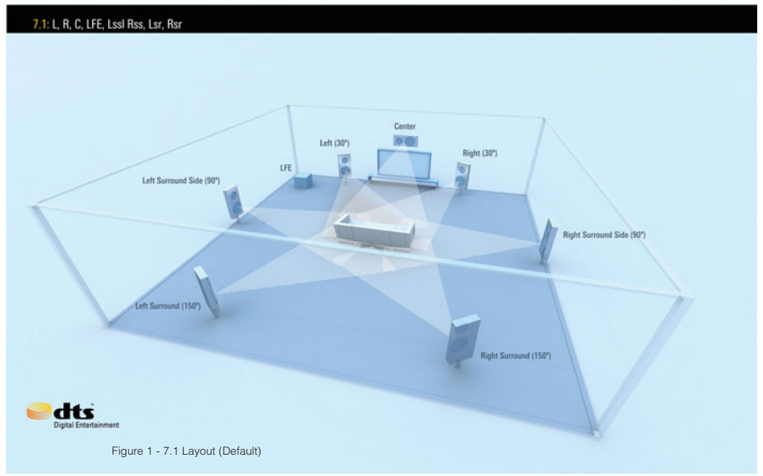


Figure 1 - 7.1 Layout (Default)

mean that the consumer HAS to do it, but we recommend it.

MCM Biles: Why is that? Because everybody has opinions, and for me, center on center, left and right, are off 30 degrees plus and minus. You know, the sides are at 90 degrees and the rears are at 135. That is our setup and, for me, that's what I think is the most, to coin one of your phrases, "holosonic" audio experience that you can have.

***WSR* Reber:** Well, I'm just saying that the big problem here is coming up with a single standard. And I thought that Dolby and DTS now have settled on this basic default configuration.

MCM Biles: Oh, no, no, no, no, no!

***WSR* Reber:** All right, well, let's go through that. What you have here is essentially the basic configuration I've been advocating for a long time.

MCM Biles: Well, here's, to the best of my knowledge—and see, I'm going to be that guy that just tells you the truth, okay. Whether you like it or not, that's the way it is. There are seven—yes, seven—7.1-channel configurations that were agreed upon by the standards committees for multichannel audio delivery for HD DVD and Blu-ray Disc. Dolby and DTS have simply provided the tools to represent these configurations as dictated by the standards committees. They include the one we were talking about, with the Star of David plus the center channel [Figure 1]. There is a configuration where it's three loudspeakers in the front and four in the back, so you've got sort of like this crown behind your head [Figure 2]. There's a configuration where it's five in the front and two in the back, where the two outside loudspeakers in the front are at +60 degrees and -60 degrees from the center, and they call that the left-wide, right-wide configuration [Figure 3]. There's also a 6.1-configuration with a mono channel right over your head, what they call "Voice of God" loudspeaker [Figure 4]. There's that same 6.1-configuration with a height channel that's in front of you and elevated [Figure 5]. There's a 5.1-configuration with dual-height channels in front of you and elevated [Figure 6], and there's a 5.1-configuration with dual-height channels that are in the center of the room over your head. So, to say that they agreed upon something, they agreed that there are numerous ways that you can use the technology.

***WSR* Reber:** So that just adds more confusion because, which one do you choose, and which one should be standardized? In my opinion, this is acting irresponsible, as no one could expect people to reconfigure their loudspeaker layout for different program content. The default recommendation is what you describe as the "Star of David," plus a center channel. This is logical and is the layout configuration that I have advocated for the past 10 years in *Widescreen Review*.

MCM Biles: It's funny you should ask because we did a multitude of experimentations. We actually have loudspeakers over our heads that we can move to various positions in the room to test them for front heights or side heights or mono overhead in 6.1, as I was saying before. And we went through and did some experimentations and found, quite honestly, that unless it's specific localized sounds, like a bird or an airplane flying overhead, other than those two things, the height is not really that useable. Now, if you have a movie where there's big thunderclouds and storms like that, great, but when you hear wind and stuff, out in the regular world, you basically hear most everything on a flat plane.

MCM Margouleff: That's the way your ears are designed.

***WSR* Reber:** The purpose of the height channel should be limited to reproduce what you describe. And when properly executed, this can result in an impressive experience.

MCM Biles: We found that keeping all the loudspeakers on the same plane, like I said—three in the front, two on the side, two in the back—seems to be the best and most holosonic way to represent a mix, and it also—I'm totally going out on a limb and guessing—is probably what most people are going to do because it sort of puts you right in the middle of everything.

***WSR* Reber:** I agree, so then these six additional configurations are just confusing, and it's never going to work, because how is the consumer going to deal with this? We're back to the old ITU versus this and that, and that's what I could never get the music guys to agree on. They had all these variables all over the place. "Just do what you want, it doesn't really matter," was the view they held.

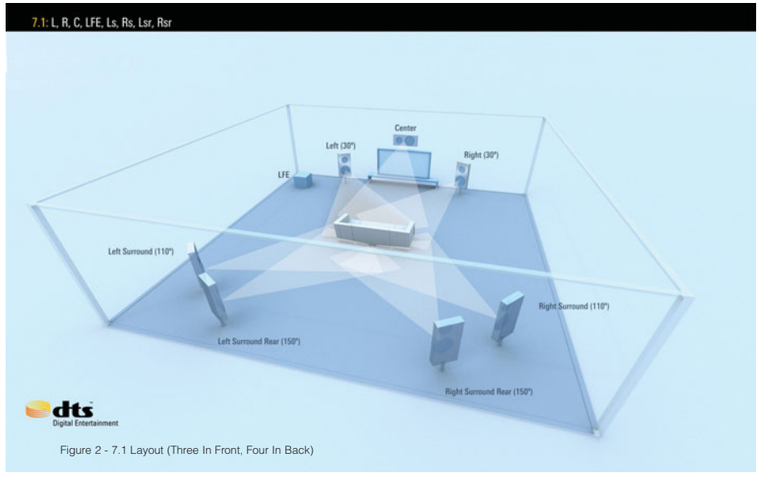


Figure 2 - 7.1 Layout (Three In Front, Four In Back)

5/13

MCM Margouleff: Well, art is about variables.

***WSR* Reber:** Yeah, but you're creating the art here, and you've got it set up a certain way in a certain spatial relationship, and if you want consumers to hear what you hear, they should re-create this loudspeaker configuration in their home.

MCM Margouleff: A lot of people don't want to hear what we hear, they want to create their own stuff. Basically, they have their own concept of the way they want to do something.

***WSR* Reber:** So you don't think it's a valid argument...

MCM Margouleff: Not that it's right…

***WSR* Reber:** ...that people should try to emulate what you have?

MCM Margouleff: Of course, but that's not always what happens.

***WSR* Reber:** I know it's not what always happens, but don't you think that you should be educating consumers that this is the way to properly re-create the art you created.

MCM Margouleff: We are.

***WSR* Reber:** No, there's no education on the New Line disc. They don't show a physical map of where all the loudspeaker placements are during production.

MCM Biles: That was a suggestion that I nonchalantly made the other week to some folks at New Line, that, "Hey, I've got an idea to sort of get around this confusion. Why don't you just put a little circle on the disc with points as to where the loudspeakers were when it was mixed."

***WSR* Reber:** Exactly. Such education is very much needed. Now that we have 7.1-channel capability via Blu-ray Disc, such education is crucial to realizing the full potential of the format's sonics.

MCM Biles: So if somebody wants to mix with four channels in the back and three in front, let them, there's a little teeny documentation that shows you what the loudspeaker configuration is if you want to listen to that particular mix in its original configuration.

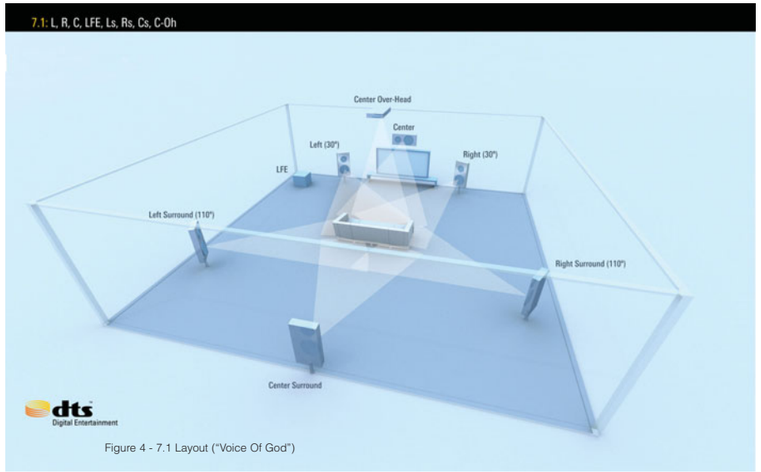


Figure 4 - 7.1 Layout ("Voice Of God")

MCM Margouleff: I think that the platform is constantly evolving and constantly changing, but I happen to think that the 7.1 format is phenomenal. I really think it filled in the spaces. It helped to really create what I like to call "subjective audio," allowing the audio and the listener to occupy the same space, whereas the film has always been inside a proscenium, an objective experience where all the film is happening inside this picture frame, and, therefore, all the sound should occur in the picture frame with just a little bit of reinforcement in the room. I believe that to really have the subjective experience, the sound needs to move into the space so that you occupy the same space as the sound. The listener has that subjective feel that you're involved in the picture so that the picture leaves the screen. And now with 3-D coming to home theatre—and it is going to be here soon, very soon—I think that we're going to be able to move stuff into the room along with the picture and be able to follow the motion vectors of the images with the audio. And I think that that's going to be the next big thing. 7.1 has given us two extra channels in the room and that has made a huge difference in the way we perceive sound in the room, and I think it's been a marvelous thing, and I'm happy to see it. I really am, and I'm loving it.

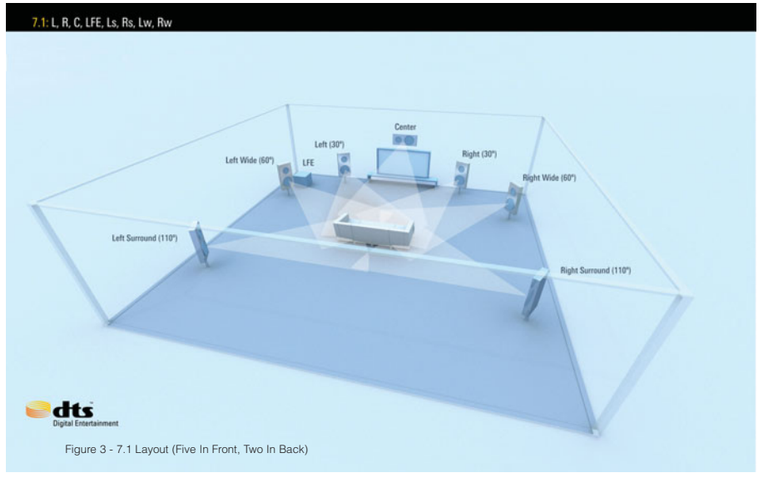


Figure 3 - 7.1 Layout (Five In Front, Two In Back)

***WSR* Reber:** I agree with that, too. I totally agree with that. But I think any good mix, even in quad, with four 90-degree-included angles relative to the sweet spot, can be tremendous. If you were able to listen to Alan Parson's mix, his actual mix of Pink Floyd's *Dark Side Of The Moon* with the loudspeakers set up exactly as the channels were when he mixed it, it is phenomenal. There was total front, sidewall, and rear phantom imaging, because it was mixed that way. The channel loudspeaker configuration was compensated for in the mix, and if you played it back in the same configuration exactly the way it was mixed, you could enjoy all that.

MCM Margouleff: Yeah, you'd hear things occurring in space.

***WSR* Reber:** Now we've gone to more channels, I mean, the 5.1 was basically four channels, which we had in quad, plus a center channel and a subwoofer to reproduce deep low-frequency effects. Now we're going to be able to have side channels to have that phantom imaging even tighter. I agree with you, that's what we should be doing. Some film people still like this proscenium, they don't like anything in the back. That's unfortunate, as it clamps down on the spatial

6/13

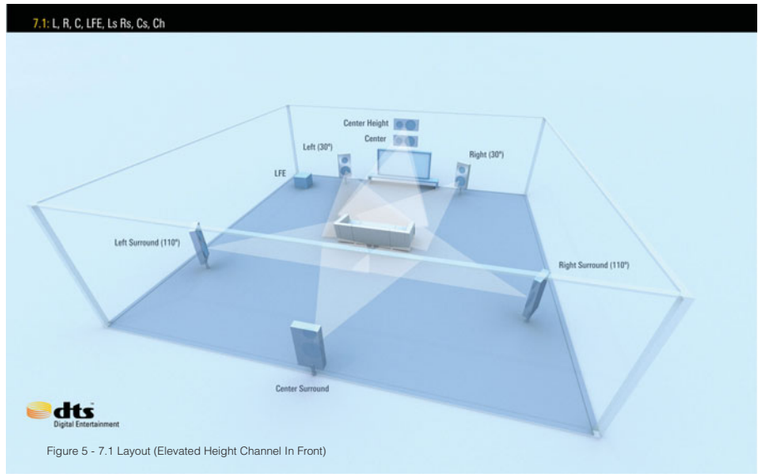


Figure 5 - 7.1 Layout (Elevated Height Channel In Front)

holosonic experience. Other soundtrack mixers are successful with aggressive holosonic mixes that put us in the scene.

MCM Margouleff: I think it's a combination that you get a certain amount of objectivity. I mean, you wouldn't have dialogue coming out from behind you if you saw a guy talking on the screen.

***WSR* Reber:** Exactly.

MCM Margouleff: You want to have the objective recognition of what needs to occur on the screen, but there are other aspects of it—music, sound effects, for example—that really do need to live in space, that really need to live in the room, and I think that is what we've really discovered and brought from the music business, to be able to bring that kind of experience, to make the experience as tactile as possible. The more you do that, the more you really touch the art of the movie, and I think that is really critical. I think that doing a 7.1 mix first before you even do the theatrical mix would reveal a tremendous amount to the mixers and to the directors, and I think you're going to start to see in the next year or two, more support for being able to do the DVD audio first and then repurpose the DVD stem sets for theatrical.

***WSR* Reber:** Yeah, I agree, I've advocated that for many years. All right, now, the other thing is that I still think the big bottleneck here is going to be in standardizing how to play all this stuff back, because you've got other things involved now. We don't have SA-CD anymore, and we don't have DVD-Audio anymore. So at some point the music community should come over to this. And, hopefully, with Blu-ray Disc the music world will embrace surround music as a holosonic experience.

MCM Margouleff: Some of them are moving ahead, but, again, you have the inertia issues with, "This is the way we've done it for 50 years, and we're going to continue doing it this way. And who are you to tell us that you know better than us?" But I think that in the end, just like everything else, a lot of the hardware is so new now and, like Brant mentioned earlier, there's even confusion among the pros—this is just going to take some time to sort of settle itself out—and I think that the marketplace and the manufacturers and people who are using it will generally start to find the moments of truth. They'll start to find out what works and what doesn't, and a lot of this stuff will be abandoned, not by virtue of saying you can't use it, simply by virtue of the fact that it won't get used.

MCM Biles: I was just going to say, there are some music products that are out there in Blu-ray Disc. There's Nine Inch Nails, there's live Dave Matthews. It looks and sounds great. It's only 5.1. I honestly wish that more music mixers who are mixing in 5.1 and mixing in surround would actually take the time and listen to really good movie mixes in surround and learn from that experience, because I find that most "5.1 representations," and I have my fingers doing quotation marks, "5.1 representations," of music mixes for DVD releases are very poor. They just sound bad. You'll switch between the 5.1 and the stereo, and there's zero difference. Are the loudspeakers even on? Oh, yeah, there's a little reverb back there.

***WSR* Reber:** Yeah, some of them. Those are the guys who want to stage a concert seating mix, they just want ambience in the back. And there are other people who actually have very aggressive surrounds in the back. It's all over the ballpark, but that's the creative decision, how they want to use those channels. The important thing to me, still, is getting a standardized format for loudspeaker placement in a home. If people know what the optimal configuration is, they can see the diagram on the disc, they can see what it is, and it's uniform across the whole industry. If they decide to do something different, then they know they're compromising. But at this point, the majority of people don't know what they're doing. They don't know that they are, in fact, compromising.

MCM Margouleff: Well, we're behind our chosen loudspeaker standard layout, and we're not alone with this format. And I think that our work speaks for itself. I don't have to tout anything to say that we know that what you want to do is get even coverage of the soundfield. I mean that makes total sense.

MCM Biles: I know that DTS is trying to address the issue of multiple loudspeaker layouts with loudspeaker remapping technology. It was my understanding—this is going back a year, year-and-a-half ago—that you

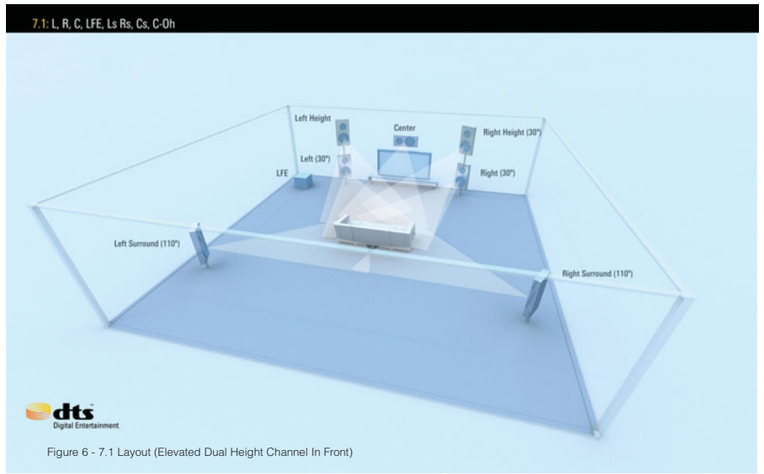


Figure 6 - 7.1 Layout (Elevated Dual Height Channel In Front)

7/13

would be able to tell your home theatre receiver, which of the seven configurations for loudspeakers you use. You'd pick if you have configuration A, B, C, D, whatever it is, and then the receiver itself would look at the incoming encoded data, which has a thumbprint of the way it was mixed, and would remap the channels to whatever configuration you chose to set up in your house. That's the way it was supposed to work. It doesn't happen at all, from what I know. I have never seen a single…

***WSR* Reber:** What? Why do all that manipulation? It's just ridiculous to do all that.

MCM Biles: Because they can. It's a great idea.

***WSR* Reber:** Yeah, if you want to get that complicated, but why make it so complicated?

MCM Biles: Some mixers want to mix in a certain configuration, and some want to mix in another configuration. You're not going to be able to change that, you know. Do you wear boxers or do you wear briefs? That's what it comes down to. These are choices that people make on a very personal level, as to where they want to put their loudspeakers.

***WSR* Reber:** But this is not an art form with numerous variables. It won't work if it is. You don't go into a movie theatre, and every movie theater's got a different way of doing it. They standardize on virtually every parameter.

***WSR* Richelieu:** But loudspeaker remapping allows the consumer to set up their system how they want to—or need to, based on room limitations—and then the receiver can see what the engineer did and remap it to the consumer's home.

***WSR* Reber:** I understand the idea, I understand all of that, but I think it's overcomplication, and I don't think there should be that many variables. And remapping will never produce the intended result, only the exact duplication of the mix setup parameters will.

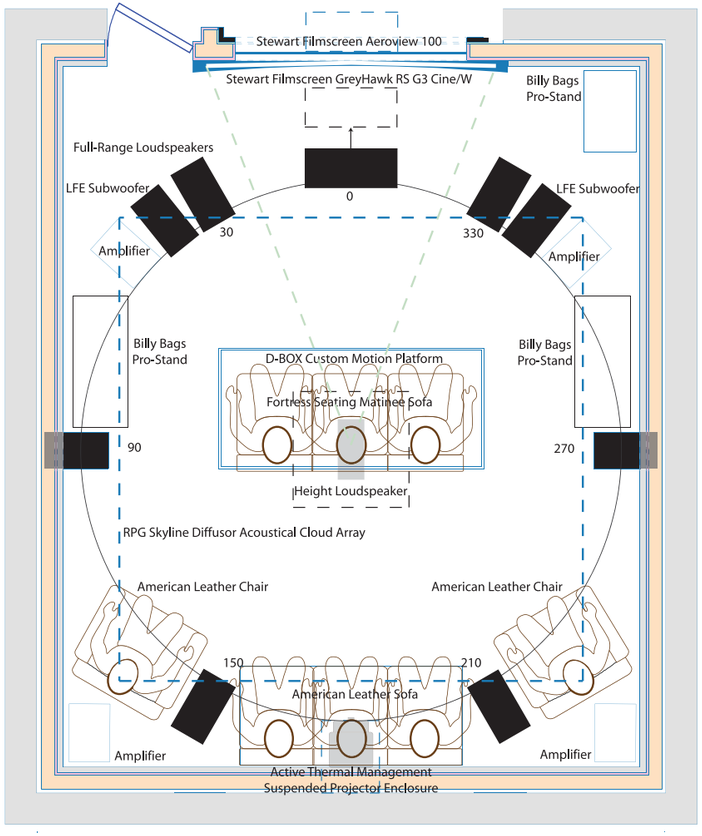
***WSR* Richelieu:** But if it's seamless, why not?

***WSR* Reber:** I just don't think it will work. I have not experienced it. The other six optional loudspeaker layout configurations will not properly convey the experience mixed in the default configuration.

MCM Thiele: It gets complicated because from what I know, there was no communication between DTS or Dolby as an encoding software provider, and Denon, Panasonic, Sony, whoever's building consumer receivers. I think the remapping absolutely makes sense because we mix in the 7.1 system with the sides at 90 degrees. If someone doesn't have the space because the room is too narrow, so they have to move it to the front with five in the front and two in the back. They should be able to tell the receiver, you know, I don't, unfortunately,

Optimum Performance Home Theatre™

Reference Holosonic™ Spherical Surround™ Home Theatre Laboratory



have the Mi Casa 7.1 setup, but I have this system. And Brant and I actually sat in Studio B and in Studio A and came up the remapping coefficients for our mix and sent it to DTS so they could implement those things.

***WSR* Reber:** I understand it for that kind of situation. But, for example, you don't want to move sonic spatials meant for sidewall reproduction to the front of the room.

MCM Thiele: The complicated thing is that the receiver manufacturers all cook their own boxes.

MCM Biles: Yeah, they all dropped the ball.

***WSR* Reber:** Exactly. Because there's no communication, and thus no agreement on an optimal recommended loudspeaker-placement standard.

MCM Biles: I'll tell you what we don't need in home theatre receivers is a "Rock" setting and a "Jazz" setting and a "Superwide" setting and a "Coliseum" setting—you know, those DSP-processing settings for reverb and delays and stuff to make your room seem bigger than it really is. It's a crock if you ask me, because it's really super augmenting the sound of the film that you're listening to.

***WSR* Reber:** Yes, I agree with that.

MCM Biles: I want to see that DSP power used for something real like loudspeaker remapping.

***WSR* Reber:** I agree in principal, but the final verdict is dependent on the results. Now, moving on, *Widescreen Review* has been in the industry for over 15 years, and we still, to this day, do not have the proper equipment to play even what you guys are putting out on New Line. Imagine that. Either the equipment is not available or what is available does not work properly.

MCM Biles: We just got the proper consumer electronics equipment a week ago.

***WSR* Reber:** Imagine that, you are the people creating this new spatial content, and we are a leading-edge magazine on technology. You just got consumer playback equipment to hear your work, and we still don't have it. And now I come here and learn from

8/13

you that even the Denon product that you have here isn't properly designed for what you're doing.

MCM Margouleff: I'm sure they'll come up with a rationale to defend themselves.

***WSR* Reber:** Well, they will at some point, but at this point…

MCM Margouleff: There's going to be a rash of letters to the editor by the time we get back from the Home Theater Cruise in late May. There's going to be a major eruption at your office, I already see it coming.

***WSR* Reber:** You're probably right. As you know, a major theme of this year's cruise to Alaska is 7.1 surround, with you and Brant on the Technology Conference At Sea program, May 30 to June 6.

MCM Biles: Here's the thing that bothers me, is when the companies came up with these seven different loudspeaker configuration empirical ideas...

***WSR* Reber:** What companies?

MCM Biles: Well, I think it was organizations like SMPTE, AES, and there were probably tens of others involved that I'm completely unaware of. Then these policy setters have conversations where they use words like "default." Oh, well this is the default setup of the seven configurations. What do you mean default? What's default? We have seven to choose from, and they're all equal, right? Oh, well no, the default setup is to have a pair of channels in the very back and then a pair of surrounds. And in any configuration other than that, the home theatre receiver is not going to properly show you that you are getting a 7.1 signal. We have received a lot of e-mails where people are thinking that they are not getting the proper output from their receiver when, in fact, they are, but the receiver is referencing and showing incorrectly what is being output to their loudspeakers, to the different channels. For instance, unless we are using two of the seven DTS standards for the 7.1 encoding, the Denon receivers will not properly show consumers that they are actually getting a 7.1 mix. They graphically show you that you are getting a 5.1 mix, but on the output side they do output 7.1. It's confusing to me. It's confusing to all of us.

MCM Thiele: The playback is seven channels, 7.1 channels coming out of the back, but since the display's not programmed to read a certain configuration in the encoding, it shows you 5.1 only. It's kind of like it's out of range. So they don't show the additional two channels on the display, but you can hear it.

***WSR* Reber:** In other words, you take the Blu-ray Disc player, and you run the HDMI out to the receiver…

MCM Biles: Correct.

***WSR* Reber:** So, you are saying that in that configuration, it's still not right.

MCM Biles: The actual sonic information that is coming out of the channels is correct, but the representation on the front panel of the device is incorrect and leads the consumer to believe that something is wrong.

***WSR* Reber:** Now, who is dictating the standard to the electronic manufacturers?

MCM Margouleff: The people at CES.

MCM Biles: Now what is cheaper to manufacture, a faceplate that has static LEDs that show loudspeaker representation as little boxes, or some sort of full-text display that could change with the configuration of the incoming encoded data? Well, that's going to take DSP, and that's going to take scrolling, and that's going to, you know—what they did was they put a one-scenario-situation representation on the front panel of their receiver, and what we are mixing as our default, what we have found to be the most compelling configuration, doesn't show up properly.

***WSR* Reber:** That will also add more operational complexity, which we do not need. So, once again, the loudspeaker placement that you're using in this room, describe it.

***WSR* Richelieu:** We'll start, from center is zero.

MCM Biles: Center is zero. Plus and minus 30 degrees for left and right. Plus or minus 90 degrees for the sides. And plus or minus 135 degrees for the surrounds.

***WSR* Reber:** That's your basic setup. That's virtually the same setup I've been advocating also, and it sounds great in here. It's spatial, it's enveloping.

MCM Biles: It's fun!

***WSR* Reber:** And it's fun. Because in that setup you've got six 60 degree vectors in which you can do anything you want in terms of phantom imaging. And it holds up solid, that phantom imaging.

MCM Margouleff: Absolutely correct.

***WSR* Reber:** So it all works great, and then the center channel is at zero, and that's simply because we've got to have it because people sit over here, people sit over there.

MCM Biles: Well, I'm going to make a correction here. We go to 135. What you say would be 150 in the back.

***WSR* Reber:** That's why I said "virtually," because you're wider between the two surround channels. In our current setup at *Widescreen Review* we are at 90 degrees included, between the surround left and right [135 degrees from the center channel], with a center surround for 6.1.

MCM Biles: I'm going a little wider at 135 degrees because I want to take that 135 and then matrix decode between the two into 180-degree loudspeakers.

***WSR* Reber:** You want to still do the 6.1.

MCM Biles: 6.1 with two sides—8.1.

***WSR* Richelieu:** That brings up a potential problem. People that upgraded to a 6.1 system now have a center surround, but what happens if they listen to one of your 7.1 mixes?

***WSR* Reber:** Well, the center surround is still going to be great because it's phantom imaged between the 60-degree surround vector.

***WSR* Richelieu:** But what I'm saying is, in Mi Casa's configuration, the side channels are the sixth and the seventh channels in a 7.1-channel setup, correct?

MCM Biles: Unfortunately, no.

***WSR* Richelieu:** No?

MCM Biles: It's a long story, where somebody forgot to ask some questions, and most of the encoding algorithms, the side channels, are actually considered the surrounds of the underlying 5.1 mix, and the back channels are considered the extra channel one and extra channel two, or channel 6 and 7 if you want. I think it was a gross oversight.

***WSR* Reber:** I want to come back to the 135 because 135 is…

MCM Biles: It's 45 degrees off center in the back.

***WSR* Richelieu:** If you're looking at the back of the room, it would be 45 degrees plus or minus, or a 90-degree included angle in the back.

***WSR* Reber:** As I mentioned, that's the setup we have in our theatre right now, a 90-degree included back.

MCM Biles: And a 60-degree included front.

***WSR* Reber:** And a center back, and then we're currently using a 70-degree front because a 90-degree front was too wide because they didn't mix it that way. So they didn't compensate for the hole that would be created because they weren't listening at 90 degrees relative to the sweet spot.

MCM Biles: But there's a loudspeaker algorithm that gives you a 120-degree included angle in the front—that would be the left-wide, right-wide.

***WSR* Reber:** Well, anyway, the thing is, what I really mean, you're still using that configuration, 90-degree included angle in the back, but now you're using a 180-degree included angle on the sides. So between the rear and side is a lot less than between the front and side. It is not equiangular.

MCM Biles: That is correct.

***WSR* Reber:** And what I have advocated is that they all should be equiangular, equidistant, and at equal height, and then it will phantom image perfectly in a center back or in between the side and back. So there are six of those equiangular pies. So that's what I'm talking about. And that works great. If you want a "hard" center back from that configuration, use the Dolby Surround matrix, to get 8.1 channels. But you don't need it because the phantom image, created within the 60-degree included angle, will give you a realistic center back. Just like a phantom image will give you dialogue in the front, or a singer's voice in the front, or a horn playing a solo in stereo, except for those listening outside the sweet spot.

MCM Margouleff: I want to say one thing that's a little tiny bit off the subject, but I think we have to give a huge amount of credit to the people at New Line for being brave enough to allow us to experiment with all of this stuff before making a commitment to release it. We can talk about hardware from now until doomsday, but unless we have the software to put inside the hardware, we're nowhere. And I know that other companies have been doing experimental work with it, but New Line especially has been aggressive through our eight years of working with them, of always trying, giving us the liberty to try things and to experiment and to find out what's best. And those guys come over here and are genuinely fans and get excited about what we do here. That has been a real blessing for us. So, I do say thanks to people like Jesse, Travis, Mike, and Alex, who come over here, who have really allowed us to do this experimental work and to take it as far as we can.

***WSR* Reber:** I, too, applaud New Line's progressive support. I think we've got to now focus on industry coordination and consumer education, so that we're all on the same page. And you tell us the story of this Denon receiver in which it properly outputs, but its display says it's not receiving 7.1. That's a problem.

MCM Biles: I would agree.

***WSR* Reber:** That is a problem. Now I don't know about the Pioneer receiver, I don't know about the Sony receiver, I don't know about the Onkyo receiver, because we don't have those to check out. And have you checked out any of those other ones?

MCM Biles: No.

***WSR* Reber:** Or is this the only one you've checked out?

MCM Biles: We don't have the time. We are not *Consumer Reports*…

***WSR* Reber:** I know, but you're mixing for the consumer, and the problem is that these things aren't even available out there. You've got only a couple of Blu-ray Disc players that can output 7.1 channels. Now let's talk about that issue. Why wouldn't all of the Blu-ray Disc players or HD DVD players output an eight-channel mix?

MCM Biles: Well, first of all, the Panasonic DMP-BD30 that we're using passes the DTS-HD Master Audio-encoded bit stream over the HDMI 1.3 cable to the receiver. That it does properly, and the receiver decodes it into the 7.1 mix.

***WSR* Reber:** The Denon receiver.

MCM Biles: Right. I think the reason is that people and manufacturers were so hot to get things to market that they went ahead and said, "You know, there's an Ethernet connection on the back of this for firmware upgrades or we can do firmware upgrades through burned CDs, so let's just get it out there to market so people can buy it." Now this Panasonic costs under $600. A friend of mine has a $1,200 Sony Blu-ray Disc player, and he was appalled when I went over to his house and had to regretfully show him that the $1,200 player he had would not do the same thing that my under-$600 player would do, because it came out three weeks previously. And they just wanted to get it to market so people would buy it. And I went online and burned him the firmware CD, and he did the upgrade. I'm not sure if that worked. Same situation with the Samsung Blu-ray Disc player at New Line in their listening room. Same issue, it would not pass the DTS-HD Master Audio signal down the HDMI line. And here I am, running around town with our Panasonic player saying, "Look, this stuff does work. Here is the proof. We'll hook this player up. Look, it's working. There you go. Here's a little test disc, pink noise on all the channels. Now let's hook yours back up." And people just stand there, and they're dumbfounded. They're speechless that these things would have gone to market and not have been able to deliver what they promised. Now I know with the Samsung, they went through a firmware upgrade from an online Web site, and it worked. I think New Line is using a Denon 2808 receiver. But here's the scary thing, we get, and they get, e-mails from consumers—and these consumers aren't idiots, these are people like yourself and like me who are knowledgeable in the field of electronics...

***WSR* Reber:** They're *Widescreen Review* readers, they're knowledgeable. But our readers are hungry for knowing about the options they have. Only now are there Blu-ray Disc players being released with an Ethernet port, while every HD DVD player from the get-go of that format's introduction has had an Ethernet port.

MCM Biles: They're knowledgeable in home theatre, A/V receivers, and stuff like that. This gentleman from Louisiana and I had a three-hour conversation on this. He said, "Look, I've been an audio engineer for 20 years, and I'm confused about this. What is going on?" I said, "I don't know. I don't know, but I'll tell you what, I'm going to go out and I'm going to buy this player, I'm going to buy this receiver." Now, this conversation happened a month and a half ago, two months ago. And I felt a personal obligation to try and have some answers for these people. And what have I found? I have found that more times than not, it doesn't work, not the way it's supposed to anyway. And many people, when they think they're listening to a 7.1 mix, if they've got the wrong player, if they've got their receiver in the wrong mode, they're actually hearing the underlying core compressed audio, which is lossy audio. And it's a shame that it's not easier for the home user, for the consumer.

MCM Margouleff: There's going to be a lot of bumps in the road until this all settles out, until the feathers settle out. The market's going to settle this.

***WSR* Reber:** Robert, I disagree. I disagree because these manufacturers, this industry has had years, years…

MCM Biles: ...it's been going on for decades.

***WSR* Reber:** …to figure this out. You know, we've had all these years of 5.1. This is not that difficult to do this correctly.

MCM Margouleff: But HDMI 1.3 is not exactly an old technology. I think there's going to be a certain amount of lag time.

MCM Biles: What HDMI is, it's digital video and four S/PDIF lines coming down a multi-core cable.

***WSR* Reber:** That's right.

MCM Biles: It's no mystery. There's no mystery as to what it is. It's actually just a multichannel connection.

***WSR* Reber:** You talk about the Blu-ray Disc, only to this day has there even been a player released that will even do certain special features, what's it called?

***WSR* Richelieu:** It's called Bonus View now. Secondary audio, Profile 1.1.

***WSR* Reber:** Explain how Bonus View works?

MCM Biles: With secondary audio, if you have the mix of the movie and you have a commentary, instead of going and doing a separate combined mix of that movie for the purpose of the commentary, you can now take the mix of the movie as it exists and put the commentary up against it with automation data out of a Pro Tools system, and the automation data will actually control the mix of the movie inside the player and mix the commentary against it—interactive secondary audio. Is this good? Is it bad? We are actually building some tests with the people that do a lot of authoring for New Line and other companies—1K Studios—so that we can make sure that this, actually, in fact, is doing what it's supposed to. Because as of yet, nobody has really seen it come into play in the real world.

***WSR* Richelieu:** And the thing is, it has to be able to decode the audio inside the player.

MCM Biles: Exactly. It does, doesn't it?

So, do you end up with a 7.1 lossless mix when you have the secondary audio activated? Not yet, you don't. You end up with the underlying—at least in the current generation of Blu-ray Disc players available—you end up with the underlying core, 5.1 being mixed against this single…

***WSR* Reber:** ...lossy 5.1?

MCM Biles: Lossy 5.1, but still 1509 kbps core, which sounds great, and has for years, being mixed against this single channel of audio inside the player. What's the problem with that? That we're going to be mixing things inside of a $500 player. I mix things on tens, if not hundreds of thousands of dollars of gear, and strive to find things that make our job better and more transparent to the world. And now we're going to leave this mix up to a $2.00 DSP chip?

***WSR* Reber:** Well, wait until the players get down to mass-market prices of below $100.

MCM Biles: Yeah, well.

***WSR* Reber:** We've talked a lot about DTS, but you're also releasing in Dolby TrueHD aren't you?

MCM Biles: We barely do any encodes in Dolby TrueHD, as of yet. We certainly have the software and the capability to. Our main client, New Line Cinema, who we're doing the 7.1 mixes for, has requested specifically DTS-HD Master Audio across the board.

MCM Thiele: Since it's not mandatory to have Dolby, like on the standard DVD, they chose to go with DTS.

MCM Biles: The reason why they chose…

***WSR* Reber:** The players, though, do not have to support both Dolby TrueHD and DTS-HD Master Audio.

MCM Thiele: Yes, they do.

MCM Biles: They have to.

***WSR* Richelieu:** They don't have to.

***WSR* Reber:** It's not mandatory.

MCM Biles: It's not?

***WSR* Richelieu:** No, in the Blu-ray Disc spec, it's not mandatory.

MCM Biles: Really?

***WSR* Richelieu:** Right.

MCM Biles: Well, is it mandatory that you have one or the other?

***WSR* Richelieu:** No, it is only mandatory that you can decode Dolby Digital and you can decode DTS Digital Surround, the DTS core.

MCM Biles: And anything beyond that, Dolby TrueHD or DTS-HD Master Audio is…

***WSR* Richelieu:** It's all up to the manufacturer if they want to include it.

MCM Thiele: There you go.

MCM Biles: Yeah, see, it's all up to the manufacturers.

***WSR* Reber:** All right, so you haven't worked with TrueHD?

MCM Biles: Of course, we have. We have a very close relationship with Dolby and think they, like DTS, have excellent technologies to offer.

***WSR* Reber:** Brant, I've heard that lossless-compressed audio is variable bit-rate audio. Where does that come in? I thought that audio wasn't variable bit rate.

MCM Biles: I'm going to speak about DTS bit rates because that is what I'm most familiar with. I think that both DTS and Dolby provide excellent packages for encoding, and there are pluses and minuses of each one. I don't want to get into that, but I'm going to speak as far as DTS is concerned, because that is what I know best.

***WSR* Reber:** And the lossless is variable bit rate?

MCM Biles: Lossless-compressed audio is variable bit rate. Here's the thing, with the DTS mix that is lossless, the lossless 7.1 information is built on top of a lossy 5.1-channel 1509 kbps core. That was one of the reasons that New Line went with DTS: for legacy systems to be backward compatible, they figured it was better to have somebody listening to a 1509 kbps core. Dolby's methodology is to take the 7.1 lossless mix, decode it to PCM, re-encode it as AC3, and send that out the pipe, which is, at most, 640 kilobits per second. So New Line figured, okay, we'll go with 1509 kilobits per second as opposed to 640. That's one of the reasons.

***WSR* Reber:** But that's only when you're playing it in standard Dolby Digital AC3.

MCM Biles: That's only when you're playing it in a legacy system, a 5.1-system without the capability of decoding the new codecs. When you play a 7.1 DTS-HD Master Audio mix that is lossless, you have your underlying 5.1-channel, DTS 1509 kbps core. Now, if you're doing true 7.1, you're already going to extend beyond that because you're adding two extra channels. And the way that it works is they do bit sharing.

MCM Thiele: Where they shovel it into the valleys, yeah. You have a wave form of the signal, and, basically, they take the top off the "mountain"—where the signal peaks—and put it in the previous "valley," and they keep a record of that in data so that when it gets decoded, it knows where to put what.

MCM Biles: One of the differences between Dolby and DTS, for their lossless compression peak bit management, is that DTS sticks their displaced information in front of the peak info in time and Dolby sticks theirs behind the peak info in time. Or it's vice versa, I'm not sure.

MCM Thiele: But basically, it's just bit management.

MCM Biles: And the core 1509 kbps is a static bit rate.

***WSR* Reber:** It's a static bit rate of 1509 kilobits per second.

MCM Biles: Now the thing is, DTS, for the Blu-ray Disc, and the now defunct HD DVD, has what is called DTS-HD High Resolution Audio, which can go up to double that 1509 kbps to a 3018 kilobit per second static bit rate. It is still lossy, but it's really good lossy. And if you have a static bit rate, it's easy to calculate.

***WSR* Reber:** But I still don't quite understand the variable-bit-rate audio part of it. Is this both on the lossless Dolby TrueHD and the DTS-HD Master Audio formats?

MCM Biles: Yes, they're both variable bit rate. Otherwise, it's just going to be PCM.

MCM Thiele: It's not lossy, all they're doing is redistributing whatever bits they have in case the bit rate gets too high, but after it's reassembled, it's lossless.

***WSR* Reber:** I see, it's variable. So otherwise, it would be constant-rate PCM.

MCM Biles: Yes. The result is going to be the same. The output should be the same.

***WSR* Reber:** I know, but it would be better to deal with constant-rate PCM, wouldn't it?

MCM Biles: Maybe.

***WSR* Reber:** And not having to deal with the other…

MCM Biles: But see, that's the whole thing. Straight PCM for eight channels, 7.1 channels, 48 kHz, 24-bit straight PCM, I think you're at somewhere like 8.8 Mbps continuous bit rate.

***WSR* Reber:** What do you think the electronics guys have to do now? Obviously, they came out the gate just like Blu-ray Disc did, not really fully baked, and now they're coming out with the receivers and the processors, and they're not implemented correctly. What do you think has to be done?

MCM Margouleff: They all have to get on the same page. They communicate through the Consumer Electronics Show (CES); there are ample sounding boards for everything. But what really needs to happen, everyone is doing brilliant thinking and stepping forward and doing things that are innovative, but now it's going to take a year or two for people to sort of settle this stuff down, and people have got to learn and understand that their box has got to talk to other boxes, and we've got to make sure that the communications standards are the same. We need to make sure that work flow and processing flow from one manufacturer to another is really working and that the boxes can talk to each other correctly. It's going to take some time for that to get figured out and sorted out—there's no two ways about it. So I think that's what we're really looking at right now, more than anything else. And I think that will sort itself out in time, but what we've got to do, at our level, is to stay consistent with what we're doing. I mean, the Home Theater Cruise is the place where a lot of this stuff is going to get talked about, and there will be an awareness there. That's the value of going on the Home Theater Cruise for us, frankly, is the fact that we can talk about this to a mixed audience of manufactures, technologists, and consumers.

***WSR* Reber:** Yes, it is an influential forum. Your presentation on this cruise needs to cover this in-depth. This is really critical to understand.

MCM Biles: Sure, I'll talk till the cows come home. But wait, I want to answer this question. I think that the product manufacturers and us, as mixers, and as New Line's product developers, all need to get in the same room and say, "Look, this is what we're doing. These are the problems that are happening out in the real world. People are pissed. What can you do to solve this, to make this better? Because it's confusing." And quite frankly, I think they should all be locked in a room and not be allowed out to eat until they come up with an honest solution. It's that drastic, it really is that drastic because there are pissed people out there.

***WSR* Richelieu:** Okay. I'd like to go back to an issue you mentioned with the receiver. From the player, your DTS-HD Master Audio-encoded mix is sent through the HDMI 1.3 cable to the receiver, which is then decoded...

MCM Biles: That is correct. The player is sending the DTS-HD Master Audio bit stream to the receiver...

***WSR* Richelieu:** ...which is decoded to 7.1.

MCM Biles: If that is what the encode is, yes.

***WSR* Richelieu:** Now, if the receiver is connected to a typical 5.1 system, it would send out just 5.1 to the loudspeakers—it would ignore the sixth and seventh channel.

MCM Biles: Correct, but it would not ignore the extra channels, it would down mix them to 5.1.

***WSR* Richelieu:** Okay, so that sixth and seventh channel in your setup here, where are those loudspeakers?

MCM Biles: Interesting question, and I'll tell you why. The back panel of the Denon receiver has left, center, right, sub. We won't worry about those channels, because they are the same for 5.1 and 7.1. Then it has surround left and surround right, which are hooked up to our sides at plus and minus 90 degrees from the center channel. And then it has surround back left and surround back right, which are hooked up to our rears at plus and minus 135 degrees from the center channel. You play a 7.1 mix, everything comes out where it should properly. Now, the rub is, if I play a 5.1 mix, such as *Fantastic Four*…

***WSR* Reber:** With the same connections.

MCM Biles: The same connections. My surround channel information comes out of my surround left and surround right outputs, which are my 90-degree sides, and does not come out of the rears.

***WSR* Reber:** Well, that's wrong.

***WSR* Richelieu:** So that's the problem.

***WSR* Reber:** That's a big problem.

MCM Biles: That is a huge problem. I have thought about making a suggestion to the manufacturers—there are so many setup menu pages in this receiver, it's like reading a textbook on your screen as you're setting it up. It's like going to Jerry's Delicatessen, there are so many choices, I don't want to eat anymore. So my suggestion would be to have a menu page—for those of you reading this in the manufacturing of A/V receiver world—have a menu page that says, "When

I'm playing a 5.1 mix, do I want my rears to come out of the surround left and right channels or the surround rear-left and surround rear-right channels?" It's a simple A or B situation that would alleviate a lot of stress.

***WSR* Reber:** Or relabel the surround left and right channels as side left and right channels and deliver the signals accordingly. But again, it requires consumers to know that to find out if there is an option they must select and then knowing what to do.

MCM Biles: Do you drive a car? Do you build the car? No.

***WSR* Reber:** They all work pretty much the same.

MCM Biles: They do, but they've been at it for decades. They've already got menus for what they call "amp assign," which is, you can set up the two extra amplifiers to be either Zone 2 or Zone 3, which is a whole other issue, or they can be 7.1. So really what these systems are is they're giant 5.1 receivers with a 7.1 afterthought. They're not really built from the ground up. They are thinking about 7.1 backward compatible to 5.1, is what I've seen. A few other simple menus would help.

I mean, to me, what you just touched on there is actually one of the biggest issues that I have with this particular receiver. Now I don't want to sit here and bag on Denon because I'm pretty sure that Yamaha is the same way, and I'm pretty sure that Sony is the same as well, and I think the nomenclature on the back of the box should change, and it shouldn't be surround back left and surround back right, it should be left center right, left surround, right surround, extra channel A, and extra channel B. And in a menu you get to pick, where are your extra channels? Are they at 90 degrees? Okay, there. Are they at 60 degrees off center? Okay, they're there. No, are they way in the back at 150? They're there. And solve it that way. Or the other option, where, when you play a 5.1-channel disc, you get to pick which of those outputs it goes to.

***WSR* Richelieu:** See, and another big problem is right now people who have 7.1 systems typically have them set up so the surround channels are at 135 degrees. And the sixth channel and the seventh channels are back in the center between the surrounds at 150 to 160 degrees. So when these people are listening to your mixes in 7.1 in their current systems, the sidewall information…

MCM Biles: The sidewall information is going to come from the 135-degree loudspeakers, and their surround back is going to come from the two channels between them. It's just going to swing around.

***WSR* Reber:** But it's not right.

***WSR* Richelieu:** And then if they reposition their loudspeakers to your 7.1 configuration, it won't be right with 5.1. It's not right.

MCM Biles: I couldn't agree with you more, it is not right, and damn it, somebody should do something about it.

***WSR* Reber:** Exactly, and that's what we're going to do, that's what we have to do. I mean, this is really a serious problem, I can't believe this industry continues to screw up like this.

MCM Margouleff: Because they're not talking to each other. They're competing with each other.

MCM Thiele: I mean, the mistakes need to be made in order for someone to get so upset that they say, "Now we really, really have to fix this." And are things going to start with people that save money over the years to buy a really expensive receiver on Christmas? They set it up, and it's not working. Then they return it, and then the manufacturers will see their sales go down because no one knows how to use this stuff. That's the only way the manufacturers will change something. If you can sell something that has a flaw and no one's really complaining, and everybody deals with it, nothing will change.

MCM Margouleff: Nobody knows to complain right now.

***WSR* Reber:** You're right, no one knows to complain right now, and, of course, the first line of complaints is probably going to be back to New Line.

MCM Margouleff: Well, we're already getting them.

***WSR* Reber:** Because they're going to say, "This disc doesn't work, it doesn't work like you say it should."

MCM Margouleff: Well, I'm privileged to be a part of this investigation, being on the cutting edge. It is a very exciting place to be. There are going to be problems, there are going to be issues. But I think Brant, Holger, John Bird, and me, everyone here at the studio, we've been really privileged to be on the cutting edge of this stuff and to be able to have the chance to experiment with it and to have the experience. I mean, you know, I've been at this for a long, long time. I first started making records in 1972, so I've been at this for a minute. And I'm glad to see that it's a brave new world because the only thing that's ever stayed the same in our business is change.

***WSR* Reber:** I like the word you use, investigation, because that is certainly what this is at this stage.

MCM Margouleff: It is an investigation, but what we're doing is we're setting the guideposts for the next 20 years. And I think that that's a really important place to be, and I feel very privileged to be allowed to do it.

***WSR* Reber:** Right, Robert, if you think about how complicated this is, going from 5.1 to 7.1, think about those who are advocating 10 or 14 or more channels. I mean, it's insane.

MCM Margouleff: I think what we're looking at here, frankly, is the point where we start to get to diminishing returns, one more step is diminishing returns. I think we're in a place where we have an extremely flexible platform that's totally viable and meaningful. I think we've got to understand that actually, it's not a pain in the ass, it's a privilege.

***WSR* Reber:** I understand. It is. Do you want to sum up?

MCM Margouleff: I think, as far as I'm concerned, we just need to help the industry learn how to talk to each other. People need to have a little more communication about some of the stuff and think it through a little bit, and I think when we go on the Home Theater Cruise, some of the manufacturers will be there, and I think we'll have an opportunity to open the can of worms and come to some conclusions about these issues. They are issues, they're real issues.

***WSR* Reber:** They're real issues.

MCM Margouleff: They're real issues, but that doesn't mean that the format right now is incomprehensible or anything else. It's out there, we're making software for it, it's there, and it works. And that's what's important. Yes, the bells and whistles are not totally together yet, but it's coming along, and we've made great progress in the last year, and we will continue to make progress. And the bottom line is the format really works. I mean, it really is the most artistically satisfying format there is, and I think that's really what it's all about in the end.

***WSR* Reber:** I can totally applaud that. Brant, do you have anything to say?

MCM Biles: As to wrap this up? Just that on some issues our hands are tied, and I wish there were immediate solutions, but these things will take time. And I wish, if I had a giant wish list, it would be that there would have been a little bit more thought put into the front of it, as to how to deliver these elements to the consumer and to make it less confusing. Holger?

MCM Thiele: I just hope that things get resolved so whoever's buying Blu-ray Discs can actually hear what we're doing here and can actually hear and still have that experience that we're creating.

***WSR* Reber:** Thanks, guys, for a thought-provoking discussion. **WSR**

Mi Casa Multimedia is well known for providing the best high-definition surround audio for many of Hollywood's biggest motion pictures. Mi Casa is highly respected by both the creative and technical communities in film and television. For more information, visit www.micasamm.com.