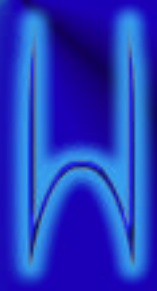

HPS-4000®

HIGH PERFORMANCE STEREO

Sound IS the Experience !™

PRESENTING: DIGITAL STEREO

BY

JOHN F. ALLEN

HIGH PERFORMANCE STEREO™

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It's 1990, just 5 years away. Imagine; your customer is sitting back in a comfortable chair in a most pleasant place. The snacks are just a few short steps away should the urge arise. Ah the show is about to begin. Tonight the picture is a particularly good one, lots of action, even a few laughs. The high definition image will fill the large screen with bright and crisp detail. The glorious sound will be played in full Digital Stereo, just the way the studio produced it.

The excitement builds as your customer knows that he is about to get his moneys worth in entertainment; a superb show and a first rate presentation. The lights are dimmed and your customer picks up the remote control and hits the "Play" button. The problem is that your customer is not watching the movie in your theatre, but in his or her living room. In fact he and she really aren't your customers anymore, but someone elses. The other problem is that this scenario is being played out in 1985 with increasing regularity. People wonder "why go to a movie theatre anyway, the sound stinks, you can't understand half of the words, it isn't even stereo in most places and all too often the picture is out of focus. It's better at home."

The American public will spend (that is vote with their money) some 30 Billion Dollars on consumer electronics in 1985 according to the Electronics Industries Association. That's about 8 times what they will spend at the boxoffice. Instead of buying theatre tickets as often as they night, they will be buying video discs, stereo TV's, movies on cassettes, compact disc players and $1000.00 car stereos. Each such purchase having an emphasis on SOUND.

What's a theatre circuit to do? Compete.! Compete! Compete! Equip motion picture theatres to provide a real experience in comfort and film presentation, not just a place to "see" a movie. The technology is here now and is not overly expensive. In the audio field, one recent development promises to give theatres a lure they have never had before: Full Digital Stereo Sound. It's really here and not a moment too soon.

It is indeed very exciting to be part of (some even say the blame for) the beginning of Digital Stereo in motion picture theatres. As many of you no doubt know, the first presentation in a commercial movie theatre of a film accompanied by a digital

soundtrack, took place before an invited audience at Plitt's Century Plaza Theatre in Los Angeles, California on December 6, 1984. Following that, on February 8, 1985 at the same theatre, Walt Disney's historic film FANTASIA opened to the public presented in full Digital Stereo for all performances. It seems especially fitting that the very first stereo film should have the distinction of being the first Digital Stereo film as well, some 45 years after its initial release. Both the public and press responded dramatically. The theatre grossed $36,000.00 in the first weekend, over 7 times the average of the other theatres showing the film.

The advantages of Digital Stereo are very real. There is virtually no noise, wow, flutter or distortion. There is greater dynamic range, a wider frequency range and no calibration problems to worry about. Digital Stereo is the same for both 35 and 70 MM presentations. More over the presentations will not be degraded after several showings. The last playing, will still be equal to the original studio master. We have never had such sound quality in theatres. And we need it now more than ever.

To get the most out of any quality recording whether digital or analog, an excellent sound system must be used. Home stereo buyers have known this for years. But some theatre operators have expressed the fear that digital systems will be too much for them to handle technically and that they will be prone to amplifier or speaker failure. However, digital does not demand anymore of a sound system than live sound. While almost all current theatre sound systems are far from this capability and should be replaced, digital recordings do not themselves harbor some magical quality which gives the recorded sound a power greater than the sum of its parts. Noise and distortion have always limited the dynamic range we could store on tape. Digital affords lower levels of both.

We can now have not only cleaner richer sound but all the true dynamic range we have seldom experienced except in live unamplified environments.

The conventional wisdom has been that while digital mastering will continue to grow in film making, as it has in the music industry, digital sound in movie theatres was still 2 to 5 years away. People have pointed to the lack of a proven technology for storing the sound on the film and thus the need for a separate or double system, with the sound and picture being synchronized in the theatre. In addition, some have believed that theatre loudspeakers that can both sound good and handle digital's dynamic demands, are not available. Beyond that, they cite the cost and complexity which are supposed to be overwhelming. Fortunately, none of these things are true, except that for the time being we will be using a double system. But, as we shall see, this is not a serious problem.

We have now presented Digital Stereo in a theatre on two occasions using two very different approaches. For our December 6th program, I wanted to show that the system which I had designed for Plitt's huge theatre could indeed play digital so I asked Giorgio Moroder's Oasis Recording Studios and Glen Glenn Sound if they might provide the equipment and materials necessary. Both studios have mastered films digitally and were happy to help. For this presentation, we used the actual masters which were recorded on 1/2 inch computer tape and run at 30 inches per second on a Sony 3324, 24 track digital recorder / reproducer.

The Sony 3324 costs $140,000.00 and weighs 600 pounds. In order to synchronize it with the picture, a separate dubber was locked with the projector using conventional selsyn motors. The dubber was used to play SMPTE time code instead a normal sound recording. The time code was fed into a $12,000.00 synchronizer which in turn controlled the Sony 3324 and kept the sound and picture together.

The sound was great. But with a 20 minute capacity and the $175,000.00 cost per projector, it was not a practical set up nor was it reliable. After our presentation of digital sound however, Plitt was anxious to bring the superior quality of Digital Stereo to their customers without any further delay. In an attempt to enhance their upcoming engagement of FANTASIA in a way that would draw an unprecedented audience to the film, it was decided to see if it could be presented in full Digital Stereo using a copy of the new digital master recording that was done in 1982.

At that point Disney's assistant chief sound engineer, Nelson Meacham and I had three weeks to come up with a commercially feasible, inexpensive and reliable alternative digital system. What resulted was a team effort comprised of staff from Walt Disney Pictures, Plitt Theatres, Dolby Labs, Tim Jordan Rentals and myself. I suggested that a 2 channel digital recording matrixed into 4 channels, be used along with a Sony PCM-F1 digital to analog converter. The PCM-F1 does not have all the features of the high priced digital converters, but it does sound the same and saves us tens of thousands of dollars. In this approach the digital information is stored on a low cost video cassette. This idea was adopted and led us down an interesting path. Of course we would have preferred using digital discs for this purpose as they do not wear out. But we didn't have the time to produce them. So video tape it was. The problem, as always, was how to keep the sound and picture synchronized. If we kept the sound locked to the projector as we had done before, the variation in the projector's speed would have exceeded the PCM-F1's error correction capability and caused the sound to mute. And again, the synchronization we had achieved so far had not always been stable.

Disney's engineers had the solution: A projector drive system which took the SMPTE time code, which we would record on the audio track of the video tape, and controlled the projector, keeping it in step with the sound.

To do this, the projector's motor is replaced with a stepping motor. This proprietary drive system was developed for Disney's EPCOT Center. Without it we could not have succeeded. Since there is no dubber or expensive synchronizer to worry about, the operation is simple and completely reliable. However, we are running a normal print and therefore it must be cut and assembled exactly to the frame, then stored on a platter. If frames are lost, the reel must be replaced. In the future, SMPTE time code could be recorded on the print and used to keep the picture and sound synchronized in the event of missing frames. When a reliable method for storing and retrieving multiple channels of digital sound data on the film is perfected, Digital Stereo will be as simple as analog is today. Even simpler if you recall that there is no sound pickup calibration to ever bother with.

In the meantime the grosses that FANTASIA's digital presentation produced has convinced studios that good sound can indeed sell more tickets and the ball has begun to roll. So far, two new films are slated for digital openings at the Century Plaza Theatre in June. Presentations in other areas around the country are also being discussed.

There is no question that Digital Stereo represents a giant step forward in cinema sound. There is also no question about how effective a marketing tool it can be to help make movie theatres more competitive against digital discs, stereo television and other high tech. entertainments. As has often been said, most theatre sound systems are not up to the standards of current stereo recordings let alone the dynamic range demands of digital sound. Replacing inadequate equipment is the only solution. Theatre owners should take comfort in the knowledge that the best in modern speakers and amplifiers are more than adequate for Digital Stereo and any other recording system which is likely to crop up in the next 25 years. We have measured consistent peak levels of 120 dB in the 30 to 60 Hertz octave in the middle of the 160 foot long Century Plaza Theatre without harm to anything or anyone. I doubt audiences will ever require more dynamic range than that. So wise investments in sound equipment now can literally last well into the 21st century and at the same time help ensure the business will too.

John F. Allen is the founder and president of High Performance Stereo in Newton, Mass. He is also the inventor of the HPS-4000® cinema sound system and in 1984 was the first to bring digital sound to the cinema. John Allen can be reached by E-mail at JohnFAllen@aol.com.