

Speakers

PART 2

Introduction

*Audio Perfectionist Journals #6 and #7 have been combined for improved continuity. It took several months to gather this data and write the more than 20,000 words contained herein. Rather than split this information into two consecutive **Journals**, I decided to present everything together in a double issue.*

*We'll continue the discussion of loudspeaker accuracy and I'll restate some of my views on the importance of accurately replicating the information on the recording. We'll talk about what high quality loudspeakers should cost and about the cost-versus-performance crisis in the industry. A guest writer will share some of his personal experiences with **Journal** readers.*

Previously, we examined some speaker systems which are demonstrably inaccurate and we discussed the reasons why many speakers fail to accurately reproduce the input signal. In this **Journal** we'll examine some speaker systems which are demonstrably accurate, according to all the accepted objective standards.

These speakers have flat frequency response within narrow limits so they don't emphasize some frequencies while de-emphasizing others. These speakers are time- and phase-correct so they won't reproduce some harmonic overtones out-of-phase with the fundamental tones, smearing transient sounds over time.

These speakers don't sing along after the song has ended because they are carefully designed and constructed to minimize electrical and mechanical energy storage and delayed reflections.

These speakers sound better than conventional "let's put some drivers-in-a-box" designs yet they cost no more. These speakers can provide more long-term satisfaction than exotic "like nothing you've ever heard before" designs and often cost far less.

Are these speakers perfect? Hardly. Don't all speakers with accurate response sound the same? No, and it would certainly be a dull world if they did.

Each of the speaker brands represented here has a sonic signature that is shared by all models in that manufacturer's line, but the sonic characteristics of each brand are slightly different.

These speakers have the capability of accurately reproducing the input signal, as demonstrated by the objective measurements, but no model described here is completely free of coloration or compromise.

We have discussed how speakers can go wrong but measurements can't tell us everything about speaker sound. Objective measurements can only tell us which products are capable of accurate response and which ones can't possibly reproduce music correctly.

Measurements can clearly show when the design process has failed...

Measurements can clearly show when the design process has failed by demonstrating that a given speaker has gross deviations from flat frequency response or is incoherent in the time domain. While

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poor measurements can guarantee that a product will be unsatisfying in the long term, good measurements can only guarantee the *potential* for good sound.

Our ears can still hear a lot more than our instruments can measure and, while much of speaker design is based in science, there is still some art involved.

Each of the three designers profiled in this issue has applied different engineering techniques while attempting to solve the speaker design problems delineated in **Journal #5**. These problems cause speakers to deviate from accurate reproduction of the input signal. All speaker designers must confront these same issues but some have been far more successful in overcoming these challenges. In the articles that follow I'll profile three of the designers who have been the most successful, in my opinion, and describe their individual approaches to the science and art of loudspeaker design. In this double issue we'll discuss design philosophies and in the next **Journal** we'll talk more about the sound of these products.

Before we begin, let's revisit the subject of accuracy and the philosophical arguments for its importance. While I believe that accurate reproduction of the recorded signal is the ultimate goal of a high fidelity audio system, this is an arbitrary position that is not universally accepted.

In The Beginning

In the premier issue I made some statements about the philosophy I would follow in writing the **Audio Perfectionist Journal** and I presented an article titled *Accuracy* that included arguments supporting my position on that subject.

I believe that a high fidelity audio system should attempt to reproduce the recorded signal as faithfully and accurately as possible. Others disagree—even though they might not admit that fact aloud or in print. Many believe that the experience of listening is of primary importance, and how that experience is produced is of little significance. This, too, is a valid position. Here is an analogy.

Viewing a photograph of a beautiful sunset will seldom produce the emotional response of seeing the real thing. While many photographers try to capture the actual scene as faithfully as possible, others strive primarily to create an emotional effect on the viewer. Some feel that the impact of the photograph can be

increased by making the colors in the photo a little more “colorful.” Others consider the act of viewing a photograph to be an entirely different experience from the act of viewing a sunset. They feel that there should be no limitations at all on how far the photo can deviate from a realistic presentation so long as it produces the desired emotional response. Similar arguments occur in audio.

Some feel that the job of an audio system is to accurately reproduce the recorded information. Those of us who feel this way think that the artists who make the recording should decide how that recording will sound, not the playback system. We assume that the artists and engineers who make the recording are attempting to bring the live performance into our homes so that we can experience at home what they experienced during the actual event.

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Those of us who accept this philosophy believe that the audio system should resolve as much information from the recording as possible and should not impose its characteristics on the sound we hear during playback. We think that recordings should be presented “as is” with no embellishment. There is another point of view.

Listening to music at home and attending a live performance are two very different experiences, in the opinion of some. This viewpoint holds that the two activities have little in common and should be considered separately. After all, the musicians aren't really there in your living room helping to get the audience involved in the music.

Some think that a home audio system needs to present sound that is a little more spectacular than what you'd hear at the live event in order to provide the listener with similar emotional gratification. These folks feel that “goosing up” the response of a home audio system is a perfectly acceptable thing to do. The arrival of home theater has increased the numbers in this camp.

Movie sound doesn't even try to mimic real sound. Everything is exaggerated for effect. That's why most movie sounds are called "effects." Real people don't make that much noise when they walk or when they eat. Romantic moments in real life are seldom accompanied by theme music. Real fists seldom make that much noise when they strike real flesh. There is no "real" standard for sound effects, which were artificially created to start with. THX has added to the confusion about the goal of a home audio system. Should the system accurately reproduce the recorded sound track or should the system alter the recorded information in an attempt to make the living room sound like a movie theater?

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I have found that honesty is the best policy, in audio as in life. I think that an audio system should accurately reproduce the recorded information, whatever that may be. I think that this philosophy provides the best path to long-term satisfaction. This is an arbitrary choice based on my personal experience and others can effectively argue for other points of view.

In The Last Issue

In **Journal #5** we discussed some of the problems that designers face when trying to create an accurate loudspeaker system. The fact that many designers don't even make an attempt at accurate reproduction was mentioned and the reasons why this is true were presented.

In this issue we'll see that some manufacturers do strive for the most accurate reproduction possible and some designers have been very successful in overcoming the inherent problems of accurate electromechanical transduction—changing an electrical signal to an acoustical signal while preserving the amplitude and phase characteristics of that signal.

Journal #5 presented measurement graphs of speakers which are demonstrably inaccurate. This issue will present graphs from speakers which are demonstrably accurate. In **Journal #8** I'll show how some measurements can actually be misleading and we'll discuss the subjective aspects of speaker sound.

There is probably not a more controversial subject than the argument about whether the time and phase characteristics of a loudspeaker are audible. Many "authorities" with PhDs after their names claim to have proven that average listeners cannot hear the effects of phase shift in loudspeakers. While there is no doubt in my mind that these characteristics are audible and important this is still the subject of intense debate. **Journal #5** presented some of my views on the subject. **Journals #6/7 & #8** will present some more. I advise you to read all you can about the subject and then go and listen to make your own determination.

In This Issue

The article titled *Crisis in the Industry* introduces this issue and states some of my motives for writing it and launching the **Audio Perfectionist Journal** in the first place. Many so-called "high-end" speakers cost too much and perform poorly. This article presents some of the reasons for this situation.

The article titled *Time and Phase, Not Just a Craze* presents my views on the importance of time-domain performance in loudspeaker design. This is a very controversial subject and it is not the primary thrust of this **Journal**. If you don't feel that this aspect of performance is audible, please don't abandon the entire issue. There is plenty of other valuable information presented here.

There are three major manufacturers making time- and phase-accurate speakers and there may be many smaller ones of which I am not aware. In this **Journal** I'm going to write about each of the three with which I am familiar, in alphabetical order. I'll discuss the approach that each designer has taken to overcome the speaker design problems delineated in **Journal #5**.

This is not meant to be a sales pitch for these brands. My goal is to enlighten the reader about the technology that is available and about what it costs. In my opinion, most people are paying far too much for speakers and getting far less for their money than they should in terms of performance.


This issue contains the first article contributed by someone other than me. Shane Buettner is Equipment Review Editor of *Widescreen Review* magazine. He has had the opportunity to listen to virtually all the major and many of the minor speaker brands at trade shows, in WSR's laboratories, and at home during equipment reviews. He has also spent much time in my home listening to my personal systems. Shane has contributed the article titled *Journey to Enlightenment* that appears in this **Journal**. It's a story of personal discovery that describes one man's path toward musical—and home theater—nirvana.

Coming Up

In **Journal #5** we discussed some objective measurements of loudspeaker performance. Measurement graphs from speakers which are demonstrably inaccurate were presented along with suggestions about how to interpret these graphs. **Journal #5** provided a list of problems which all speaker designers must face. In **Journal #6/7** various solutions to these problems are discussed and the unique approaches taken by three of the industry's top engineers are described. Measurement graphs from speakers designed by these engineers are presented.

In **Journal #8** we'll continue to examine the subjective qualities of loudspeakers. We'll talk about how good measurements can sometimes be achieved at the expense of sound quality.

While good measurements can reliably predict which products will provide unsatisfying performance in the long term, measurements can actually lead you astray in some circumstances. I'll write more about the sound of the speakers discussed in this issue and I'll review some specific models of loudspeakers and comment on their use for stereo and home theater applications.

The information in **Journals #5 & #6/7** is specifically about stereo speakers but the same basic data is applicable to speakers used in a home theater system, although some additional factors must be considered when speakers are used for center channel and surround channel applications. We'll discuss these special surround sound applications in **Journal #8** and beyond. 

The Crisis in the Industry

by Richard Hardesty

*The ongoing crisis in the high-end audio industry was one of my original motivations to launch the **Audio Perfectionist Journal**. It appeared to me that charlatans and snake oil salesmen had overrun the seekers of the sonic truth, converting a once legitimate and vital high-end audio community into an industry promoting poorly engineered and often ridiculously overpriced components. I wanted to speak out about this situation and to offer a voice of reason to those who simply want good sound along with good value for their money.*

I believe that knowledge can be a powerful tool in the hands of consumers. The more you know about how things are made, and about how they work, the less likely you are to be confused by a product review in a magazine; if you understand the products that are being discussed and how these products should be used you are less likely to be swayed by a skillful salesman's polished pitch.

My goal is to provide you with objective, useful information and thoughtful opinions about home audio components and systems. It is impossible to do this from any perspective but my own. My ears are attached to my head, after all.

While I certainly don't know everything, I have learned a lot about our subject of interest over the years. My opinions are based on my experiences and I can share those with you. I can write about the things that I have experienced and the opinions I've formed, and mention opposing viewpoints that you can research elsewhere. You may come to different conclusions in your own search for sonic satisfaction and that's part of the fun.

In that spirit, I present this issue of the **Audio Perfectionist Journal**. I hope that you will find it interesting and that it will provoke you to read other viewpoints and to go out and listen.

The Early Years

In the beginning, discerning music lovers could buy audio products with acceptable performance at the local chain store, or they could seek out specialty audio retailers where they could often get better sound for the same money. State-of-the-art products were offered to those willing to spend more. "High-end" stores were run, for the most part, by audiophiles dedicated to helping music lovers achieve greater satisfaction from