



**From WIDESCREEN REVIEW Magazine, Volume 2 number 8
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**John Allen
A Conversation With The Creator Of The HPS-4000®
Motion Picture Sound System**



John F. Allen is the creator of the High Performance Stereo HPS-4000 Motion Picture Sound System, the first sound system developed to reproduce the full dynamics of cinema digital sound. Mr. Allen writes technical articles for Boxoffice Magazine and is one of the most highly respected sound professionals in theatrical exhibition, and a leading advocate for digital sound at the movies. Editor/Publisher Gary Reber visits with Mr. Allen to discuss digital sound at the movies and the development of the HPS-4000 Sound System, and the impact digital sound will have on home theatre.

Widescreen Review: What aspects of your background led you to develop the HPS-4000 Sound System?

John Allen: I put my first stereo system together when I was twelve-years old. I built a HeathKit stereo amplifier and using designs of loudspeakers that were popular of the day I built two bass reflex loudspeaker systems. Clearly the loudspeakers were rather a sorry experience, and in fact I would say that I still find most loudspeakers today are in one way or another pretty sorry loudspeakers.

My next door neighbor had a Klipschorn and some other equipment which he used to record the live broadcasts of the Boston Symphony which were then three times a week. That experience of hearing the Klipschorn changed my life. Even though I didn't know what the Boston Symphony really sounded like because I had never heard it live, I knew that I liked the sound. I make that point because a lot of people like what they hear having no idea whether or not it is accurate, and they, of course, are perfectly entitled to do that. But my business today is accuracy and clearly I have had to learn what things really sound like. I ended up buying a pair of Klipschorns and obviously went on to other amplifiers, solid state and others. I also began to record the Boston Symphony broadcasts and to attend the symphony. To this day I still attend the symphony. In fact, I went yesterday.

The subjects of sound, music and television were just things that I absolutely loved. All through college I was sort of free-lancing, building stereo systems, and building television distribution and antenna systems. In fact, master antenna systems became my major business activity. I built Boston's first cable television system in 1976. Also in 1976, I was doing consulting for WGBH which was the station that was doing the symphony broadcasts.

I had become involved with the people who were putting together the special Fourth of July programs with Arthur Fiedler and the Boston Pops on the Esplanade in Boston, at a band shell called Hatch Memorial Shell. At a 1975 production meeting attended by Arthur Fielder and Harry Ellis Dickson, who is today the associate conductor laureate of the Pops, the discussion of the horrible sound at the Esplanade came up. I had always understood that since it was owned by the state, it was all politics and there was really no hope of anybody doing something serious about it. I was told no, that wasn't the case. There was genuine interest in doing something. So I volunteered to take a listen and make some suggestions. I went down and listened to a concert. It was awful. They only had two pairs of rather small loudspeakers on each side of the stage. The next day I went to WGBH and borrowed some equipment and spent the next day and half rewiring the sound system at the shell for stereo. Stereo had never been successfully done before although it had been tried. I set up three microphones in stereo and reaimed the loudspeakers. The conductor that evening was Harry Ellis Dickson. He got a hold of me during intermission and wanted to know what the hell I had done because the audience was not talking anymore. They were attentive. They were actually listening to the music. Obviously they could hear what was going on for the first time in history. Dickson told me he had never felt so comfortable on that stage in his life. He absolutely loved it.

The next year I submitted a proposal for a real sound system at the facility, something large enough to do the job. I felt that clearly my experience with the Klipschorns had been that they were loudspeakers that came the closest of any loudspeakers that I ever heard to reproducing a symphony orchestra. In terms of tone, dynamic range and clarity there was and is simply no comparison. I wanted to rely on that experience at the Esplanade so I

used the Klipsch La Scala's which are Klipschorns with one less fold in the bass horn. I put four on each side in a rather large cabinet in which the doors of the cabinet opened to become wings. We now had huge loudspeaker cabinets on each side of the stage. They were nine feet high, eight feet wide and weighed half a ton. They were first used in 1976 for the Boston Pops Bicentennial Concert. It was a huge success. I continued to do sound at the Esplanade for several years, adding a center channel in 1978.

During that period, while still very active in television systems which was my primary business up until then, two films came out, one was SUPERMAN and the other was APOCALYPSE NOW. These two films, I think even more than STAR WARS, established the work that Dolby was doing as very important. Indeed if you listen to particularly APOCALYPSE NOW, I think that it is still a landmark mix. Both were mixed with split surrounds. Even today, you won't hear any mixes much better than APOCALYPSE NOW. But the theatre sound systems of the day were totally inadequate to those kinds of mixes. They could not reproduce them correctly. They could play them, you could hear something. But you sure didn't hear everything. Of course I didn't even know how much was missing until I started building my own systems and started hearing all the things that I never heard before.

Widescreen Review: Would you say that in the dubbing theatres where those soundtracks were mixed that they were hearing everything that was recorded?

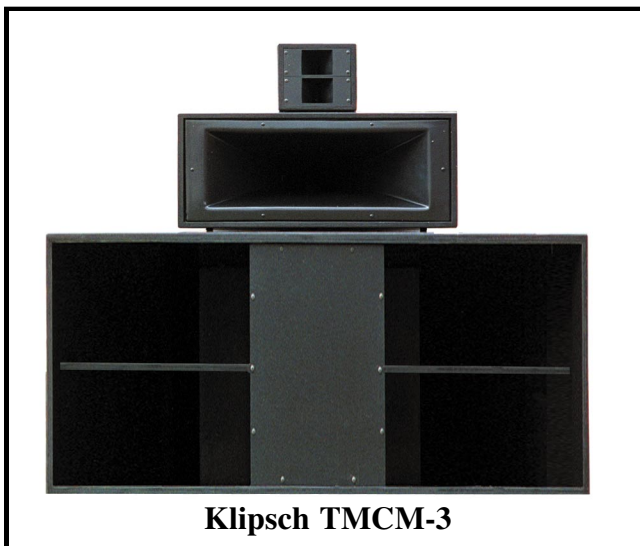
John Allen: In the case of APOCALYPSE NOW they probably did because they were in a very small room. They had some rather large loudspeakers and of course headphones plus everything else. I think they probably got to hear everything that was on the track even without the spaciousness of a large room, which of course is a very important part of the experience of the film. But generally you bring up an excellent point. No, even on the dubbing stages they do not hear everything that is on the soundtracks. As an example, we had a producer of a major film who came to one of our theatres and he had a rather strange reaction. He kept walking around saying "I didn't hear that before, I didn't hear that before." He told me that he hadn't heard the harp in the orchestra since the day that he heard it live on the scoring stage. He hadn't heard it in the control room, he hadn't heard it in the rerecording room. He hadn't heard it at the Academy. He hadn't heard it in any theatre. And there it was, the harp. We had done nothing special. It was a normal HPS-4000 system. But where had the harp been all this time, where did it go?

Widescreen Review: I interrupted you.

John Allen: I felt that with the success of the Esplanade plus my work with the Boston Symphony and the Boston Ballet -- today I remain the sound director for the Boston Ballet -- with all the time I had spent in front of live orchestras and amplifying large orchestras outdoors to the level, for instance, at the Esplanade that you could not tell the sound system was on. (It sounded live, it sounded real.) I thought that I might be able to translate that quality to movie theatres in Boston which sounded awful. So I decided to

try and see what I could learn as a hobbyist. Sound was still a hobby of mine. I thought that I might be able to do a theatre or two around here and maybe have something decent to go to and listen to. I had been an apprentice projectionist at a local theatre when I was in high school, so I had some familiarity with what was going on. I decided to go out to one of the seminars that Dolby was doing. That was in 1979 and it was a wonderful experience. Of all the seminars that I have been to that Dolby presented I think the first was the best because it was essentially done by Clyde McKinney who I think is one of the finest teachers I have ever met. He has a wonderful way of telling stories and a wonderful way of conveying information that keeps you interested. You learn very quickly.

On the way back from Dolby's headquarters in San Francisco I went to the Klipsch factory. I had never been there. I met with Paul Klipsch and told him what I wanted to do. I thought I could use the large Klipsch loudspeakers in movie theatres and get better results than were being obtained in any other way by anyone else. Theatre always had been an interest of his and he certainly did have many ideas as to how to reproduce sound in a movie theatre since, after all, that's one of the things that started the whole high fidelity business to begin with. So he asked me if I was interested in becoming a local dealer or a national dealer. The way he asked me, I wasn't sure if he was going to laugh in my face or what. But I just said I hadn't really thought that out. He said to one of his associates "let's set him up as a national dealer." So I began marketing Klipsch theatre loudspeakers and putting together some ideas as to what to do.



Klipsch TMC-3

The Klipsch sales staff and I went to a National Association of Theatre Owners (NATO) convention and found that there was a larger demand than we realized from other dealers for the kind of loudspeakers that we were offering, which were and are quite unique. We had a meeting until 1:30 AM that first night trying to figure out what to do. The answer was that I was not to be the national dealer, I was to be the worldwide distributor. It wasn't my idea and I wasn't comfortable with it at first, but I accepted it and we started putting on dealers.

I went back to Boston and got the first installation of a full stereo system in the town next to mine called Wellesley, Massachusetts, in a theatre owned by a local family. It sounded absolutely dreadful and they wanted to do something about it because business was flat and wasn't going anywhere. So we put in what became the prototype of the HPS-4000 Sound System. It consisted of three Klipsch TMC-3 three-way fully horn loaded loudspeakers behind the screen and the first Allen Sound Array which was a group of

Klipsch Heresys, at the time, that were not just placed on the walls at some random interval.

I really thought that thirty years ago there had to have been a really smart, well thought out way of placing surround loudspeakers. I figured it had to do with somehow comparing the radiating patterns of the loudspeakers with the shape of the room and coming up with some relationships that would provide even coverage. It turns out that I was dead wrong! Thirty years ago they had not been able to figure it out. I didn't know this and went ahead to try to guess whatever art had been lost because there was nothing in the literature about it that I could find. So I came up with some formulas and concepts, and put them into place at Wellesley. I discovered that the resulting surround coverage was even, plus or minus a half dB. This was as built. There were no adjustments. We put it up and it was just there. It worked. I went from blueprints to reality with no steps in between. It was really amazing. Coverage was even throughout the surrounded area. Coverage across the front row of the theatre was plus or minus a quarter of a dB from the surrounds. The sound of the surrounds matched the sound of the screen because we were using basically the same drivers and the same horn throats, so that helped. No equalization in the surround array was required at all and indeed today no surround system of ours is ever equalized. The really nice part about it was that you couldn't localize to a single loudspeaker even if you were sitting underneath one. People who had been in the business longer than I came in and started listening. I was more excited about the stage loudspeakers not knowing that I had come up with anything special in the surrounds. They were also fascinated with stage loudspeakers, but they were absolutely amazed at the surrounds. They had never heard anything like it. The surrounds didn't attack you. They had the same tone. They were perfect. Even today, people who hear it for the first time say it's perfect. I was fairly generous in those days with the information on how to do it until the president of a cinema equipment company came up to me and said



Klipsch TSCM

“you know you’ve invented something here, you shouldn’t be passing it around. You shouldn’t be telling people how to do it. You should keep it a secret. You have something here that nobody else has and it can help you sell your sound systems.” So that is how it all began and business took off like a rocket. I ended up having basically to shift gears and the cinema sound business became my primary business within two years. The Wellesley theatre experienced a twenty-five percent (25%) growth in admissions the first year with the HPS-4000 system and was named “Best Theatre in Boston” by Boston Magazine, noting the sound.

Widescreen Review: Many exhibitors and filmmakers consider the HPS-4000 to be a no compromise sound system. Why do you think that your system has earned that respect?

John Allen: If I have that respect, I am pleased to have it. The system was designed to be a High Performance Stereo sound system, hence "HPS." It is a no compromise system. It is the elite sound system of all the theatre sound systems out there. It is the best of the best. And I am not just saying that of course because I have anything to do with it. I intended it to be that way. I went out and did everything that I could to learn what I needed to do in order to make that happen. If you walk into our theatres it's like getting into a Cadillac versus a Chevy. It's that kind of difference. And that's entirely by design.

How is it a no compromise system? There is more than enough power to do the job. There is at least four times the acoustic power, four times the electrical power that is required to reproduce every decibel that is on the soundtrack in every channel.

Widescreen Review: What exactly is the HPS-4000 Sound System? What does the system consist of?

John Allen: It consists of loudspeakers and amplifiers, everything that is in the B-chain, everything that is loudspeaker dependent. We sell the loudspeakers. We sometimes sell the amplifiers, but we always specify the amplifiers. We specify the loudspeaker locations, we specify the type of loudspeakers. Acoustic requirements are provided. Finally, the system's tuning is extremely critical. I personally tune every HPS-4000 Sound System to make sure that it not only meets the International Standards Organization "X" curve (ISO 2969) but that the tone is natural. They are then maintained by people who are equipped with the proper analyzers and I personally calibrate every analyzer that is used to maintain a HPS-4000 Sound System so that they are all maintained by equal measuring equipment. The specifications are not only on file here but they are left in the theatre, and those instructions are followed so the system is capable of being maintained to its new performance forever. The loudspeakers are clearly the difference between our system and all others. If you look at our systems they are three-way, not two-way. They are fully horn loaded, not a direct radiator/horn combination which is a big mismatch. No walls or absorption are required behind the screen. Our systems are fully matched in efficiency from woof to tweet. The surround loudspeakers use the same drivers as we use in our stage loudspeakers. No one else does that. We simply have more output, less distortion, more dynamic range and more low frequency radiating area than anything else on the market.

Widescreen Review: Comparisons with the THX Sound System are often made. How do you compare your system with that of others including the THX Sound System?

John Allen: I listen to them.

But rather than getting into specifically THX except to say that I have a lot of respect for

what they have done. Clearly the difference between us and our competition is that the HPS-4000 Sound System is vastly larger (800 percent larger). For instance, just take the radiating area of the low frequencies. In a double 15-inch direct radiator woofer, the total radiating area that acts air on the room is the piston area of the drivers, just the little old paper cone areas that move. It doesn't matter how big the box is. The radiating area of a double 15-inch direct radiating woofer system is one and a half square feet (1.5 sq. ft.). If you have five of those behind the screen, one for each of the main channels and two sub woofers, you've got seven and a half square feet (7.5 sq. ft.) acting on the air in the room, period. If you look at one of our TMWM woofers, it's got a radiating area of ten and a quarter square feet (10.25 sq. ft.), which is thirty percent (30%) more than our competitors' entire sound system. We have typically five TMWMs behind the screen and sometimes seven. So we have anywhere from 50 to 70 square feet of low frequency radiating area. There is simply no comparison. Seven and a half square feet (7.5 sq. ft.) to 50 to 70 square feet is an enormous difference. Even though we are not playing anything louder than anybody else, it's bigger, it's fuller and you hear many things that you don't hear in any other theatres.

Widescreen Review: How does the piston radiating area translate to a home theatre sound system? Is there such a thing as having too large a system in a home theatre application?

John Allen: I would say basically that there is no such thing as a loudspeaker that is too big. If you look at just the immense size of a symphony orchestra, and movies have symphony orchestras behind them, the sound is made by a very very large thing that can move a lot of air. It's pretty ridiculous to think that you are going to be able to get two little boxes to be able to reproduce that, because the fact is that they can't. Yes, you can get the music back. Yes, you can get a lot of things back but you do not get the experience of being there. The stage effect is gone. The fullness and the richness of the sound are simply not reproduced by small loudspeakers, whether it be in the living room or whether it be

in a movie theatre. In order to get control of the air in the room you need a large device and the smallest loudspeaker that will do that is a horn loaded loudspeaker. If you tried to do it with direct radiator loudspeakers (and people have) you get into monstrosities. I don't think that you could fit them in most living rooms. And the truth is, when I have heard this done the spaciousness is there, the bandwidth is there, the power is there, but oddly enough the tone quality is still not there. There is still a coloration problem that just seems to be a given with direct radiators. Not all, but most of them have coloration problems. Just to start off, go up and tap the cones and you'll hear a sound. Then listen to something and you will often hear that sound coloring the music. That's an artifact of loudspeakers that we have lived with for years, something that we're used to, but it's wrong.



Klipsch TLSI

Widescreen Review: I have found that in one of my reference systems I use bipolar dual pair Mirage M1si which are full bandwidth over the range of 26 Hz to 24 kHz $\pm$ 2 dB on their own without support of the Mirage bipolar subwoofers in the system. They are not a satellite/subwoofer type of arrangement but truly full range with a bipolar dispersion pattern. They give me a sense of spatiality that I have not heard ever with any other combination of loudspeakers.

John Allen: Yes. It's amazing how important the low frequency is. The very bottom of the audible range is where a tremendous amount of spatial information exists. For instance, if you make a comparison between a Klipschorn and a La Scala -- which I think is a good one for this discussion because they use the same drivers and the same horns in the mid and the tweet -- the only difference is the woofer horn which is smaller in the La Scala. If you put the La Scala right in front of the Klipschorn and switch back and forth the difference is enormous, and the difference is in the spaciousness of the sound. Suddenly you are far more transported to the stage and to the hall where the music is being performed then you are with the smaller loudspeaker. And the La Scala is not a small loudspeaker, but it doesn't have the ability to get control of the air in the lower frequencies that a Klipschorn has. Nothing does.

Widescreen Review: This is a significant point which we have been discussing. I do not believe it is in the consciousness of most people when they are thinking of designing a sound system or installing a sound system in their home theatre.

John Allen: Absolutely.

Widescreen Review: The HPS-4000 Sound System is capable of immense acoustic output. What is the terminology you use to describe this performance capability and how much acoustic power is necessary for undistorted digital stereo reproduction?

John Allen: Typically our 70mm sound systems and digital sound systems, and I'll stick to those at least for right now, are the ones in which we have dedicated sub woofers. Those systems are capable of an acoustic output equivalent to about seven symphony orchestras. We have one system in Jamaica in a theatre that is 180 feet long , 50 feet high and 85 feet wide with the acoustic output of twenty symphony orchestras which is probably the most powerful theatre sound system that anybody ever built. The reason for this amount of power is because theatres are very large spaces. Using the inverse square law and the sensitivity of the loudspeakers, you simply calculate what is required to reproduce the levels that the program requires. In the case of a theatre like the one in Jamaica, you're 90 feet from the screen when you're sitting in the middle of the theatre. You're going to want that sound system to be able to reproduce a 103 dB to 105 dB SPL first arrival, peak, from each channel and even more than that from the subwoofers. I say each channel and that includes the surrounds. The last thing you want is for an amplifier to run out of power. Amplifier clipping is responsible for a lot of distortion as well as loudspeaker destruction

and amplifier destruction. You don't want that to happen. So you have to decide how much headroom above the program peaks you are going to add to prevent clipping. I think that 6 dB to 8 dB is a pretty reasonable number as opposed to 3 dB, which is not enough because you could eat that up just by having somebody turn up the fader a little bit more, or having the output of the processor drift in one channel over another by a couple of decibels. That does happen. So 3 dB is clearly not enough but 6 dB is and 8 dB is even better. So all our systems are designed to reproduce levels in the center of the theatre at amplifier clipping, of 111 dB per channel at least and more than that on the subwoofers which typically clip at about 122 dB, or 130 dB in our larger systems.

Widescreen Review: In a home theatre room with say 3,000 cubic square feet, applying that rule what would be the minimum amplifier power per channel? Home THX specifications call for 100 watts per channel matched to the sensitivity rating of their approved loudspeaker designs.

John Allen: When you're talking about how much amplifier power a loudspeaker needs it's like talking about how much gasoline a car can burn. It's that kind of analogy. You have to use loudspeakers that have a certain amount efficiency to them, or you are never going to get them to play loud enough without applying kilowatts of power. Also of course, the smaller the loudspeaker, the harder it has to work. And the harder it has to work the worse it sounds. All of these things come into play. A hundred watts into efficient loudspeakers would deafen you at continuous levels. What you need depends on the loudspeakers that you have, how far away from them you are, and how loud you want them to play. In the home environment I think that any suggestions as to what amplifier power should be should be only considered as minimum because if you simply want to play it louder, for your own enjoyment, than the actual dubbing stage level, you are going to need more power to do that than some of these suggestions might give you. So don't be afraid to put more than enough power on anything and don't be afraid to put the biggest loudspeakers that you can fit into your living space without having somebody telling you to get them out. Clearly if you want big sound you have to have big loudspeakers and lots of power, and then you have no worries.

Widescreen Review: Can you explain to our readers your terminology for acoustic output?

John Allen: Most people are familiar with amplifiers being rated in watts which is a unit of power. For a lot of amateurs the electrical watts are very interesting - "oh wow, I've got a 100 watts or 200 watts." But when you pass that power, whatever it is, through a loudspeaker virtually ninety to ninety-nine percent (90%-99%) of that power is thrown away by loudspeaker inefficiency. Even the most efficient loudspeakers, which are ours, are twenty percent (20%) efficient which also means that they are eighty percent (80%) inefficient. Typically home entertainment loudspeakers are in the half to one percent (.5%-1%) efficient range. Acoustic output also can be measured in terms of acoustic watts. For instance if you have an amplifier with 100 watt output and you have a one

percent (1%) efficient loudspeaker then, when the amplifier is producing 100 watts, you are getting 1 acoustic watt out of the loudspeaker. So when we talk about acoustic output I relate it to symphony orchestras because a lot of people don't understand what acoustic watts are but they sure know how loud an orchestra gets. And when you tell them we've got the acoustic power of 7 symphony orchestras or 10 or 20, then they understand the awesome and immense power of the HPS-4000 Sound Systems.

You realize that most of time three-quarters of all of this acoustic output is never used. The purpose of all that power is to make everything just coast along and be really happy. The loudspeakers are never strained, the amplifiers are never strained, our ears are never strained and the loudspeaker drivers never fail. We have never, ever had a failure of a single driver in a HPS-4000 Sound System. No one has ever been able to come up and match that record.

Widescreen Review: In my Mirage M1si Series reference system I use extremely powerful Perreaux amplifiers. These are Class A/AB which operate nearly always in Class A because I use separate subwoofer systems. I drive the front pair of loudspeakers with 1,000 watts per channel into a 4 ohm minimum load at a sensitivity of 86 dB in my listening room. The rear pair is driven with 600 watts per channel into an identical pair of M1si's. The center channel CMsi loudspeaker is driven by a custom Peter Perreaux-built 2,000 watt 4 ohm load bridged mono amplifier. Four internally powered Mirage BPSS210 twin 10-inch servo bipolar subwoofers complement the system, one for each M1si crossed-over at 50 Hz. I have found the system to be an excellent audiophile music reproducer and to have sufficient headroom for any task that I have put to it in my home theatre listening room.

John Allen: When putting a system together, it is the loudspeakers that are the problem. If the loudspeakers are inefficient, they are going to be pushed in order to reach levels that you want to listen to. If the loudspeakers are efficient they won't be. So if everything else is done right, the radiating patterns and the frequency response and all of that, the larger and more efficient loudspeaker is going to sound better. It is going to sound cleaner.

Widescreen Review: How do you interpret loudspeaker manufacturers specifications?

John Allen: The specification that you really want to look at is sensitivity. Sensitivity is different from efficiency, and in some respects it is more important from the standpoint of the design of a sound system, because what the sensitivity tells you is how much level you are going to get in front of the loudspeaker from a 1 watt input. Typically loudspeakers are rated 1 watt/1 meter but you cannot measure a loudspeaker at 1 meter because the inverse square law doesn't work that close to a loudspeaker. So typically if you are going to do it honestly, (some people do and some don't), you measure it 3 meters from the loudspeaker and then using the inverse square law compute what the 1 meter level would be. Most of the loudspeakers that are used for homes are in the low 90s or the high 80s, 1 watt/1 meter, which is, to my way of thinking, extraordinary low. The smallest

loudspeaker we use is a 106 dB, so how can you compare? (20 dB in power is a factor of 100 times.)

The thing that is happening these days that is somewhat disturbing, is that some loudspeaker makers are using a 2.83 V (volt) sensitivity rating, and 2.83 V doesn't mean a darn thing. For instance, if you have an 8 ohm loudspeaker and you rate it at 2.83 V you in fact do have a 1 watt signal going into that loudspeaker. If you are rating a 4 ohm loudspeaker (and many loudspeakers are today 4 ohm loudspeakers, more than there used to be), if you want to rate it at 1 watt, you reduce your input voltage to 2 V because two volts into a 4 ohm loudspeaker is 1 watt. That gives you a number that is 3 dB lower than if you had left that voltage at 2.83 V. So some are going to 2.83 V because it gives them a higher number, but it doesn't tell you what's going on unless you go down and look at the impedance, or the minimum impedance particularly. If it is in the 4 ohm region and they are rating it at 2.83 V, you have got to reduce the sensitivity specification by 3 dB to get the real 1 watt number. It's just one of little games that seems to have crept in during the last couple of years, which is rather disturbing. You can get around it by providing abundant headroom in the amplifier power to compensate. Of course, frequency response, bandwidth and polar patterns are also extremely important not to mention distortion.

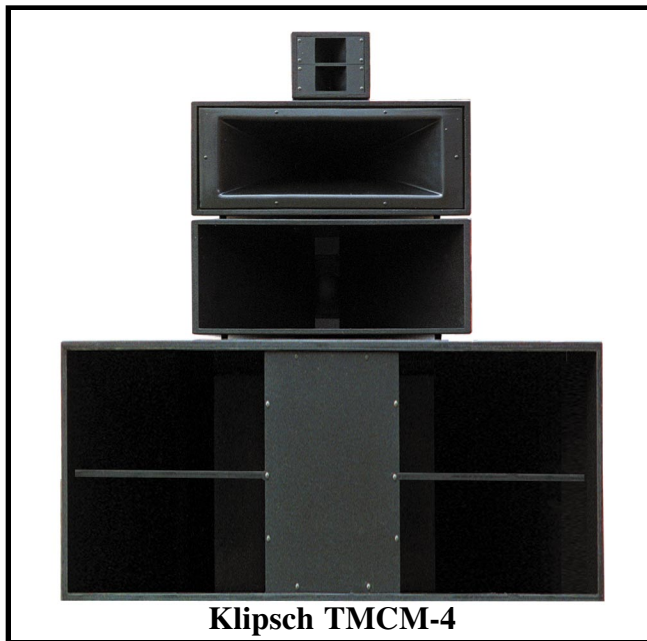
Widescreen Review: The THX Sound System is an integrated sound system packaged with certified and approved equipment and theatre acoustic design and treatment. To what extent is the HPS-4000 Sound System matched to the theatre it will be installed in?

John Allen: THX is basically doing what we started in 1979-1980 only I give them a lot of credit because they have been a lot more successful than I was in the early days, in getting theatre owners to pay attention to ventilation noise and wall construction. In terms of being an integrated package, we're the only ones who are really selling an integrated package. Others have specified equipment that is acceptable and you can pick between various product lines of different manufacturers what you want to use. Whereas our customers simply come to us and say design the sound system which is correct for this theatre and they take it as it is designed. We don't generally give them a choice. Our list of acceptable equipment is very limited. Certainly there is not a choice downward. We specify the loudspeakers necessary to do the job. If clients want to use something larger, that is their option. But we do provide the package that is indeed matched to that specific theatre.

As far as acoustics are concerned, we need less treatment than any other speaker system on the market because our polar patterns are more consistent with the screen in place than any other movie theatre loudspeaker in history. And we are the only ones using beamwidth shaping in our stage loudspeakers to overcome the beamwidth spreading effect of the screen. Our polar patterns are consistent within ± 3 degrees with the screen in place, whereas others are ± 25 degrees. Since we are not splattering high frequencies all over the walls, we don't need quite so much absorption on the walls. Indeed, what we

generally specify is an absorptive ceiling, an absorptive rear wall, and generally nothing more on the side walls than just a fabric to cut down a small amount of high frequency splatter which always will occur to some degree. We have some theatres that have little or no treatment on the side walls whatsoever and they are extremely successful. No one has any trouble understanding words or anything else.

Widescreen Review: Are not the controlled directivity horns now being used in THX Sound Systems and other sound systems designed for behind the screen applications?



John Allen: They certainly are not. The controlled directivity concept is nothing new and in fact it was basically invented by Paul Klipsch back in the 1950s. There are patents of Paul Klipsch's that date back to 1951 that are being incorporated in most of the popular modern horns, constant directivity or otherwise. The latest constant directivity horns were designed to be used in large clusters and arrays of loudspeakers that would go into stadiums and other large spaces. It was only an afterthought to put them behind movie screens. They were adopted because they were felt to be superior to the old multicell horns, but

that doesn't mean that they were the best solution. Indeed when we came along with our three-way and now four-way systems where we were able to tailor the beamwidth to overcome the effects of the screen, that was really a major step forward. I think that it is fair to say that we are now the only ones producing and marketing loudspeakers that are specifically designed to be behind movie screens.

Widescreen Review: In home theatre THX has specified a sound screen manufactured by UniScreen Inc. for use with front projection and Home THX loudspeaker systems placed behind the screen. Are you saying that the match can't be a proper match and there will be an inherent distortion in that application because of what the screen itself does to the sound?

John Allen: Putting a screen in front of a loudspeaker does something. And what it does is different for different loudspeakers. So if anyone is attempting to solve this problem they have to, 1) have an idea as to what screen they are using is doing and 2), they have to have a loudspeaker system that can be worked around so you can overcome some of these effects. Most people have simply gone ahead and just taken a loudspeaker, put it behind a movie screen or any screen, lived with it, and dealt with its problems in some other way like putting in massive amounts of absorption to overcome the reflections that they have

back there behind the screen. We don't have any reflections. Up to 7 kHz we have no reflections whatsoever behind the screen. They just don't occur because our horns are right up to the screen and they are such a shape that they fit right to the screen so there is nothing bouncing around back there. And even from 7 kHz on up, behind the screen reflections are a good solid 10 dB below those of anyone else. So we don't need any sound absorption behind the screen. But if you have a loudspeaker that is splattering a lot of sound around back there, you have got to do something about it. Our approach has been not to put Band-Aids all over the place but to solve the problem at its source.

Widescreen Review: To what extent does a sound screen absorb high frequency energy?

John Allen: Not as much as you might think. Of course it depends on the kind of loudspeaker you are using. If you are using a large radiating area for the high frequencies then you are trying to push that through a very large area of the screen. If, as we do, you use a small tweeter with basically an 8 to 10-inch square aperture and push all the highs through a screen with a flat mouth horn, you have a much better chance at getting the highs through. Clearly, the screen blocks some highs, but in the loudspeakers that we have tested, it's only probably a couple of dB. The real high frequency level loss appears to be the fact that the high frequency beamwidth has been spread so much, that the actual high frequency response that you are listening to at a single location has been reduced. It's just being spread over a larger area and therefore reduced at one point. But the insertion loss of the screen for the theatre loudspeakers that we have tested has not been as significant as people had thought in the past and have found in the past with other devices.

Widescreen Review: Typically home tweeters are dome designs. What would be the effect of putting those behind a sound screen?

John Allen: I haven't done it. I don't know.

Widescreen Review: Is the HPS-4000 Sound System capable of full bandwidth reproduction in the split surrounds?

John Allen: Right from the very beginning, all of our surround systems have been full bandwidth. There was a time when some people wanted to leave the tweeters out of the surround loudspeakers. Because the stereo optical decoders limited the bandwidth to 7 kHz, they felt there was no need to buy the tweeters. I went along with that in a few installations and have regretted it ever since. There have been a couple of cases where we have actually gone back and installed the tweets. The answer to your question is yes, full bandwidth, absolutely. Plus we do it without any equalization. It is wonderful. I do not agree with those who say that you should have a limited bandwidth in the surrounds. One of the reasons that people are saying that is that the surround loudspeakers in movie theatres are only capable of delivering limited bandwidth. They are not capable of delivering enough low frequencies in order for bass to be heard and effective. If you try to

play bass through those surround loudspeakers, at levels high enough to be perceived, and in balance with everything else, they would simply fall apart, and they do so regularly. So filmmakers roll off the bass. My feeling is that producers should make the films they want to make and that they shouldn't compromise on the sound. If it destroys loudspeakers in the theatres, so be it. Inadequate loudspeakers don't belong there in the first place. They should be replaced. In fact what's so funny is that now that digital sound is being put in movie theatres they're changing screen and surround loudspeakers all over the place, but no one is changing a single HPS-4000 loudspeaker, screen or surround.

Widescreen Review: Are the surrounds timbre matched to the fully horn loaded screen loudspeakers?

John Allen: Absolutely. The amazing thing is when you are able to achieve that, the walls of the theatre just disappear and you just are transported to wherever the movie takes you. You are not thinking about the surrounds. You're not noticing the surrounds and indeed we've had experiences where theatre owners hearing it for the first time say 'I can't hear the surrounds, there not on.' And of course they are on. What we do is to turn off the stage loudspeakers and let them hear how loud the surrounds are playing. The fact is that because the coverage is so even, there is no localization and since the surround sound matches the sound from the screen, it becomes what it is supposed to be, a natural kind of acoustic where you're not aware of the surround loudspeakers because you're simply not supposed to be. Then there are cases where specific effects such as something flying through the room, an airplane, a helicopter, gunshots and bullets, you know these things will go into the surround loudspeakers and seem to fly across the room. That's certainly an effect we can also reproduce with a high degree of directionality when it's required and recorded that way. There's another place where putting in superior components can really, really make a difference.

Widescreen Review: What is the best way to achieve surround timbre matching with the front screen loudspeakers?

John Allen: We do it by using three-way horn-loaded surround loudspeakers. We use midrange and tweeter horns that use the same basic throat structure as our stage loudspeaker and tweeter. The midrange and tweeter drivers are identical to the ones we're using in the stage loudspeakers. So we have a pretty good shot right there at matching the sound from the stage simply because of the fact that we're using essentially the same kind of loudspeakers. The surround loudspeakers obviously can't be as big as the stage loudspeakers and so we have a direct radiator woofer. Our surrounds use a 12-inch, not a 10- or two 8-inch drivers, but a 12-inch high efficiency driver in a sealed box with a high 98 dB 1 watt/1 meter sensitivity. They can handle a lot of power. I've put over 600 watts into them at clipping levels without damage. That's what you need to do. If you're using other loudspeakers that are completely different than what you have for the stage loudspeakers, the only way you're going to be able to get any kind of a match at all is with lots of equalization. Good luck!

Widescreen Review: You mentioned the limitation of physical size for the surround loudspeakers for the theatre environment. Is this not an arbitrary architectural limitation that could be overcome by a structural design to accommodate matching surrounds at the very initial stages of the theatre's auditorium design?

John Allen: The truth is that you could put anything you want on the walls. But just from a cosmetic standpoint you don't want to put something so big on the wall that it overpowers everything else in the room.

Widescreen Review: I understand your point. But could not the surrounds be architecturally integrated into the aesthetic style of the room and be completely unobtrusive, yet be completely identical to the stage loudspeakers? Wouldn't this be a more optimal approach than to have to compromise in any respect in the performance of the surround loudspeakers matched to the stage loudspeakers?

John Allen: We're missing a critical point here and that is a typical surround array consists of 10 to 12 loudspeakers and the combined effect of having that many loudspeakers gives you a large sound reproducer for the surround channel. Indeed, if you add up 10 or 12 12-inch woofers you're approaching the radiating area of one of our stage loudspeakers. In fact, the surround channel is actually supposed to be able to match the output and everything else of a stage channel. And we do that. We are the only ones that have always done it.

Widescreen Review: But if 10 to 12 12-inch woofers are required to match the output characteristics of one stage channel how does the digital format requirement for two surround channels work in that formula?

John Allen: Fine. Both surround channels are considered as a total group.

Widescreen Review: In home theatre applications, then, would you say that it would be ideal to use surround loudspeakers that are mirror images of the front left and right loudspeakers?

John Allen: Yes, I don't have a problem with that at all.

Widescreen Review: In home theatre typically surround arrays are not used, but a single left and right rear surround loudspeaker.

John Allen: That is a compromise because you are not going to produce a surrounding effect from two loudspeakers. The best place, if you had to, is to use the two rear corners. Of course, we're then talking about a system that is necessarily going to be a sweet spot system. There is a tremendous benefit to be actually able to surround yourself with the surrounds. That shouldn't be cast aside.

Widescreen Review: I want to come back to the school of thought that advocates a sweet spot system for home theatre because I think that has some application with the discrete digital quintaphonic format.

John Allen: Yes.

Widescreen Review: I think that there is an inherently greater opportunity to optimize the home theatre application of the digital quintaphonic format than that in the theatre.

John Allen: I don't agree. I think the potential is equal. In fact, in some degree there is more potential in a theatre only because it's physically a larger space and you can't fake the greater volume and the experience of being there.

Widescreen Review: Audiophiles over the years have been critical of horn loaded loudspeaker designs which do not measure up fidelity wise to other loudspeaker designs? Why did you select a horn loaded design over a direct radiator design for theatre use? Why did you incorporate Klipsch horn technology?

John Allen: I agree with the criticism of horn loaded loudspeakers that do not measure up with other loudspeakers, because most of the loudspeakers that are out there, whether they be horn loaded or not, in my opinion, don't measure up to much of anything. Certainly, there have been a tremendous number of horn loaded designs over the years, most of them I think, that were really terrible. Even today, there are products on the market that I wouldn't give you five cents for. And I say that not because I think there's anything fundamentally wrong with the people who designed them or the companies that market them. I say that because my criteria for what a loudspeaker should be is very simple. It should reproduce, unobtrusively, totally transparently, what went into the microphone. We have to be honest with each other and admit that this is not possible. So what is the next best thing? Well if the best sound system is the no sound system (which I think is probably a good rule), then the next best thing is a sound system that doesn't sound like sound system. It should sound as natural and as close to the original sound as possible. And whether it be a horn design, or any other design, it was very clear to me that the Klipschorn and Paul Klipsch's work has gone further towards that goal than anything else that I've encountered. That's why I chose it. It wasn't because of any philosophical prejudice that I had towards one design or another. It simply sounded more like the real thing and it happened to be a horn design. But I am in total agreement with people who hate horn loaded loudspeakers or any kind of loudspeakers that don't sound very good. Most of the non-Klipsch horn systems I've heard are very poorly done. They sound honky, like your talking through a garden hose. Who wouldn't reject something like that?

Widescreen Review: Wasn't another side of that choice a practical one, in that a horn loaded design offers the kind of high efficiency necessary to produce the acoustic power to

fill the large acoustic space of a theatre.

John Allen: Oh, absolutely. But I also have to include lower distortion and the radiating area. With our big HPS-4000 TCM systems, we have 10.25 square feet of low frequency radiating area. We'll put five of those in a theatre. Then we've really got control of the air in that room. In the case of a Klipschorn, it has an added advantage in the sense that it goes into a corner of a room. The walls and the floor of the room become part of the loudspeaker in a very unique way. I mean, think about it for a moment. If you took a light bulb and put it out in space, you would see the light emanating from that bulb only in the direction where you are sitting. If you put a mirror behind that light, you would now see the light that comes directly to you, but also the light that is reflected from that mirror. So you now have twice as much light coming at you. If you were to think about putting a Klipschorn in a corner and making the corner and the floor out of mirrors, then count the number of Klipschorns you would see, it would be eight. In the lowest frequencies, the Klipschorn behaves like a loudspeaker eight times bigger than it is. In the very lowest frequencies, of course, where it is hardest to reproduce the kind of acoustic power that you need in order for the bass to be accurate and in balance with everything else, this is an advantage in the sense that you can put a loudspeaker in a living room that will fit through the door and still do its job efficiently. That's the benefit of the corner placement that the Klipschorn obviously has. But you're absolutely right. In terms of acoustic output most loudspeakers just give up long before realistic levels are achieved. They just don't have the horsepower or the coupling area.

Widescreen Review: Is there a Home HPS-4000 Sound System in the works using perhaps the Klipschorn, one in each corner?

John Allen: I built my first home theatre system in 1972. I wouldn't say Home HPS-4000 is in the works. I would say that it exists. I have built them. It is very easy to do. For instance, I was telling you about the enormous system that I have in Jamaica. At the office screening room of the company that runs that theatre we set up what is essentially a Home HPS-4000 system with Klipschorns and a La Scala in the front and Klipsch Heresys in an Allen Surround Array in the back. The beauty is, that even though you are in a much smaller space, a space that's only about twice as big as my living room, you know what a film is going to sound like in the big theatre. The tone is remarkably similar. What is lacking is the space of the large room and the effect that has on sound, and you can't fake that. In terms of tone and accuracy they sound the same. Another benefit of using that kind of system is when you're playing a regular music recording. Of course, they are also reproduced extremely well. What I have found to be the case with a lot of home theatre systems is that while they may do well in certain aspects of reproducing film, they really do poorly when it comes to music. So badly, that I know some dealers have been ashamed to even consider them for music. In fact I heard that one company even offers a loudspeaker that has two completely different sets of drivers, one for film and one for music. What a joke. Why should that be?

For years I have had telephone calls from people interested in marketing the home theatre HPS-4000 system. I have discovered that in fact they weren't interested in anything of the kind. They were interested in getting information and talking a lot. No one in the home theatre market that I have yet encountered has been really serious about this. They have been interested in making a lot of hoopla and a lot of money, but they have not been interested in seriously approaching what I think is a real subject. They've just been playing politics with it and playing games with it. But I have not detected a level of seriousness in this business yet that I think ought to be there. Maybe someday. In the meantime, these phone calls are boring.

Widescreen Review: Where is the Klipsch company with respect to all of this opportunity for a Home HPS-4000 Sound System? Would not Klipsch be the logical company to forthwith market your system for home theatre?

John Allen: Yes. They have a fantastic line of loudspeakers.

Widescreen Review: You have mentioned the Allen Surround Array several times now. What makes it unique?

John Allen: The fact that we match the radiating patterns of the loudspeakers to the shape of the room through various formulas. The formulas are different for the side walls than they are for the back walls, or for the corners, and we do use corner placed surround loudspeakers. It is a very intricate set of equations that provide a pattern of coverage that is the same no matter what theatre you're in because as the shape of the room changes, the position of all the loudspeakers change. But the result is the same. It's never failed. We've built, I don't know, 200 or 300 of them. A lot of them were put in theatres that had other stage loudspeakers in the early days, particularly. I've honestly lost count of the number that we did. I believe we have about 100 surround arrays out there in addition to our own HPS-4000 systems. So that would be somewhere around 250 to 300.

Widescreen Review: How does the HPS-4000 Sound System differ from other premium sound systems in sound performance and application?

John Allen: For one thing the HPS-4000 Sound System can go into any theatre. And indeed we get asked to do some landmark historic theatres where you're not allowed put in a lot of acoustic treatment or you're not allowed to change a lot of things. So a sound system has to be able to go in that doesn't require absorption on one hundred percent of the surface of the room. And of course we don't. Another important thing is cost. Believe it or not, we cost less than our competitors because we don't need to be bi-amped, and we don't need to do a lot of acoustic treatment, and we don't need to do a lot of things behind the screen that other people are doing. You end up with a sound system that costs about half what anybody else's cost and yet has eight times the output and quite a bit more performance.

As a matter of fact one company did do an A/B comparison with our system versus one of our competitors and that was Showscan. They wanted to be able to actually switch between the two sets of loudspeakers. I said fine, but we have to do this fairly and that means that we should put a switch in between the magnetic preamplifiers and two Dolby CP-200 cinema processors, that feed two sets of amplifiers that feed the two sets of loudspeakers. They agreed and installed just that. I made a deal with them that they could put this thing in and play with it for 45 days. If at the end of 45 days they didn't like it, they could ship it back. The truth was that it was all over in 45 minutes, which was the amount of time which it took to play the film that we were playing twice and get everybody down to hear it, because they were hearing things that they had never heard before. When they switched to the conventional system a lot of detail and spaciousness went away. The sound became thin. Colorations came back that were not in the recording. And there were simply things that they couldn't hear anymore. I remember one scene where the actor goes over and pulls a string to turn on an overhead light which is suspended by a chain. The chain and the lamp rattled after he pulled on this string for several seconds. It was the right sound at the right level, but when you switched back to the conventional system from the HPS-4000 system, the sound of the rattling lamp completely disappeared. Now you knew it was there. You could see the lamp moving. You could switch back to the HPS-4000 system and hear it, then you could switch back to the conventional system and its sound would totally vanish. So there is a lot to be said for comparing our system to others. The best way to describe it is to say that you hear everything, and with the other systems you simply don't.

Widescreen Review: In the case of the conventional system in this A/B Showscan comparison was it a premium theatre system?

John Allen: Yes. Bi-amplified, the whole thing.

Widescreen Review: In what specific ways is HPS-4000 audio performance better than other premium sound systems?

John Allen: First of all dialog is more important, when you think about it, than anything else in a motion picture. Because if you can't understand the words that tell the story you don't have anything. I am in complete agreement with that. But I have really emphasized the fact that in addition to being intelligible, the dialog should also sound natural. Naturalness has been sacrificed in most sound system designs, whether they be theatre or public address sound system designs. Naturalness of tone has been very, very unimportant relative to intelligibility and coverage. Those things are paramount. I simply said that I am going to make naturalness of voice tone equally important to the other factors, and I believe that we are the first to do that. But of course the dynamic range of our system is superior. The overall sound is considerably clearer and the bass is just unequaled.

Widescreen Review: You have been working with loudspeaker playback designs for

digital soundtrack reproduction probably the longest of anyone else in the theatre industry. I believe your system was used first to premiere the re-mastered Walt Disney FANTASIA in 1985 at the Plitt Century Plaza Theatre in Los Angeles. How do you see digital stereo impacting theatre sound systems?

John Allen: Well, actually before FANTASIA we did the world premiere of digital sound in a commercial movie theatre in 1984. It was a special presentation basically to the industry, at the Century Plaza Theatre. We had over 300 people there, studio heads, directors and producers. The whole purpose of that presentation was to show off this new installation that we had just done there. At the time we installed that system, it was the largest 70mm sound system that we had ever done. I wanted to show off what the HPS-4000 Sound System was really designed to do because when I first started this in 1979-1980, I very much had digital sound in mind. I knew that as the compact disc was going to become very popular that digital movie sound had to happen. I wanted our systems to be ready to play it back. And indeed, I did not design the original sound systems with optical or 70mm requirements in mind. All of my sound systems have been designed with digital requirements in mind. So we played, at that time in 1984, a portion of a silent picture called METROPOLIS, which was restored visually and presented with a contemporary music score by Giorgio Moroder. It was all done digitally, so there existed a five channel (left, center, right, mono surround, and bass) digital master. We locked that up with the projector and played digital sound directly from a Sony DASH 3324 machine using the digital master and using Moroder's personal print which was actually used to make the video. We played this at the Century Plaza, and it was a phenomenal success. The theatre was instantly dubbed the best [sounding] theatre in the area if not in the country by various critics. Right after that, literally two hours after while at lunch, Ed Plitt and others were saying "well that was great, now what?" Clearly we had shown that there was a significant improvement to be found with digital playback and HPS-4000 Sound Systems. The only thing left to do was to play a whole movie. METROPOLIS was not an easy choice technically because it was a five channel discrete master and there was no convenient way to lock it up and play it in the theatre because of a lack of change-over capabilities and things like that. (It was a two projector theatre.) I just didn't feel that, technically, it made a lot of sense. Also, we all felt that METROPOLIS was probably not a film that had as wide an appeal as you would like to have for that kind of an introduction.

FANTASIA came along very shortly and offered us the opportunity that we needed. For openers, there was a digital master; the Irwin Kostal rerecording of FANTASIA which was done in 1982. The sound quality was stunning. The recording was mixed by Shawn Murphy. It was just an absolutely stunning recording, better than anybody knew, including, I think, the people at Disney, because they hadn't been able to hear it so well. But we had the ability to take the two-track master and lock that up with the film using Disney's proprietary synchronizers which they had developed for the EPCOT center. And that's what we did. I often tell people that, yes it was sort of my idea, but Nelson Meacham and the folks at Disney really made this thing happen and without them we

could not have done it. It was a huge success. Disney Chairman Michael Eisner told me it was the best sound he had ever heard. He went on to name our competitors and wondered “Why” we were so much better? It was one of the nicest compliments I’ve ever had. FANTASIA played at the Century Plaza opening on February 8, 1985. The film did five times the business of the average theatres throughout the country. It did twice the business of the next highest grossing theatre and the film played four times longer than it played in any other theatre in that particular release. So to say that it was a success is an understatement. But what it did do more than anything else, outside of making everybody very happy, is really prompt an acceleration of the development of digital movie sound. We had to use a rather fussy double system and clearly something better than what we were using in terms of either an interlock or a single format system where the sound is on the film had to be developed for digital sound to be practical in regular theatres. Now we have three digital systems that are being proposed and being used in theatres. I think that it is just tremendous because I believe that digital sound has the potential to transform the theatre-going experience. Unfortunately it probably won’t, but it has that potential. If the industry were to do it correctly it would extend the life of movie theatres considerably. I say a life because a lot of them are closing.

Widescreen Review: I remember clearly that experience back in 1985 with FANTASIA. In fact I believe that is when we first met. It was for me an extraordinary experience to hear that musical score.

John Allen: Yes. I remember specifically the Beethoven Sixth Symphony. What was so interesting about that was, of all the pieces in that score, the Beethoven was the one I knew the best. I can honestly tell you that there were times sitting in the Century Plaza listening to that recorded music played over loudspeakers, I actually found it more satisfying than listening to the Boston Symphony play the same thing live in Symphony Hall. Now I don’t want to be misunderstood. I am not saying that the sound system was better than Symphony Hall. I am simply saying that there were moments when I was actually more satisfied with what I was hearing in the theatre than I heard at Symphony Hall. What does that mean? That means that we were really close.

There were people still sitting in the seats of that theatre ten or fifteen minutes after the curtain closed. I’ve never seen anything like it. They just couldn’t leave. They were mesmerized. I would wait for those ten or fifteen minutes to go by then I would go up and I would talk to those people because those were the ones I really wanted to talk to. I mean no one was in a hurry to leave the theatre. You probably stayed there yourself. As a matter of fact I believe that is how we met. I would ask how they like the sound. They would say, “oooooh, it was wonderful!” You contrast that with the 50th anniversary analog presentation of FANTASIA when people were out the door before the lights came on and you can see the kind of difference that I mean.

Widescreen Review: I must admit John that I have not had an opportunity to hear one of the current crop of digital motion pictures played back on one of your HPS-4000 systems

in the Southern California Los Angeles metro area. However I have heard virtually all the digital films in their respective systems and I have observed numerous digital stereo presentations whose character was loud, harsh, and shrill with sibilant dialog. Are these characteristics the fault of the digital systems, the mixes, or the theatre sound systems?

John Allen: The short answer is the sound systems. You did not hear anything like that with FANTASIA yet you're hearing it in so many other theatres. And by the way, your characterization is very similar to everything that everyone else is observing. As I have been saying all along I believe the small two-way loudspeaker systems that are occupying theatres these days are simply incapable of accurately reproducing this kind of sound. And when you add to that the inadequate tuning procedures that are used, you really end up with a mess.

Widescreen Review: How would you characterize each of the leading digital systems, Dolby Stereo Digital, DTS, and SDDS in terms of performance?

John Allen: They are all excellent. When you think about digital sound per se it's kind of amazing that it works at all. To then be able to manipulate it in the ways that these three companies are doing in order to fit it onto a film or onto a CD-ROM and still come out sounding so good is really incredible. I really like them all.

Widescreen Review: What system do you think will become the theatrical standard?

John Allen: Well I really don't know. I don't know if anybody does. I can tell you this, the performance of the systems will have very little to do with it. If we do get a standard digital format anytime soon, quality will not be the issue. The issues will be titles, politics, and money. But sound quality will not be an issue at all. And I am not sure that it needs to be an issue. They are all very good. The point is that there are things that are far more influential in these kinds of matters than sound quality and politics is certainly it when it comes to the movie business. I mean, you had Strong International with a double system and 16 bit linear encoding. It was probably as perfect an approach as you could imagine and yet they weren't able to get any titles. They never got any sales and dropped it as far as I know.

Widescreen Review: How do you see digital stereo impacting the theatre exhibition market?

John Allen: Nowhere near enough. I don't think that the industry is going to be any better at dealing with digital stereo than it was with Dolby Stereo. Dolby Stereo has never been properly implemented in most of the theatres that it has been installed in. Again, the loudspeakers are inadequate, the tuning procedures are inadequate, and the amplifiers are inadequate. It's just a joke. We have had so many people tell us that our 35mm presentations are superior to our competitors' 70mm presentations. That gives you an example of how much is missing. If the audience ever knew how much was missing from

the sound experience that they were getting, they would be furious. If you put a picture on the screen and you blanked out as much information as is missing from the sound presentation, no one, including the theatre owners, would tolerate it.

But do I think exhibitors are going to do what's necessary to get the full advantage out of digital sound? No. And it's really a shame. I honestly believe that there are many, many sincere exhibitors that really do want the best, but they simply are, for whatever reason, unsure of what that is or their staffs are misinformed. Again, there is a lot of politics. The quality of the sound that should be found in movie theatres, clearly is not there. And you do not have to be an Einstein to realize it.

Widescreen Review: It's so frustrating that the condition of theatre sound systems is so deplorable for the most part in the United States. Is there any hope that theatre owners will come to care enough about sound quality to revolutionize an entire industry?

John Allen: I don't know. I think that slowly but surely we have been able to make an impact. The theatres that are equipped with HPS-4000 Sound Systems have surely benefited with Dolby A, Dolby SR, 70 mm and now digital. Of course the theatre owners equipped with HPS-4000 are really happy. As these better formats have come along they have not had to replace their loudspeakers, because they bought digital-ready loudspeakers right from the beginning. In that sense, we've been able to help out. But the industry is a small industry. There's a lot of cliques. There's a lot of politics which is contributing more harm than good. I am not sure that the skills required at the technical level to provide sound at the level that I am talking about, are widely enough available. That level of skill throughout the professional sound field is also sorely lacking. I mean think about it: When you go to a movie, and the director wants the theatre audience to believe that they are listening to a PA system in the scene, you know like a high school dance or something like that, and the crowd in the scene is addressed through a PA system what is the first thing the director does to let you know that you are listening to a PA system? He gives you sound of feedback. The second thing that he does is to make the sound very bandwidth limited and sound like a honky old horn of some kind which really degrades the quality of the sound. That tells the audience that they are listening to a 'sound system.' Why is that? Because nine times out of ten when an audience of any kind does listen to a sound system anywhere it is a pretty sad affair. Bad sound is our culture.

Widescreen Review: With the movie going public hopefully becoming more sophisticated and quality conscious isn't it necessary for theatre owners to distinguish their sound system performance in the digital era to attract audiences and keep them coming back?

John Allen: Yes, and when they do it pays off handsomely.

Widescreen Review: How many of your HPS-4000 Sound Systems are out in the field now?

John Allen: I don't have an exact count but it's about 180 and we have 58 under development at the moment of which four are coming on line very shortly.

Widescreen Review: If I were a Dolby, DTS or Sony I would want to target your theatres for digital system installation.

John Allen: They are not in the business of targeting anything. They are in the business of selling equipment and delivering it to the theatres that are playing the pictures whether they be HPS-4000 theatres or otherwise. We are certainly respected by the companies that are making digital equipment but there is no way that they are going to single out one sound system over another as being suitable for their equipment because that's not the business they're in.

Widescreen Review: Why is there so little education for theatre employees? Within that industry I have found that theatre managers, ushers, and attendants know virtually nothing about the technical esthetics of the various projection and soundtrack formats, and their own theatre's sound system. Most theatre personnel don't have a clue as to what the technology is all about or how the presentations work, and therefore draw a blank when quality conscious, caring moviegoers ask questions about presentation formats.

John Allen: There is no formal education beyond what happens when technicians visit a theatre. Perhaps a manager may take it upon himself to read up on various things by reading manuals and things like that. But you're talking about people who are not expected to be technically proficient. They are expected to be able to operate a theatre without necessarily having the knowledge of how each individual piece of equipment works. And that's just the reality. It's sort of hard to expect a seventeen-year old ticket collector to understand the intricacies of a 4-2-4 matrix or 16-bit PCM. You just can't expect it.

Widescreen Review: Do you see dual or multiple systems in the same projection booth for theatres using DTS, Dolby, and Sony digital systems?

John Allen: Well I think that some theatres will be equipped that way. It's more likely that within a multiplex you will have one theatre equipped with one and another equipped with another. In other words each one of the 500 seat houses will have one of the digital systems whether it be Dolby, DTS, or Sony. I think it will spread out among the various theatres rather than have them all sitting all on one projector. Clearly there are some premiere houses that will have all three or two of the three. I am not sure that I agree with my own thinking of just even a year ago, that it would be two years before one system was dominant. I think now that they all are so good that we are going to have multiple digital formats for the foreseeable future. That makes it really difficult for theatre owners. Clearly they can't go around installing three digital processors in every theatre, but what they can do is put one of the three in each three of their houses and

therefore have the same number of digital equipped theatres. They will simply put the films in the right theatres with the right equipment. But at that point it's bad for the equipment manufacturers because their sales are going to be reduced accordingly. In terms of the public's access to digital sound I don't think that it's going to be affected. I think there will be enough digital theatres out there in the circuits, at least those that care to put it in. I suppose I shouldn't say that there will be enough. There will never be enough. Keep in mind that most of the theatres out there are mono. What does that tell you?

Widescreen Review: What digital system offers in your opinion the best sound and application for a theatre standard?

John Allen: They all have advantages and they all have disadvantages, although the advantages of all of them are stronger than the disadvantages of any of them. Clearly we can't talk about the Sony SDDS system at this point because all they have exhibited so far are prototype presentations and their actual processor is still some months away. We haven't had the experience of using them in theatres in any large numbers. But what I've heard from Sony is quite good. Of course they are offering something that, at least initially, the other systems are not offering and that's eight channels, which you would divide up so that you would have five full range channels behind the screen instead of three. This is a big, big advantage to large theatres, particularly theatres with screens wider than 40 feet. I think those theatres definitely benefit from having five loudspeakers behind the screen because you can maintain a wall of sound with very, very wide screens that you cannot maintain with three. Below 40 feet, five loudspeakers becomes really an unnecessary burden, because the sound perspective that you want is created by three loudspeakers quite well. So, there are a few theatres out there that will benefit from this. We have several of them equipped with HPS-4000 Sound Systems. The Century Plaza, by the way is equipped for this with five full range loudspeakers behind the screen. I am certainly looking forward to working with the Sony system just because of that. [Since this interview was done in 1993, I have changed my view on the subject of five screen channels versus screen size and found that five screen channels enhances the sound with screens of all sizes. For those who are interested an article on the subject entitled THE EIGHT CHANNEL ADVANTAGE can be found on the hps4000.com web site. -JFA] The Dolby and DTS systems use three main channels behind the screen, split surrounds, and a bass channel. In terms of sound quality I would say that they are quite equivalent. The DTS system has, of course, an advantage in cost because it is a double system and it is therefore something that can be produced more inexpensively. The Dolby system is a single system with the sound on the film, which means that if you had trailers to run or something like that you could move those around any old time you want and basically put a show together the way you would an analog show. So they've got an advantage there. But in terms of decidedly saying which one is better, none of them are better enough over the other to say, well here is the choice we must make.

Widescreen Review: DTS already has over 1,500 commercial cinemas equipped in the

United States. That compares to about 125 Dolby-equipped commercial theatres in the United States. Sony has 6 systems in prototype form, two of which are in Japan, and have no plans to introduce production units until next April or May. Do you see Dolby and Sony ever catching up with DTS which continues to sell and equip more theatres?

John Allen: Well I think they could. I just don't know if they will. As long as a Dolby installation costs twice as much as a DTS installation, people are going to be hesitant installing to install it in as many theatres as they might. It really has to do more with how the movies are made. If nobody makes any movies in one of these formats no one is ever going to buy it. And if everyone stops making movies except in one format than that one format would be the one that would be used. For instance if everyone decided to release all their pictures in 90mm film, then that's how they would be played. So it's driven by that kind of thing as much as anything else.

Widescreen Review: What are the differences between 70mm sound performance and that of digital sound?

John Allen: The short answer is basically very little, however there is a longer answer and that is that digital sound is far more durable than 70mm mag stripping. When they are properly set up, 70 mm presentations are just wonderful. Of course the picture quality is superb and unsurpassed. You cannot get that kind of picture quality from 35mm projection. However, as time goes on and the mag stripping wears and the heads wear, the sound quality can diminish. It is not a big diminishment but it is a diminishment. It requires somebody to go back and check things, and that rarely is possible and just doesn't seem to happen. So the 70mm presentation over time will deteriorate to some degree whereas the digital presentation won't. So depending on the day that you go, the difference will either not exist or it will exist. The real advantage of course with digital is that it's read off the film without anything touching the film. The other advantage is that kind of quality sound that you have associated with 70mm is now possible on every day presentations with 35mm, which is far, far easier to produce and a lot less expensive to release. It just means that a larger number of presentations at least have the potential for this kind of sound than has ever been the case in the past.

Widescreen Review: I personally see the capability of creating a balanced, integrated holographic three-dimensional sound field as the true promise of digital.

John Allen: I would agree except that it is also the promise of 70mm but the creation of such a feeling in a theatre is not possible with most of the theatre loudspeakers that are in use today.

Widescreen Review: I agree on your point about 70mm but there are not, nor have there ever been, that many 70mm theatres equipped with stereo surrounds that would deliver that holographic sound field capability, nor has there been but only a few 70mm pictures produced with split surrounds.

John Allen: I don't know what the number is either, but you're absolutely right that most 70mm theatres do not have stereo surround capability. We've got about 30 70mm HPS-4000 houses and I would say that maybe twenty-five percent (25%) have split surround capability. I doubt if twenty-five percent (25%) of all 70mm theatres are so equipped. It might be 50 theatres that have that kind of capability.

Widescreen Review: What discouragement's have you had with trying to accomplish your objective of getting theatre owners to improve their sound systems?

John Allen: Well initially it was a matter of price. Our systems were once the most expensive on the market. Then some other competitors got into the act with far more expensive systems that didn't offer any more performance and didn't in fact even offer equal performance to HPS-4000 systems but they sure did cost a lot more. So that made us less expensive and cost is no longer an issue. I think that the biggest difficulty that I've had, and it's not just my company because I think that anybody who's interested in the improvement of the quality of presentation in movie theatres, runs into the concern that 1) some theatre owners really don't believe that they have enough money to equip all their theatres with the best Xenon lamps, the best lenses, and the best sound systems, and 2) there is a fair amount of opinion that audiences don't care. Now this is not industry wide, but I am saying that there are people who have said that they could bring in a big picture and set up lawn chairs and people would come. That's no doubt true, but my argument has always been that theatre owners obviously want to sell tickets to their theatres when they don't have the big pictures and they do want people to be in the habit of simply going to the theatre as a place to go without even worrying about it, knowing they are going to have a really nice time. And that kind of marketing doesn't seem to be the way things have gone. Investing in better equipment has been basically picture motivated as opposed to experience motivated. If a big picture comes along exhibitors will put the money in for upgrades, but they will not do it in all their theatres. They'll just do it in the premiere theatres. Six weeks down the road when people are going to the multiplex and the film has been moved into a smaller house, maybe even a mono house, they're still spending the same dollars to see that picture and it seems to me that those people should get the same show. I know exhibitors who agree with that, but the reality is that it doesn't generally exist. So I wouldn't say that I've run into anything unique. It's just the nature of the business. I know that there are a lot of people in the business that are very serious about quality. I've got circuits that are all stereo and circuits that are all HPS-4000. That kind of commitment pays off tremendously and I have a lot of admiration for the exhibitors who are doing that. But there does seem to be a reluctance in other quarters. Some simply don't believe that it's going pay off as well as it really does. And I think slowly that perception may change. But I also know that a lot of theatres are closing and when you are the chief executive of a company that is closing a lot of theatres, it makes you a little gun-shy when it comes to investing in the theatres that you have without knowing whether or not they are going to stay there and you're going to be able to keep them busy.

Widescreen Review: How do you see digital sound translating to the home theatre market?

John Allen: I think basically the same way that the compact disc has revolutionized the way people listen to music at home, or least provided the potential to revolutionize it. Certainly digital has brought a dimension of quality and lack of noise to music playback that we have never had. Obviously digital sound with a discrete format could provide a marvelous experience for people at home, an experience here in 1993 that they don't now get in ninety-nine percent (99%) of the theatres that they go to. So there is a tremendous potential for improving the movie watching experience in the home and in theatres.

Widescreen Review: If people can get a better experience in their homes than they can going out to a movie they will be even more likely not to support theatres. Won't this have an even greater impact on boxoffice attendance?

John Allen: I think that has already happened. Don't you?

Widescreen Review: They always say that boxoffice is the greatest it has ever been but the fact is that actual attendance continues to diminish each year. It is ticket prices that continue to inflate. That is the reason for greater boxoffice.

John Allen: That's right. And it's also greater for just a few pictures. The truth is that most people watch films at home. Most of the viewing of motion pictures is done at home whether it be cable or video rental, or just network television. Why is that? The people in the business are telling me, and I believe it is true that the ticket price has simply grown high enough so that people are being very, very fussy about when they decide to spend that kind of money on seeing a movie. They clearly have voted with their wallets that they are willing to spend \$2.00 on renting a video or \$1.00 or whatever it might be, and give up a tremendous experience that they would have just simply watching a film with a whole lot other people. There is a feeling of community that you have when you're in a movie theatre and you're experiencing some funny scene, or some tragic or scary scene with 300 or 500 other people. There is an experience and a feeling that comes out of that you don't get at home. And they're willing to give that up. They're willing to give up a large screen, and they're willing to give up whatever sound there may be. In fact, in terms of sound maybe they're not giving up anything depending on the theatre that they might go to. But they're willing to give all that up for price, for two bucks. I think that the answer is if you want people to go to theatres all the time, you've got to give them something so compelling at a price that they are willing to pay for it that they can't stay away. And I honestly believe that the potential is there to do that. I also think that digital sound, properly presented, is the most important component. Without it, whatever else you do will not be enough.

Widescreen Review: Thus far the consumer press has not had an opportunity to evaluate

how the various digital 5.1 systems would sound in a home theatre environment. Do you have any perspective on the translation to the home?

John Allen: Again it will be based on the loudspeakers that people will use. But certainly the potential is there for a tremendous experience, no question about it, and certainly equal to the best theatres and better than ninety-nine percent (99%) of the ones that are out there.

Widescreen Review: Do you think that the 5.1 discrete format will have an impact on the Home THX specification for dipole surround loudspeaker arrangements that call for mechanically diffused dispersion rather than a point source loudspeaker placement for optimal 5.1 formatted soundtrack reproduction? This assumes a symmetrical, equal powered 5.1 format loudspeaker arrangement with the imaging capability between each point source to reconstruct a three-dimensional holographic sound field.

John Allen: Most of the people I know who have looked into this have found that you need more than two loudspeakers to do this. I know what Lucasfilm was trying to do with their dipolar approach and I think they have achieved what their objectives were. Whether or not that proves to be satisfactory to everyone else remains to be seen. I think that our approach is the purist one because what we want to do in people's homes is what we are doing in movie theatres. [Sound systems] that clearly will playback correctly whatever has been recorded on the track and put everything where it is supposed to be because we are basically using the same geometry in the home as we are in the theatre. Everything else is a compromise and some compromises are better executed than others. I think that in terms of creating a diffuse field, what they did with the dipolar loudspeakers actually works pretty well. But there are other important effects besides diffuse effects and I think that the purest approach is probably the better one for those.

Widescreen Review: Traditionally the motion picture sound systems have executed the surround arrays as a diffuse mono sound field. Now that we have a digital system with equal powered, full bandwidth discrete channels which is the basis for creating a balanced, integrated three-dimensional holographic sound field with left front, left back and right front, right back channel assignments. do you see a need for cinemas to change their approach from left wall/right wall diffuse surround arrays to accomplish what I call a virtual acoustic reality that the discrete digital format can deliver?

John Allen: No. They don't have to change the practice of attempting to build a diffuse field, they just have to get successful at it. The Allen Surround Array formulas are successful. But in addition to creating a diffuse effect you can also reproduce rather remarkably good directional effects. I would disagree with you in the sense that historically the surround system has not been considered a diffuse effect-only system. It has been used for diffuse effects most of the time because that's what's appropriate for most of the scenes, most of the time, when all you're looking for is the ambience, the wind in the trees or something like that. But even if you go back to SUPERMAN, that phantom

zone exists through the right rear of the theatre. In our theatres, at least, it did so even in the 35mm presentations with the mono surround channel. While it is necessary to have a surround system capable of reproducing a diffuse sound field because you can't have a diffuse sound field unless you are producing it, the fact is that at the same time if you do it well enough you can also have, even with mono surround, some rather spectacular directional effects. One of the most interesting effects that I ever heard was in a movie called UNCOMMON VALOR,. There was a scene in which two actors were speaking on screen and clearly there was a lot of activity around them that you didn't get to see. One of them was a helicopter that entered from the left rear of the theatre, flew over your head, and exited through the right wall. You never saw the helicopter in the scene, but you sure heard it, and you sure heard it flying over your head and from one side of the theatre to the other; from one corner to another. That was all done with a mono surround track. What stereo surrounds give you is 1) a much easier way of producing directional effects and 2) by putting the surrounds in stereo it opens up that feeling that you have of being in a space, and it's actually far more satisfying over a long period than it is in a short period. You leave the theatre feeling better because of stereo surrounds. Unless you're a professional you're not really sure why. But that's not the point. The audience isn't necessary supposed to know why, they are just supposed to have fun.

Widescreen Review: I bring this up because the comparison is that in a home theatre environment you can set your sitting area up to be a sweet spot in which you have good imaging capability between the left back and left front or the left back and the right back side to side, or the right back and right front in which you can literally see images and sounds placed within those walls of sound. In a movie theatre you have many surround loudspeakers which create kind of a left wall effect or a right wall effect, but it really doesn't have the true capability of recreating good imaging along those walls in relation to the front screen channels.

John Allen: I know. Clearly you can do anything with a sweet spot kind of a system but the truth is there is a lot of misconception as to what surrounds are capable of because the surround systems in most movie theatres are not capable of anything. They can't play the levels required. They can't play the bandwidth required. They don't have any punch. They don't have coverage. I mean you name it, whatever mistake you can think of, you're going to find it pretty common practice in most existing theatre systems. But the truth is that it's perfectly possible, as we have shown in hundreds of theatres, to create a completely surrounding field that is capable of both diffuse and directional effects, matching the screen, without a sweet spot.

Widescreen Review: I am going to ask you the same question that I posed to Michael Kohut in an interview related to the Sony SDDS system. In home theatre we have basically two schools of thought for home theatre sound systems. One is the Home THX approach which embraces the idea that the surrounds present an always diffuse sound field thereby inhibiting the recreation of a real acoustic sound field created from four signal points (left front, left back, right front, right back). The philosophy is that there

should be no pin-point imaging capability in the surround field, but strictly non-localizable diffuse sound. The extent to which specific front to back left or right wall or back to front left or right wall or side to side back wall imaging takes place is limited to non-specific left wall diffuse, right wall diffuse or back wall diffuse field effects. They have chosen to process those signals in the surrounds mechanically no matter what was envisioned by the mixers. With this arrangement you will always hear a diffuse effect. You can never create an accurate sound field with specific-image discreteness using that type of dipole arrangement if such a mix is present on the soundtrack. There is also the idea that a single mono subwoofer whose energy is derived from the screen channels is sufficient for movie soundtrack presentations in the home because bass frequencies are “non-directional” below 100 Hz. This school does not recognize the need for extended bass to 30 Hz or below in the surround channels, nor the necessity for stereo subwoofer capability in the screen channels.

The other school of thought says that we can do better with an equaled powered, full bandwidth quintaphonic capability with full extended bass response in each channel including that in the split surround channels. This approach sees the listener positioned in a sweet spot area in the room in relation to the screen and surround loudspeakers to optimize the capability of the system to recreate a smooth, image-specific soundstage between each loudspeaker vector for a balanced, integrated and coherent holographic three-dimensional sound field experience. This approach is more attuned to stereo on four walls with accurate imaging capability on each wall and from front to back and back to front. The level of the center channel loudspeaker, when switched on, in such an approach is just enough to keep the dialog tied to center screen to lock the center sound image for off-center, off-sweet spot viewers who otherwise would experience a shift of dialog to the side of the screen on which they’re seated.

Do you have any comments or observations on these approaches?

John Allen: You have to look at the way movies are made. Clearly those who are championing the idea that surrounds should always be diffuse, don’t make all the movies. Beethoven had every note in the world available for every piano piece that he ever wrote, but that doesn’t mean that he used them all. He used the ones he wanted to and he didn’t use the others. But they were there. One of the things that we as sound system designers have to do is to make sure that whatever an artist decides to create in the way of a motion picture, we can recreate in a theatre. And if it means a diffuse sound field then so be it. If it means the sound of a bullet going right through the middle of your head, so be it. That kind of effect has to be able to be reproduced as well. If you want something to be bouncing around the back of the room from left to right, right to left, clearly that has to be reproduced or the effect that the creator intended doesn’t occur. So it’s not like I am one school or another I am simply saying that we have to be able to reproduce whatever they are producing. I personally happen to like directional surround effects when they are appropriate. I think that it adds a lot of enjoyment, a lot of fun, a lot of excitement and a lot of reality to what you’re watching.

On the other hand as far as going down to 30 Hz in the surrounds it certainly is possible to do that, but there is not a whole lot of material that is going to require it. I do believe that surround loudspeakers should extend as well into the 40 Hz and 50 Hz range as they can, but below that I don't see it as practical, although it is certainly possible and certainly reasonable. I don't have any philosophical problem with it. But recordings like that are not being created.

Widescreen Review: Maybe not yet or to the extent that the full bandwidth surround channels will allow once the more demanding performance delivery systems are in wider use. Then too once in place I think that will create a demand for four channel quadraphonic recorded full bandwidth sound beds or sound sculptures which will become part of new digital sound libraries and be used for motion picture soundtracks of the future.

John Allen: In a movie theatre environment they are not being created and I know of no desire to recreate it except perhaps in special venue theatres, which is a whole different subject, and a good subject. But at the moment that's not being done. The digital sound subcommittee of the SMPTE (Society of Motion Picture and Television Engineers) on which I served, (in fact a survey I did for that committee did turn out to be a major part of the report), found that theatre owners did want split surrounds, certainly more than one surround channel. But beyond split surrounds and beyond three channels behind the screen there was no strong desire to go beyond that either among the people who participated in the survey or the people on the committee. I think that what they did was basically decide that the format that had been used for split 70mm with three channels up front, a bass channel, and the addition of the surrounds being totally discrete, (which they are not in 70mm, as the bass is being derived out of the mono surround track at all times even in the stereo surround 70mm presentations), really would provide the format that was necessary to do the job. Beyond that you got into a situation of rapidly diminishing returns. So that's how things happened. As far as the subwoofer channel being mono or stereo, I agree that it should be stereo. There is no question in my mind. The easiest way to make that happen is to simply play the information that is intended for the subwoofer channel, but record it in stereo and play it through the left, center, and right loudspeakers as well as through the mono subwoofer channel. You get more bass capability that way by simply using five loudspeakers instead of one or two, and you have the ability to reproduce the random phase of the low frequencies which adds to the feeling of spaciousness as we have discussed.

Widescreen Review: Do you think that a dipolar loudspeaker positioned to mechanically produce a diffuse surround sound field from an emphasis on reflected sound patterns is a limiting factor in terms of being able to recreate a real sound field feeling with discrete imaging capability in a home theatre environment?

John Allen: I personally have not made A/B comparisons, but those who have, that I have

spoken to, have indicated that the dipolar approach is a handicap. It is certainly not the approach that we took. But on the other hand, it does create a nice diffuse field from a couple of rather small boxes.

Widescreen Review: Yes it certainly does what it was designed to do. The question that I am raising is should that have been the goal in the first place if we wanted to have the capability of recreating a real sound field?

John Allen: It should have been the goal in the first place to create that option because again it is a very practical and nice little solution. On the other hand I hate compromise and so I don't.

Widescreen Review: You made mention that thus far filmmakers have not created soundtracks with full bandwidth extended bass response in the surrounds whether a mono channel or stereo surrounds.

John Allen: No, I said that they have been created but they have not been played because most of the loudspeakers inhabiting the theatres are totally incapable of playing it. The mixes do exist. I've heard them.

Widescreen Review: That corresponds to my experience. I must watch about 300 to 400 movies a year on widescreen laserdiscs and my system setup is such that I use Audio Control real time analyzers that individually look at both the front left and right decoded output, the center channel decoded output, and the surround left and right output directly out of my Fosgate processor. So I can look at level and frequency spectrum at it occurs in the front, center, and surround channels. I can tell you and you would be totally surprised just how many movies do in fact have fairly substantial deep bass content down to 30 Hz solid. It may not be at the levels that the front channels are, but nevertheless it is at a significant level and should be reproduced. And yet consumer electronics loudspeaker manufacturers marketing home theatre-specific application systems do not incorporate extended bass response capability into their surround loudspeakers, nor do they seem to have the awareness for the importance of such capability with the exception of the Kintek Onyx system (others too are now designing more bass capability into a new generation of surround loudspeakers). The implementation of home theatre surround loudspeakers have been essentially limited to small point-source satellite boxes or the Home THX approach with small dipole radiators positioned so the null of the loudspeaker's figure-eight pattern faces the listener. Response in either instance has been limited to about 80 Hz or so, not much lower.

John Allen: They are responding to a market place that says people don't want to spend that kind of money. This gets back to what I have said before. I don't think that the marketplace has really gotten serious.

Widescreen Review: But John, home theatre enthusiasts and consumers in the

marketplace look to the leadership of the experts who have been vocal about how to approach home theatre such as the Lucasfilm THX group and others who have come forth to advocate their particular design philosophies which may be seen as a limiting factor for the greater potential for home theatre entertainment systems. Where are the leaders who are saying there is a more optimized approach, another way that does not restrict the potential? For whatever reason, perhaps these people just don't see the full potential.

John Allen: I am saying it but it's not doing much good.

Widescreen Review: You're one of the leaders that I personally respect and can support your approach to theatre sound systems, and who I believe has a vision for the potential of the movie theatre and home theatre experience. There are others who share your and my sense of it all but who are not known by the consumer electronics manufacturers, or the traditional consumer press, and therefore not by consumers who have an enthusiast interest in home theatre entertainment. A lot of people are looking for guidance, and they don't want to be misguided because there is a lot of money involved in putting together a good home theatre entertainment system. They need to hear from others like yourself that there are other valid approaches that should be tried, that don't subscribe to the philosophy that that's good enough. But thus far it seems that the limited, minimum performance approach, full of compromise, is what is being preached today.

John Allen: I am saying try it. Avoid compromises. It will blow you away!

Widescreen Review: To me it is just a matter of time before special editions or director personalized editions of motion pictures on laserdiscs will feature specially mixed holographic quintaphonic mixes which will optimize the feeling of being in a real acoustic sound field on a scene to scene basis. This will follow the trend of already releasing pictures in deluxe laserdisc collector's editions with remixed soundtracks but with greater emphasis on the full potential of the discrete 5.1 digital format to recreate a virtual acoustic reality.

Garrett Smith, director of video operations at Paramount Home Video, has proven to be a leader in this regard with a commitment to remixes created from the original non-limited six-track with split surround discrete master stems dubbed directly into a Dolby DS-4 encoder. I have been happily impressed with the widescreen laserdisc soundtracks on **1492: CONQUEST OF PARADISE**, **THE HUNT FOR RED OCTOBER**, **APOCALYPSE NOW**, **STAR TREK VI: THE UNDISCOVERED COUNTRY** and **PATRIOT GAMES**, all from Paramount. Others are embracing the vision as well, and certainly the newly-introduced THX LaserDisc Program has the potential to create such mixes.

I think that the fullest realism is that premium home theatres will be equipped with full bandwidth loudspeakers with extended bass response to fully reproduce the true feel of any sound field environment that the filmmaker wants to convey. These special mixes will be created in smaller living room size home theatre dubbing spaces, not in the large

dubbing spaces now used to mix for theatrical release. This will have an immense impact I think on the home theatre experience and further diminish the desire of people from going out to movie theatres with inferior performance. They will increasingly become more selective and demand a quality out-of-the-home experience that they cannot recreate at home.

John Allen: Well I don't think that there are that many home theatre systems installed or even in demand to make that much of an impact. High end home theatres are still a very, very small part of people's lives. There just isn't that big of a demand for it.

Widescreen Review: I acknowledge that today the demand is still small, but I see a much greater, more significant demand on the horizon as more and more families become exposed to the experience of home theatre entertainment. And there is a trend, although presently small, with custom installation and contractors, who, for example, are beginning to include in the purchase price and financing package of a new home, complete home theatre environments and systems patterned after the success of other pricey home amenities such as swimming pools. As more and more people and families invest in home theatre systems this will certainly influence the demand by others who also will want to have a home theatre system, We are at the infancy stages of a major entertainment revolution in the home and the opportunity is there for a host of valid approaches that work for every pocket book and aesthetic taste.

John Allen: Unfortunately there is another limiting factor here. I was reading a quote in one of the publications I get and it went something like, "if bad audio was fatal, then sound systems would be the leading cause of death." You're talking about a level of sound quality that people would only expect to get in a concert hall. That raises the question of how many people go to concert halls? A lot, but not everybody. How many people have access to really good ones and really have any idea of what the potential is, even for live sound let alone for reproduced sound? The answer is a relatively small number. It's a minority of the population, certainly. Then once you've overcome that and everyone has been to Symphony Hall and everybody has heard the best thing there is, then you've got to get people trained with knowledge to be able to deal with the equipment required and know how to set it up. That level of expertise clearly does not widely exist even in the professional sound business. So there is a long way to go.

Widescreen Review: That's an area that the CEDIA (Custom Electronic Design & Installation Association) has organized to deal with in terms of custom installation setups of home theatre systems. With time I think this organization will produce greater numbers of technicians with the knowledge and expertise to get the right job accomplished.

John Allen: Well of course, one of the things that people care about in some respect more than the sound, is cosmetics. There certainly has been an increased demand for installations that look really nice as well as sound really nice. So there is a tremendous

opportunity for custom installers to get into that market and really do well. But still, when you look at the systems that are being installed-just look at the magazine covers of all these fancy sound systems-and you know that they are too small. You know that they can't reproduce music in a realistic way, at real levels or at even louder levels than it was originally played. People will play things at the level that they want, and these systems are not always capable of that. They are capable of soft to moderate levels but they are not capable of the large dynamics that are really on the recording. And again, the surround loudspeakers in almost all the situations that I have encountered have been just dreadful, the same as in most of the movie theatres. So in that sense they're duplicating the worst of theatre experience very well. But they are not accurately duplicating what's on the recording.

Widescreen Review: But again these people who are designing these systems and then installing the systems have taken their cue from an extremely limited population of so called or acknowledged experts in the motion picture professional sound industry that are saying this is the way that it should be done.

John Allen: Everybody is trying to do at least the best they can and what you're saying is that having said that, the best that they can do right now really needs to be improved, and I agree.

Widescreen Review: We got a bit off onto a tangent but I think it was productive and hopefully provides a better understanding of the challenge that is before the home theatre consumer electronics industry and consumers who want the very best that home theatre entertainment sound systems can be.

But now let us return to the central topic of motion picture sound system performance. What do you think is the cause for the variation from poor to excellent sound performance with the digital systems in actual public cinemas, including those equipped with pretested and certified performance-assured premium sound systems? Is the blame with the filmmakers and soundtrack mixers or with the performance of theatre sound systems? Is digital pushing these systems into a state of "shock?" In actual use are there any differences in equalization and SPL levels being set with recording soundtracks for the various digital system releases? Do you think that perhaps the fidelity differences are the result of an industry going through an initial learning phase with using the digital systems? Are filmmakers really listening to their soundtracks reproduced digitally in public cinemas? Do you think it will get rectified?

John Allen: Filmmakers are listening in theatres, but that doesn't mean that they are happy with them. They are listening to films primarily on the dubbing stages, and the dubbing stages are designed to allow them to create mixes that will play in every theatre. So in some respects having a "middle-of-the-road" sound system in a dubbing stage is a benefit because at least you know that you're going to get the essentials delivered. Whatever handicaps that the "middle-of-the-road" may present, you are certain those

kinds of handicaps are going to be found in movie theatres. You know that if you've got the dialog in the dubbing stage, you have to have a situation where you know that is going to be heard in any theatre-mono, stereo, good, bad.

The answer to your question as far as the variation and the performance that you have experienced with digital films is totally theatre sound system dependent. Even having fixed all that. Let's say you took out all those loudspeakers and amplifiers that don't have a prayer of reproducing digital sound, and that's most of them, then put in the best loudspeakers and amplifiers in the world whatever you think those are, the tuning procedures that are used in movie theatre sound systems today are totally bogus and do not work. They are not capable of reproducing consistent results from day to day in the same theatre let alone from theatre to theatre. The results that these techniques do generally create are exactly what you describe -- too bright, harsh, no bass. That's the one consistent thing about these tuning techniques and it's very unfortunate. Fortunately we have been able to figure out how to get beyond that and we have. If you listen to HPS-4000 theatres large or small, they sound remarkably alike. None of them exhibit that harsh sibilant sound that everybody is complaining about. They just don't sound like that. They all sound natural and they are all smooth. You could remove all the equalization and everything else and I could start from scratch with the same theatre and the same loudspeakers and I would end up tuning the thing virtually the same way every time. The tuning system that we use is very repeatable.

Widescreen Review: If you and I are hearing this in a majority of cinemas then what are the filmmakers listening to? Don't they hear the anomalies?

John Allen: They are listening to the same thing. The dubbing stages sound better than most of the theatres do, even equipped with the same equipment, because the dubbing stages are tuned better.

Widescreen Review: Aren't the filmmakers perceiving what audiences are hearing? Aren't they going out and actually sitting with an audience?

John Allen: Sure they do.

Widescreen Review: What are they doing to rectify the awful state of sound presentation?

John Allen: There's not a lot they can do. They don't own the theatres. And you know, it is possible that every one of these systems that you are describing can be shown to be meeting "industry standards." What I am telling you is that the way systems are measured and determined to meet industry standards is not reliable. In fact the theatre's sound system can measure absolutely beautifully and sound terrible, and that usually is the case.

Widescreen Review: How do you see the digital future for HPS-4000 Sound Systems?

John Allen: We seem to be in a position to take best advantage of all this. I think that no matter what format may come out in front of all the others and ultimately gets adopted, if indeed one single format does get adopted, no matter what happens, HPS-4000 sound is going to be a big winner. There is no body else producing this kind of dynamic range and this kind of clarity, and I doubt that any time soon that anyone is going to be able to come in and do what we're doing simply because the development costs are so high and the theatre market is actually, believe it or not, so small that the return on their investment probably isn't there. Fortunately for me, I am dealing with two very relatively small, although Klipsch isn't all that small anymore, loudspeaker manufacturers and they have been able to settle for less of a return and still maintain the commitment to quality that they have. Klipsch certainly has had the option anytime they wanted to of building direct radiating boxes and selling them like hot dogs to anybody that wanted to buy them. Their approach has been that they do not want to be copycats. They do not want do what everybody else is doing. They want to stand for higher quality. They always have. They have been very, very supportive of my efforts. It's possible that someone could have come along and sold a lot more loudspeakers than I have, but they were more interested in assuring that the loudspeakers they did sell would be used correctly, set up correctly, and that the customer would in fact get the kind of quality that they would like their customers to have. You have got to really hand it to a company for being able to maintain that kind of commitment. I have great admiration for the people at Klipsch.

Widescreen Review: What are your immediate plans for creating a greater acceptance for HPS-4000 amongst theatre owners who as yet have not shown an inclination for quality?

John Allen: We are going to continue to do what we've been doing all along, which is to provide the best possible sound systems. I will continue to write in Boxoffice Magazine as I have for the last thirteen years. I think that has been very helpful not only for the readers, but also for me in getting the information that is important communicated. It is really up to the market, the customers that I have and the customers that I would like to have. It's really always up to them isn't it in the final analysis. My only hope is that more people will feel the way I do, which is that quality is the most important ingredient for survival, and that total quality comes from the moment that you pull into the parking lot to the moment that you pull away. There has to a total quality experience with every aspect of going to a motion picture theatre no matter what film is playing. Those theatres that provide it I think will be around and those theatres that are providing it certainly have shown that to be the case. Those theatres that do not provide it, just like a lot of other businesses that haven't provided quality for their customers, are going to go away.

Widescreen Review: Do you have any final observations as we close out this conversation?

John Allen: In general, I think that music and sound have been a tremendous life-enhancing experience for me. I have really gone after it. I have made it my life to listen to

symphony orchestras, go to concerts all over the world, go to ballets and work with them. I can't tell you how proud I am to be part of the Boston Ballet. I spend a rather large amount of time with them considering how much I could earn doing something else. But that's not the point. The point is that when that curtain goes up, I am really, really proud to be there and happy that I have been able to enhance that experience for so many people as indeed I believe that I have. The point of all of this is that I think that kind of quality experience just simply is not available to enough people and if they knew that it was, that they would gravitate to it. I am simply trying to make the world sound a little bit better and help other people get the same kind of enjoyment out of listening that I do. Certainly they are under no obligation to like the kind of music that I like or the kind of movies that I like, but they certainly like something and there is no reason that they should in any way be deprived from the kind of enjoyment that I get out of the things that I prefer. The possibility is certainly there to improve that portion of people's lives dramatically over what they are listening to now. I am very grateful and I think lucky to be a part of that process.

John Allen has been active in the motion picture industry since 1979. He founded High Performance Stereo™ and was appointed world distributor for Klipsch Theatre Loudspeakers in 1980. During that same year he developed the HPS-4000® Sound System, the first major improvement in theatre playback systems in decades. Early in 1981 Mr. Allen became the first in the industry to computerize the design of theatre sound systems. His Allen Surround Array™ formulas have been widely accepted as the first reliable method for mathematically locating surround loudspeakers, yielding exceptionally even coverage. "Digital Ready" HPS-4000 Sound Systems can be found in a growing number of theatres across the country and around the world.

Mr. Allen is the author of numerous articles. He has been the principal writer on the subject of sound for Boxoffice Magazine. Mr. Allen is a member of the Boston Audio Society, The Audio Engineering Society (AES), the Society of Motion Picture and Television Engineers (SMPTE) and the Boston chapter of the Acoustical Society of America. He has served on the Committee on Audio Recording and Reproduction Technology of the SMPTE and was Chairman of the film sound workshop at the 1987 AES Convention.

Epilogue:

In 1995, the TCM-4, TCM-3 and TSI speaker systems discussed and illustrated in this 1993 interview were extensively updated and renamed the 545-4, 545-3 and 525 respectively. These models are seen below along with the SR-70 surround speaker.

