

How to buy a sound system for your church and not get blistered!

By Ellis Guy
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How to buy a sound system for your church and not get blistered!

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Understand what you are buying.

The number one reason so many sound systems sound terrible or the owners struggle every service with them, is because buyers do not understand what they are buying. There are far too many people trying to buy what they don't understand and too many sellers ready to fill the orders. If you ask for a square tire, someone will sell you one. The trick is knowing what to ask for.

You do not want sound equipment. You want good sound (*whatever that means to the buyer and what the salesperson thought the buyer meant*). Good equipment and good sound aren't the same thing. Good sound **does not** come with the purchase of "good" equipment. Good sound comes from a deliberate system design that fits your acoustic space and application.

"Every year thousands of ¼ inch drill bits are sold. But people didn't want a ¼ inch drill bit, they wanted a ¼ inch hole" – *paraphrased from Zig Ziglar*. I can't say it any better.

It's the sound or **type of sound** (*important clue here*) you are trying to buy. Not the equipment. The equipment is chosen by someone that decided this list of equipment will give you the **type of sound** you want in your building.

Here's what you've got to think about:

- **What is "good sound"?** Don't assume everybody is on the same page here. They AREN'T!
- **Who** is deciding the list of equipment and what are they basing their decisions on? Does the "system designer" understand your definition of "good sound"? Does that person understand the art of sound, have years of live sound experience, or just a computer geek crunching out quotes all day?
- **How are you going to measure the "good sound"?** Who is going to be the judge to decide if the contract has been fulfilled – not that the equipment was installed, but did the installation give you the good sound you wanted. Do you understand terms like %ALCONS or RASTI? Do you know what makes speech clear from a sound system? Then, how are you going to evaluate your purchase? (*You will learn a simple way using your own ears without any fancy test equipment at the end of this article!*)

"Good sound" means different things to different people.

Know what your definition of good sound is. A DJ thinks good sound is solid bass and crisp highs to fill a room at high volumes. A rock n roll band wants sound as loud as you can get it. A music store might think whatever brand they sell will give you "good sound." Heck, it sounds good to them! A convention

center or auditorium needs clear sound at every seat to sell tickets and attract major events.

What's your definition? How do you communicate what you hear in your head as the “good sound” you want to buy, to the prospective sound contractors? If you say you want “good sound”, that opens up a wide field of subjective opinion based upon each contractor's experience or lack thereof, yours included. You will be comparing apples with skateboards (*yeah-you're not even in the same mineral and vegetable group!*), and if you don't know what you're looking for, you won't know it if you heard it. Big mess, huh.

What you need.

Let's start saying the right words here: it's not “sound system”, it's “speech reinforcement system”. That's really what you need. Too many churches own nothing more than big home stereos. Big speakers, amps, big mixer, and lots of power. A CD sounds great. But the choir sounds like a mass roar. No clarity at all. Just one big jumbled sound particularly if you have a live band. It's hard to hear anything but echo in the back seats, but the front seats hurt your ears.

A system should be designed for speech clarity at every seat. That's what all of our sound engineering math is based on – clear speech. Focus on getting clear speech at every seat and the music will take care of itself.

We judge sound clarity against our experience in casual conversation. We are generally talking to each other within about a three foot distance of the other person. Speech is clear and easy to understand. A speech reinforcement system is designed to make the person standing 100 feet away sound exactly like they are standing within three feet of you. That's the whole point. That's the entire objective of speech reinforcement systems and designers like myself – to acoustically move the talker or singer to within three feet of where you are seated, not a simple big home stereo to impress the neighbors.

To acoustically move the talker or singer to within three feet of you consists requires two components: an increase in volume *while retaining clear speech*. Increasing the volume is where 99% of novice sound contractors and buyers focus. Let's turn up the volume by installing what amounts to a big home stereo. Oh, it looks impressive all right. And, a CD will rattle the front door of the church. But the speech transmission is not there, was never considered, nobody cared, wasn't designed into the system, and frankly most don't understand it. Then they wonder why they have so much trouble with feedback, the mass roar on stage, they can never hear the drama in productions, can't get an even sound mix, and have never heard the children's choir. About the only thing the system is good for is playing sound tracks!

Designing a system for speech transmission is where the art and mastery is in sound system engineering. You generally don't get that with a “free quote”. It takes hours and sometimes days to visit your church, see and hear what you are doing, talk to your staff to understand your long term goals, do acoustic testing, and gather other need to know info before a quality design can begin. Just running back to the shop and generating a list of equipment based around a brand name or “hope they can afford this so we can get the job” mindset, is a sure way you are about to throw away thousands of dollars and waste years

struggling with sound problems. Again, design the system for speech transmission first and the music will take care of itself. It will **not work** the other way!

Since the majority of what you do is speech related, you need the same high quality speech clarity that business convention centers and auditoriums require. They hire the best acoustic engineers to design their buildings and sound systems (*the building is part of the sound system*) because the sound must be excellent to attract paying patrons. There's big money at stake here. They can't afford to mess this up.

They don't "get bids" from various "contractors", then try to "pick one out". They have one person design the acoustics of the building and sound system, and then let installers bid the cost of installing it. Anybody can install sound equipment, but the right design is where the good sound begins.

Getting three "bids" from the local sound guys is really getting three different designs. You can make that four different designs if a layperson is trying to pick "the lucky quote or bid" because the layperson is using their knowledge of sound to judge the three bids.

It has nothing to do with the brand or price. It has to do with performance. Performance DOES NOT mean how loud you can play a CD! It means you can clearly hear every word that is spoken or sung by a 4 year old wearing a lapel mic regardless of where you are sitting. It is impossible for a layperson to look at several "bids" or actually several different designs from different contractors with various levels of experience, and "know" this is the one we need to get maximum articulation or speech transmission at every seat.

Picking a system by price alone is just like buying a pair of slacks the same way. You try on the slacks first to see if they fit, THEN we look at the price. It's remarkable to me that so many buyers think that price somehow is related to the "right size" when it comes to buying a sound system. Price and performance are as far apart as we are to the nearest star! Likewise, just because the shoes are NIKE have nothing to do with the fit on your feet.

The problem is, you have no way to "check the size" or how the system sounds or covers your seating area until AFTER, the system is installed. You can't "give it back" either. It's yours. "Well, the salesman said this, was dressed nice, had pictures, blah, blah, blah, blah, yatta, yatta, yatta." So what. You still don't know how the system will sound in your building.

Here are the key points:

- 1) The key to great sound is the speaker system design. NOT amplifiers, mixers, microphones and lots of power. Yes, those parts are important, but not as important as the speaker system design. It is the speaker system's responsibility to cover the seating with clear, articulate sound. Put the money there first and work the problem backwards to the mixer, microphones, etc. The rest will take care of itself.

2) Forget about name brands and focus on results. Who cares who makes the speaker as long as the speaker can focus clear sound into the seating area? Of course, some do sound better than others. But since a large portion of the population is tone deaf anyway, the most important thing to shoot for is overall clarity of speech. Let the audiophiles debate to the nth degree about the nuances of sound quality. If you can afford the best on the planet great, but you don't need to spend more than necessary to get the basic job done. What results are you after? Clear articulate speech at every seat. Always remember that.

3) "I have no clue how to tell a contractor what good sound is". OK, here's how you say it.

"We want the sound to cover our seating area with plus or minus 3 db 2khz band limited pink noise with no more than a 5% loss of Alcons". That will get the system designed for clear speech. That definition will also immediately separate the box hangers and equipment salesmen from the people that really know what they are doing. The real sound guys will run back to the truck and bring in some test equipment and start asking you a pile of questions. The others will turn white as a sheet and leave. Add more horsepower if you have a strong music ministry like sub bass and the power to push it. You will need lots of headroom in the system too. But get the system designed for speech first and the rest will be much easier.

4) Don't test the sound system with just a sound track. Any big home stereo can do that, and you aren't interested in a big home stereo. Forget about trying it with a front line vocal group and a live band too. Of course, you can do that later, but what you want is clear speech with acoustic gain to spare. Put a 4 year old on the stage with a lapel mic. See how loud you can turn up the system before feedback. Walk around the room as the kid recites a script. Can you understand every word spoken regardless of where you are listening from? Good! That's good sound! Can't get the mic loud enough without feedback? You aren't done yet. Rip the system out and start over. You will certainly have the wrong speaker system design.

5) How much should a system cost? How much you got? I can literally spend as much as you can come up with. The question is how much do you need to spend? That can only be determined by some acoustic tests, asking you a pile of questions, and attending one of your services so I can hear what you are doing. If you want a ball park idea, figure about \$100 to \$125 per seat in your building, including the choir. Again, this figure will be way too much for some places and pitifully too little for some others. It's a ball park idea, not a hard figure.

It's akin to pricing an air conditioning system. If your building requires 40 tons to cool it, it will take 40 tons regardless of what you wish it would cost. You can use Trane, Carrier, or whatever make you want, it will still take 40 tons. If you only have enough cash to buy 20 tons, you are going to be hot during the summer. Neither can you get a little of it now and add on. Well, you can, but you are going to be hot until you get up to the 40 tons of cooling required to cool that space.

A heating and air purchase never starts out with "Well, we're willing to put \$3,500 in it. See what we can get". Sound is consistently bought with that mindset, but is grossly incorrect. You have a certain size building with acoustic problems built in. It will take whatever it takes to fill

that space with the type and quality of sound you need for clear speech at every seat.

I'm often asked about getting a piece at a time when the price of the system is way beyond what anyone had imagined. I've always wondered where people came up with the imaginary number to start with. If a building requires a certain amount of speakers and other equipment to get the sound in that building they want, that's what it takes.

There is no "start with this and add on". I can't install "a piece" of a sound system and get the quality of sound you want. It's the whole thing. That's like saying I can't afford a car, let me buy a piece along the way, while I drive it around. You aren't driving anywhere without the whole car. The tires are no good without the engine, transmission and other stuff. Even if you had the minimum of the chassis, engine, transmission, and the wheels, what kind of ride would that be! Better to save up and buy the whole thing at once.

Too many times, I've seen churches try cut corners and buy "something to get by" with. That is always a waste of money. If you can't get your message, your teaching, the choir special, and other speech related ministry to the people seated in your building, what's the point? Not to mention the aggravation of struggling with feedback, can't hear anything, and poor sound quality, from service to service. That type of sound system is no help at all but is a strangle hold on your best efforts to grow your ministry. A business like a convention center or major arena wouldn't consider anything but what they really needed. If their system wasn't getting the job done, it won't be in that building long. They can't afford poor sound. Doesn't your church demand the same? I'm sure of it.

- 6) There's another key piece that too many people miss – the sound tech. During a service or performance, the sound tech is the most important person in the building. Wanna bet? Let me behind your console one Sunday morning and I'll prove it. I can make you fill the room and captivate your audience or make you sound like a five dollar pocket radio. I can give you the confidence to speak boldly or keep you on edge of anxiety the entire time you're talking wondering when the next squeal is going to come. All the music directors reading this just jumped up and hollered "AMEN!" It is absolutely imperative that you have the best sound tech you can find. I highly suggest that you make it a paid position so you can enforce some standards. You can't fire volunteers. Stop dancing on egg shells. The quality of sound directly affects every ministry on the platform. If the person behind the mixer can't cut it, get some training for that person, or get someone else to do the job. How long would you put up with a pianist that constantly struck bad notes? I also suggest you go outside the church to find this person. Someone that wants to tinker around learning to operate the system isn't good enough, unless they are dead serious about learning it.

People asked me how I learned to mix and how can they do what I did. Simple. Find a rock band and travel on the road for 7 years playing 4 nights a week in every type of club or room you can imagine. Oh yeah, learn to play an instrument while you're at it. I haven't had any takers yet. Mixing sound is more art than a technical thing.

Learning to mix and develop an ear for music takes time and hours of work. Most people don't

have time or aren't willing to do what it takes to learn how to mix. You've got to love it and have a knack for it to do it. Twiddling a volume slider up and down once in a while ain't mixing sound. The mixing console is an instrument to be played like a piano. Those knobs move for a reason. Again, it might be easier to find someone outside the church that already has the skills you need. Hire that person and let someone in your church learn from them and later take over the position.

When a good sound tech sits down behind a console, it's a thing of beauty to watch and listen. It's almost magic. The choir directors just jumped up again! You will hear sounds, depth, and clarity in your music ministries you never knew were there. You will hear and feel the choir build into a crescendo. You will hear and feel the warmth of vocals. If you have a poor sound tech, all you will hear is feedback and flat, dead sound. You see the choir working but the song has no life. It just lays there.

An \$85,000 Steinway piano is worthless in the hands of a beginner, but a good pianist can make a cheap rental piano make music. You can have the best sound system ever designed and a poor sound tech will absolutely ruin it. The biggest struggle I face as a system designer is wondering who is going to sit behind the mixer when I leave. That person can ruin my best work and yours too.

When you buy a Cathedral Premium sound system, I require a minimum of 8 hours of tech training. Require. There is no option. I will require the techs to take a hearing test by an audiologist and I will do some sound testing of my own to find out how they hear, if they are tone deaf or not, and can feel music structure. Again, a requirement. I can teach what the knobs do. I cannot teach the art of hearing. And that's the problem. The sound tech MUST have some ability to hear the sound mix. If they have some, I can teach the rest. If they are tone deaf, forget it. We need to find another person. That is not to be cruel or hard, it's just the facts. You wouldn't dare hire me to direct or produce your Christmas production. I have all kinds of talents and abilities but that is not one of them. I wouldn't know the first thing about how to get it done. Blind people can't drive cars. Tone deaf or hard of hearing people can't mix sound. That's just the way it is.

Why is this listed in how to buy a system? Because you need to think about who is going to operate the system. Don't think for a second if you buy the best system design that it will automatically sound good. Forget it. Also forget the notion of a "set it and forget it" sound system. Get the myth out of your skull too, that a digital recall mixer will solve the problem. Two problems here. First, someone has to set it the first time. Second, those programmed adjustments were only good for that one instance. Sound changes every time. The weather is different (yes it matters). People's voices change from service to service and all sorts of minute changes add up to the fact that you need to constantly tweak the mix from service to service. You've got to have a good sound tech. So, if you need training, who's going to provide it? This goes along with the next thing to look for.

Know who is going to design your system.

The mindsets of “system designers” you’re likely to encounter

The mindsets of various sound system equipment suppliers can be likened to doctors. Some doctors are general practitioners. Some are specialized in different areas. Which one you need depends upon your illness. Buyers don’t realize a difference exists among sound system “experts” and can easily choose the wrong person to do the job.

Church sound is a permanent installation requiring a different skill set to design and install properly, than sound for touring groups, theatres, clubs, recording studios, etc. You cannot mix the disciplines. They do overlap, but they are not the same.

The designer must have experience working behind the mixing console during live church events to understand what tools you need to work with and understand the problems in sound for ministry.

The designer must have technical skills to understand the products on the market, their capabilities, and how to interface them correctly, plus know who makes the best product for your application and be brand neutral.

An understanding of acoustics is required to know how sound will behave in your sanctuary or multipurpose space. It is impossible to design a system that will provide even, clear, and dynamic sound at every seat without knowledge of acoustic principles.

Then there is practical installation experience and knowing how to mechanically and safely hang hundreds of pounds of speakers overhead, meet building codes, and electrical safety issues. It has to look great too.

Finding this combination of talents in one person is difficult but that’s what it takes for this type of work. You must know going in, the qualifications of the prospective system designer you have chosen to provide a bid. Not the salesperson, not the company, but the physical person that is going to create the list of equipment. You wouldn’t ask a foot doctor to meet you in the operating room next week for heart surgery! Be careful of who you select to design your sound system.

Here are the most common mindsets in no particular order.

The music store

Most music stores offer sound equipment and generally a person is in charge of that department. This environment is retail sales. A customer walks in looking for something and it’s the salesman job to sell something. Generally, music stores have only one or two lines of audio equipment for sale and have a

very narrow view of what is available in the audio industry. Music stores are price sensitive meaning they stock products that the average person can afford, not particularly the best product for the job. There's nothing wrong with that, just know what the situation is. Musicians are the typical customer and bands need a PA system. The equipment is designed for portable use to cover an extremely broad range of applications. It's made to be thrown in the back of a truck, hauled all over the country, easily setup, and make a loud noise. It is not necessarily intended to provide the perfect sound coverage or clarity, but to make decent sound for the money.

The local band guy

I run into this once in a while. "So and so sings in a quartet and can get a sound system at cost and install it himself."

This is the same thing as the music store or rock'n'roller. It will be the same equipment the music store sells just bought somewhere at the rock bottom price. Again, nothing wrong with that. We all are looking for the best deal. But, remember, what you need is a person that knows how to acoustically fit a sound system into a building. Any 16 year old can buy some sound equipment and hook it up. That's just no big deal. But that is not a sound system. That is sound equipment. That is a big home stereo.

The recording studio owner

"We know a guy that owns a recording studio and he says we need this."

Recording is a completely different discipline than designing sound for permanent install. Once in a while, I'll get a call from someone that wants me to set up a studio and design the acoustic space. I refer those jobs to a studio designer because that's not what I do. It's requires a different, though related, skill set. I understand the difference. The recording engineer looks like a regular sound guy because he sits behind a mixing console and twists knobs just like the live sound guy. But the recording engineer is mixing sound for a boom box, tv, car, or home stereo speaker. He does not have to think about feedback problems, even sound coverage, or articulation issues in a live environment. Typically, recording engineers aren't good at sound system design though they will understand the fundamentals of hooking up equipment.

The typical "sound contractor"

"Just tell me what so and so's price is and we'll beat it"

In my mind, the typical sound contractor is an equipment salesman on wheels. There is some basic knowledge of clusters, side mounted speakers, equalization, etc. But, more often than not, the game is to get the sale instead of clear speech at every seat. Brands and prices will be the topic of conversation more than a guarantee that the sound will be articulate and clear at every seat. Computer generated coverage maps are presented to "prove" the integrity of the design but buyers don't realize the computer

can come up with the wrong answer depending upon what data was entered. A sound system cannot be designed with a computer system. I use the same software but I use it as a way to check my design not as a replacement for my expertise. With all that said, if you are looking for an install at the lowest price and aren't concerned about the best coverage, clearest sound, and the best fit for your ministries, that's fine. Again, know who you are dealing with.

The acoustical consultant

A good consultant may or may not know how to design a sound system to fit an acoustical environment, but may only have expertise in solving acoustic problems. Either way, they typically have excellent hearing, technical expertise, and knows what they are doing. The consultant may design a system, provide you with the specification package, help you find someone to install it, and then follow up to make sure the project turned out right. This is one of the best ways to buy a system. Let someone that knows how to design for permanent install design your system and then let several contractors bid the actual installation. There will be engineering and other up front fees paid to the consultant for acoustic analysis and design.

Acoustically engineered sound

This best describes what I do. I have a combination of several mindsets. I am a certified electronics technician, have taught basic sound systems at the local community college, have mixed sound for hundreds of live productions, was a professional musician for 7 years, and have a formal education around sound engineering and acoustics. I can operate as a consultant or design / build. I do charge up front design fees for most projects depending upon the time required, but the amount typically goes toward the purchase if an installation agreement is initiated within 90 days.

I've crawled around in ceilings and hung thousands of pounds of speakers. I know how a good install should be done to protect your property and keep the safety of your audience in mind. I know how to make it look like it belongs there and not tacked on.

As a technician, I have serviced just about any name brand and type of product you can name so I have a good understanding of the quality of various brands of audio / video / and lighting equipment. I can look across the landscape of manufacturers and pick the best product for your application and price. Sometimes only one manufacturer has the perfect product for the job and the price is the price. Sometimes there's no need to pay more for a product when another cheaper version will do the same thing in this particular application. But, you can only know that by having your hands on it.

As a musician, I know what the musicians, the choir, and the music director wants to hear, not only in the audience, but what they hear on stage. They must sound good to themselves to have any confidence they sound good out front. Balancing the sound on stage with monitoring systems and vocal to music mix is important. Years standing on stage gave me that perspective most sound contractors don't have.

As a live sound tech, I've mixed sound for every kind of production you can think of. From outdoor talent shows to full orchestras with live drama, I've done it all. I know the problems your sound techs

will face and how to design in solutions you will need to solve them. I know how to teach your sound techs how to get the most out of your system.

The bottom line is, I'm a real sound man. I love great sound and I know how to get it!

Choosing the right mindset

You can have anything from the lowest price “we installed it ourselves” type of system to one that captivates your audience with even, clear, articulate, and dynamic sound. It's your money and frankly, sometimes there just isn't enough to get what you really need. I understand that. We all had to start somewhere. Just keep in mind your objective when you start asking for proposals, quotes, and system bids. If you have a small budget, no need to bring in an acoustical engineer or other top system designer. If you are sick and tired of sound problems and you've been through the “local experts”, then you're ready for a real sound system solution. Call or email to set up an appointment.

How to find the person with the right mindset

One of the best ways to find out if someone knows anything about sound is have them mix for you. Forget what the salesman said, get the designer behind your mixing console. Have the sound system designer mix sound for a Sunday morning service. If you can't stomach that uncertainty, then at least have a serious choir practice – that means most of them show up for practice. The system designer should be able to get a better sound than your sound techs (typically) or show some ability to hear the mix. Think about it.

If a system designer can't hear the mix, how in the world can they design a sound system!

Before the prospective system designer gets there, purposely move around the levels, low, mid, high controls on each channel from where you normally have them. Don't do anything else to play a joke or cause wasted time, just un-tune your normal settings so the person will have to actually find their way back to a good mix. I'll take you up on this challenge anytime. If the designer looks lost behind the console, can't explain what he / she is doing, or you can't get a feel of this person's ability, look for another company. You are most likely dealing with box hangers, equipment salesmen, and you will be buying another version of what you already have. It's not a big home stereo you want. It's clear speech at every seat. Again, they are not the same thing.

Train yourself to judge a sound system for speech clarity

Here's the big piece of information you need the most. I'm going to show you how to hear the most important tonal range of a sound system, the part that ensures clear speech. But first, some basic science.

The English language is composed primarily of consonant sounds. When we are having casual conversation a few feet apart from each other, there is a certain type, quality, or tone range of sounds we

make as we speak. It is this type of sound that makes it easy for us to understand the difference between heavy consonant sounds between words like “bean” and “being”. Those words sound almost identical particularly if a person speaks too fast or mumbles. Without this type or quality of sound I’m referring to, anyone listening would have a hard time deciphering what they thought you said: bean or being. Keep in mind, I’m only referring to two simple words in this example. Every sentence you say is filled with similar consonant sounds. The type of sound that makes it easy for us to understand each other occurs naturally as we speak. We never think about it.

Remember what the purpose of a sound system is: to acoustically move the talker closer to the listener, so that the listener hears the same sound quality heard during casual conversation.

There are two components the sound system must be able to transmit to the listener: ample volume to be heard and this special type of sound. Every system on the planet can get the volume. An alarming few can transmit the special sound. That’s the problem. That’s the WHOLE problem. That is why a system can be loud and not sound clear. This is also the very reason that hard of hearing people constantly complain they can’t hear though to most people it’s too loud. It’s not the loud that missing! It’s the special type of sound that is not being transmitted by the sound system. It’s also the same reason musicians, choir members, and choir directors keep asking for more monitor, when the monitors are already louder than the main speakers! You’ve got the volume. You DON’T have the clear sound. Amazing isn’t it. Again, I’ll keep banging in your head . . . loud DOES NOT have anything to do with clear, articulate sound.

There’s so much more than meets the eye about getting clean articulate sound. This article described what the goal is. How to get it done is very complex. It’s a blend of art, technology, experience, and expertise. It’s NEVER as simple as buying some sound equipment.

“OK, so what’s this special secret “clear sound” thing?”

The best way is to hear it yourself. I offer a no obligation on site demo that lasts about 30 minutes. I teach you what to listen for, and then we test your existing system for articulation and coverage. You will never think the same way about sound systems again!

Or, you can order the CD version and conduct the tests yourself. Either way, you need to hear the sound I’m referring to.

To get your test CD, send \$35 to:

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