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**Is Sound Quality Important  
in a House of Worship?**  
**And if So, How Do You Achieve It?**  
by Curt Taipale

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*Bose Corporation commissioned professional audio consultant Curt Taipale to prepare this paper. Its goal is to help you better understand professional sound systems and to provide information about planning and choosing a sound system for your house of worship.*

*We hope you find it helpful.*

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# Is Sound Quality Important in a House of Worship? And if So, How Do You Achieve It?

by Curt Taipale

Sponsored by Bose Professional Systems Division



## Introduction

Does it ever seem to you that the sound in your worship services just never quite “gets there”? I mean, sound comes out. It’s plenty loud enough. But the quality isn’t there. Some members find it hard to understand the spoken word. The music isn’t clear. In fact, your home stereo might offer a better listening experience than the sound system in your house of worship.

Comments from religious leaders across the country suggest that quality sound is a factor in increased attendance, turning visitors into members while retaining your existing congregation. But how much quality can you afford? Where can you find a sound system anyway? Who can you trust to design and install it?

It’s hard, isn’t it? You’re wrestling with your desire for excellence, yet torn by the budget realities. Just then, the phone rings. It’s the leader of another ministry area reminding you of their request for funding. You hang up the phone only to find a new e-mail from the General Contractor saying that the cost of steel for the new building just went up.

So when your sound tech stops you backstage hoping to convince you how important that new digital console is, you’re about to lose it.

Fortunately, there is a solution within your grasp. No, no, not hitting your sound tech!?! Inside knowledge! Come along with me as I reveal to you the secrets of acquiring the sound system you always wanted. You’re about to discover:

- The Three System Rule.
- Engage the Design Systems and Room Acoustics Early in the Building Design Process.
- Design It Yourself or Call in the Pros?
- Design Matters.
- Install It Yourself or Call in the Pros? Worth the Liability?
- Pulling a Budget Figure Out of Thin Air.
- A No Surprises Project Schedule.
- And Way More.

The houses of worship that enjoy technical excellence in every service are those that have come to realize that a quality sound system is not a cost. It is an investment in the future of your house of worship, and a tool that equips and enables your leadership to more effectively minister to your congregation.

Why do we need a sound system in the first place? That's easy to answer from your own experience. As the size of your congregation grows, you will reach a point where you can no longer talk loud enough for everyone to hear. A quality loudspeaker system will allow you to project your voice to your growing congregation without having to strain your vocal cords. As you begin to incorporate worship music into your services, a sound system allows naturally loud instruments, softer instruments, and voices to blend in a musically pleasing balance.

As you begin to consider what kind of sound system will support the needs of your ministry, some questions begin to surface. To start with, how important is sound quality to you?

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I recently conducted an informal poll of Senior Pastors and Music Pastors, asking them "When it comes to buying a new sound system, what do you care most

about? How important is cost versus quality versus long term reliability versus other concerns?"

There were lots of great responses, but the most common answer from Senior Pastors was that they just want it to work. Period. (Read that with the appropriate sense of frustration, and you'll feel their pain.) From their vantage point, when the system doesn't work properly, it can become a distraction both for them and for the congregation.

I'll share more of their comments with you later in this paper, but first let me ask you a question. How many houses of worship have you been in that had a great sound system?

### **Biography**

*Curt Taipale enjoys decades of experience in audio as a recording and live sound engineer, a consultant, educator, and author. He contributed three chapters to the Yamaha Guide to Sound Systems for Worship, has written numerous articles for several magazines, and is the Church Editor for Live Sound International.*

*Curt and his wife, Jeanna, launched their ministry web site, [www.ChurchSoundcheck.com](http://www.ChurchSoundcheck.com), in 1997. Their CSC Discussion Group brings together thousands of people in countries throughout the world on a daily basis to help each other achieve technical excellence in their local churches.*

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## The Three System Rule.

You might be surprised to learn just how common it is for a house of worship to purchase three sound systems before they get the one they wanted in the first place. Every step made towards those initial attempts at a quality system was made with the best of intentions, but often out of a lack of knowledge. It has been said that guys won't stop to ask for directions. Maybe sound committees have the same problem!?!

### Avoiding the Pitfalls.

Here are the systems that a house of worship may go through if they don't engage the help of a design professional from the start. If your experience doesn't line up with one of these scenarios, then consider yourselves ahead of the game.

(1) The first system was a DIY project, maybe using homemade loudspeakers built from plans found on the Internet, or used equipment from a defunct rock band. The imaginative placement of those loudspeakers was determined by advice they heard from a friend of a friend who has a good home stereo.

(2) The second system arrived courtesy of the local Musical Instrument (MI) store. It could be that they helped you load it into your van. Maybe the brand of speakers was chosen based on a sound system that your senior pastor heard while attending a pastor's convention in another state.

(3) For the third system, the powers that be finally saw the light and engaged the services of a seasoned designer with a proven track record to design and oversee the installation of the system that you always wanted in the first place.

By the time they have installed three sound systems, the average house of worship has spent far more money in the long term than had they simply installed the system they truly wanted the first time. Instead of being one of those houses of worship that is on their second or third system, ask yourself now: would it not be better stewardship of the available funds to seek out the experienced system designer the first time around?

If your house of worship is about to embark on a new building project that will bring to life the vision for a new worship center that your staff and congregation have been dreaming about for so many years, I implore you to stop for a moment and carefully consider the steps you are about to take. Why? Because I've just seen far too many houses of worship totally miss key steps in the process until it's too late to affect a positive outcome. It's human nature isn't it?! We often don't know what we don't know. So it helps to engage the help of specialists to lead us through the process. And the sooner they are on your team, the more they will be able to help you and, frankly, the more money they will be able to save you.

### Engage the Design For the Sound System and Room Acoustics Early In the Building Design Process.

I just took the call again this morning. A house of worship that talked with me about their building project nearly a year ago, but chose not to hire a design professional at that time, is now in a panic. The steel is up. The walls are framed. They expect to hold their first service in the new building in just six weeks. And yet

they are just now realizing that they need to address the sound system needs.

Or consider the project that I just started last week. The Owner had everything lined up, drawings basically completed by the Architect and the Mechanical-Electrical-Plumbing (MEP) engineering team. It wasn't until someone at the MEP firm asked the building committee for the details of the sound, video and lighting systems that the committee realized they needed someone to design those systems. In all, that will set back their project schedule by at least six weeks.

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Regrettably, it is not uncommon for building committees and Architects to wait until the Construction Documents are at 90% of completion or later before calling in an acoustical or technical systems consultant. And at that late point in the project it's too late to affect meaningful, positive changes. The project budget is already allocated and no funds are left to apply towards the technical systems. Then the real surprise comes when the costs of the conduit and AC power required to support the sound, video and theatrical lighting systems are added up. It can run into thousands of dollars for even a moderate size auditorium.

With the budget pressures mounting, the first line item to get crossed out is often the room acoustics. The very line item that is one of the most important elements to have as part of the

building construction process is often eliminated before the dirt starts moving as the committee adopts a “wait and see” approach.

The better plan is to introduce your architect and acoustical consultant before the first line is drawn. Allow them to develop their working relationship very early in the project. An acoustical consultant can often save the house of worship the value of his/her fee simply by steering the project team and their architect around some of the common mistakes before they become part of the building design. It is inexpensive to correct problems while they are still just lines on paper.

Many building committees have the mistaken belief that all architects are schooled in room acoustics, when in

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*What some building project teams may not recognize is that in choosing the size of their auditorium, they are already dictating the requirements of the sound, video and lighting systems.*

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fact that is rarely the case. Just as an architect depends on the knowledge of an outside engineering team to design the structural, electrical, mechanical and plumbing systems for a new building, an experienced architect welcomes the input of a seasoned acoustical consultant and technical systems designer.

Remember that you’re building an “auditorium”, which by definition is a “place for hearing”. If the design of the auditorium neglects to address the acoustics, then the design has failed from the outset. I know of auditoria that were completely unusable from the first day they opened the door, and in fact had to be closed for weeks or months while changes were made to fix the acoustic problems. Talk about a costly change order!

## Strategic Obligations.

Think about it. Your building team has determined through their research that you need to build an auditorium of a certain size, in particular with a certain number of seats to hold your growing congregation. Your building committee recognizes that this certain size building will require a certain number of lighting fixtures to adequately light the space, a certain amount of air conditioning and heating capacity to keep the building comfortable year ‘round, and a certain amount of water delivered to the building. A certain amount of electrical power needs to be brought to the building for all of the motors and lights to operate properly. Those air handlers and ducts need to be a certain size to move all that air efficiently and quietly. The pipes need to be a certain size for that water to flow properly. They even make sure that there are enough parking spaces.

What some building project teams may not recognize is that in choosing the size of their auditorium, they are already dictating the requirements of the sound, video and lighting systems. They are, in effect, obligated to cover all listener seats with highly intelligible sound. If you decide to project song lyrics and sermon notes onto a video screen, then you are obligated to provide a bright, high resolution video projection system capable of displaying text large enough for all congregants to see and read clearly from a distance. The more complex the worship services become, the more important a flexible theatrical lighting system becomes. The larger the platform, the more theatrical lighting fixtures it will take to light it properly. It all interrelates and it all costs money. Plan for it from the start and you won’t be forced to compromise the design later.

Fortunately the loudspeaker system, the acoustics, the video projection and the theatrical lighting system can each be designed with a deliberate, measured approach and can deliver predictable results in much the same way that the heating and cooling, lighting and basic electrical requirements can be determined. The design of those technical systems is simultaneously a balance of art and science, and the calculations have been in place for decades.

If you want your first system to be the “right” system, work with a designer who understands those design calculations. If you don’t, you may find yourselves with a shoot-from-the-hip, LAR (Looks About Right) approach to system design.

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## Design-It-Yourself or Call In the Pros?

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Who, Me?

Let’s be realistic. The design requirements for a very simple system (e.g., a couple of speakers mounted on speaker stands fed from a powered mixer) don’t justify hiring a professional to design the system for you.

Yes, I realize that I just contradicted myself. But understand that statement only refers to one specific, simple type of sound system requirement. And since we could easily come up with a list of twenty different portable loudspeakers that would fulfill this simple requirement, each of which sounds different than the next, you may want to engage the help of a design professional on an as-needed basis to advise you on some key purchase decisions.

On the other hand, properly designing a more complex sound system isn’t as simple or as easy as many want to think early on in the process. It can involve a

significant investment of time and effort, and if done incorrectly can waste quite a bit of money. As your requirements for the sound system grow in complexity, at some point you should accept the fact that hiring a professional designer is just good stewardship.

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*A design professional relies on first-hand experience, comparative listening tests, measurement and input from peers to research the right solutions for your project.*

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Let me say it another way. One of my Dad's words of wisdom for me when I first started to drive a car was how to interact with the repair shop. Rather than go in and tell the shop manager what I thought the problem was, Dad encouraged me to tell them what the *symptoms* were. In other words, rather than tell them that "I think I need a front end alignment", it would be better to tell them that "the car seems to be pulling to the right", and then let them engage their experience and knowledge to determine what the actual problem is.

In much the same way, one of the best words of wisdom I can offer you in searching for your next sound system is to let the professionals do their job. Rather than take the advice of your friend in another state, a nice looking magazine ad, or what you found on the Internet, tell the design professional about your needs, about the problems you're currently having, what your worship music style is like, and so on. Ask them to attend one of your services so they can experience it firsthand. Then let them do what they do each day – help you find the best solution for your needs.

The bottom line is that you're not really looking for Brand "X" loudspeakers or the latest buzzword on the street.

You're looking for the **best solution** for your needs. A design professional is not swayed by magazine ads or buzzwords. Instead, they rely on firsthand experience, comparative listening tests, measurement and input from peers to research the right solutions for your project.

### Who Are the Design Professionals?

Professional designers who are serious about their craft have invested years of their life in training and the study of the equipment and design techniques. They have invested a small fortune in computer modeling software and other design tools that allow prediction of the results before the installation begins. They own the proper test equipment to measure the results of the installed system, and have the experience to fine tune its performance both by ear and by scientific measurement.

Technology is constantly evolving. I am using loudspeakers in my designs today that weren't even available two years ago. A video projector that I might specify for a project today may be obsolete two years from now. So design professionals strive to stay on top of new design techniques, and make a concerted effort to personally evaluate new loudspeakers as well as other audio, video and lighting equipment.

They regularly attend trade shows, workshops, seminars, demonstrations and comparative listening tests, stay in touch with manufacturers, and network daily with their peers to stay on top of the latest products. It's a continual process, and the results of their work show it.

### Engage the Services of a Design Pro & Heed Their Advice.

Working with a professional designer really can save you money, provided that you follow all of their recommendations. Here's a case in point. My consulting firm worked with a church a few years ago that, because of their concern over budget constraints, cut the size of the theatrical lighting system that my design team had proposed down to a bare minimum. In so doing, they instructed the electrical contractor to install just the amount of power they needed to run this bare bones lighting system.

All was well until three months later when the church contacted us to say that they wanted to start doing a web broadcast of their worship services. That put us in the awkward position of having to remind them of the reality we had discussed months previously. Since they had not brought enough power to the building in the first place, their lighting system could not be expanded beyond its existing capability.

The bottom line was that they could not provide adequate lighting for them to deliver a quality video for their proposed web broadcasts. Their hands were tied. Bringing additional power to the building during the construction process would have been a simple matter, but adding that power to the building this late in the process would be prohibitively expensive.

The moral of that story is that not only is it important to engage the services of a seasoned, professional designer for your project, but it's also important to heed the recommendations they give you.

## Roles of the Professionals.

At one time, the terms *Dealer*, *Sound Contractor* and *System Integrator* suggested clearly defined roles, however over time the lines have blurred and those terms have become interchangeable. Services offered by each company may vary, but for the most part, their core competencies are very similar. In comparison, the role of a *Consultant* is quite a bit different.

### What Does a Sound Contractor / System Integrator Do?

A Sound Contractor or System Integrator specializes in furnishing and installing sound equipment. Some also furnish and install video and/or stage lighting equipment. They are typically authorized resellers for several specific manufacturers' products, and other manufacturer's products are available to them through various distribution channels.

Most Contractors/Integrators operate as a *Design/Build* company. Their services include assessing your technical needs, designing the system in-house, furnishing and then installing the equipment. They may also bid on Consultant-driven projects where the design has already been completed for the Owner.

Once your new sound system has been installed, your agreement with a Contractor/Integrator should ensure that someone familiar with the project, ideally the lead installer or project manager, will be on site during the first two beneficial uses of the system. In other words, you want someone on hand during your first two weekends with the new system to handle any unexpected problems with the system.

Most Contractors/Integrators include a warranty period on their workmanship, and of course the manufacturer typically warrants their product for a certain time period as well. Once the installation is complete, the Contractor/Integrator

### Make Sure You Are Working With An Authorized Reseller.

In essence, a Dealer is any company that is authorized by a manufacturer to purchase and resell their products. For example, Sound Contractors, System Integrators and Music Instrument (MI) Stores are dealers for several brands and types of equipment.

Whenever you purchase sound equipment, ask if the company is an Authorized Reseller for that item. Note that some manufacturers require any warranty repair work to be done only by their authorized service centers.

will endeavor to stay in touch with the Owner in particular during that initial warranty period to make sure that all is well with the systems they installed. And ideally they will stay in touch with the Owner for the next several years to provide future technical solutions as they arise.

Sound Contractors/System Integrators often advertise in the Yellow Pages of the phone book. If you can't find one near you, note that many are members of the National Systems Contractors Association, and their contact information is available online at [www.nasca.org](http://www.nasca.org). Another active group is called Infocomm ([www.infocomm.org](http://www.infocomm.org)).

### What Does A Consultant Do?

The role of the Consultant starts with understanding a client's vision for their ministry, then developing a design for the technical systems that will support that vision. They serve as the client's advocate throughout the process, defending as needed the design that must be in place in order for the client to fulfill the vision they have for their

ministry. Because of that, much of the Consultant's time on a project is invested in sharing basic principles and even laws of physics that underscore his design conclusions.

Since a consultant does not sell equipment, he/she is not obligated to use products by any specific manufacturer in the design for the project. That gives them liberty to choose equipment based solely on its merit for your project.

Once the design is complete, the Consultant will help you through the bidding process to find a capable, qualified Sound Contractor to install the systems for you, on time and within budget. Once the building committee awards the installation contract, the Consultant watches over the installer's work to ensure that the systems are installed according to the Consultant's design intent.

The final step in the process is called system commissioning, where the Consultant will personally review the installation, work with the installer to resolve any discrepancies with the equipment or how it is installed, and then fine tune settings of the loudspeaker system voicing, video projector adjustments, focus of theatrical lights and so on to ensure that the systems perform to their expectations.

Some Consultants will follow through to train your technical support team on not only how to get the most out of the new equipment, but also on the production techniques he or she has learned over the years of personally operating such systems.

One seemingly small but important distinction is that a Consultant does not sell equipment. They are not a dealer. In fact, all they have to "sell" you is their knowledge and experience. In that regard, one could compare the role of a Consultant on a project with

that of an Architect. By working with you from the design phase through construction and final commissioning, the Consultant can bring a sense of continuity to the project.

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*When choosing a company to work with, make sure that you contact their references to ask about their work.*

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There really is no central place where you can locate a Consultant. Most do not advertise in the Yellow Pages with the reasoning that a company about to invest that kind of money depends on word of mouth and reputation. The National Systems Contractors Association ([www.nasca.org](http://www.nasca.org)) does maintain a list of its members, and many Consultants are members of NSCA. That's a good place to start. The Audio Engineering Society ([www.aes.org](http://www.aes.org)) is another. Some acoustical consultants are also members of the National Council of Acoustical Consultants ([www.ncac.com](http://www.ncac.com)) as well as the Acoustical Society of America (<http://asa.aip.org>).

### Which Approach Should You Choose?

Of course the answer is "it depends" on your needs and your situation. If you have started a portable service, setting up in a rented facility each week, and you need a trailer full of portable sound equipment, your favorite local music store may have just the right selection of gear on hand ready to go. In fact, there are even companies that specialize in equipping portable groups with everything from the trailer to the sound equipment to the coffee filters to the daybeds for the nursery.

### Documentation You Should Expect.

For a very simple project, it is possible that the only documentation you really need is the sales slip for the equipment purchased. As the complexity of the project increases, and certainly when working with a professional Consultant or Contractor, documentation ensures that the right equipment is placed where it needs to go, and is connected properly.

Several editions of the drawings may be developed through the design phase and installation phase of a project. But here is the important part. At the completion of the project, the Owner should receive a set of the As-Built Drawings. These are prepared by the installing contractor, and document important details like wire numbers, how the system is interconnected, and even key equipment settings.

To the Owner, the As-Built set is the most important set of drawings to receive because they directly relate to their investment in the sound system. It should be kept in a safe place, with copies made available to the leaders of the tech team. Since ten years from now that paper may not be in good shape, ask for electronic copies as well. At the very least, you should receive a set of PDF copies of the AV drawings. Ideally, get a CAD file of the signal flow drawings so you can document future changes made.

If you are upgrading the sound equipment in your current sanctuary, a local sound contractor is in a good position to come out, evaluate your needs and install the equipment you need.

If you are building a new worship center, you can reap tremendous benefits by engaging the advice of a seasoned Audio Consultant who will work alongside your Architect to develop the best possible design within your budget constraints, and then oversee its installation by a capable Sound Contractor.

When choosing a company to work with, make sure that you contact their references to ask about their work. Talk with the music pastor and tech team about how well the system is serving their needs, and what the working relationship was like. If at all possible, go listen to a sampling of their systems.

### Design Matters.

Even the most casual of observers will likely realize that the sound system requirements for a house of worship that simply offers up the spoken word and a traditional worship music style are far different from those at the house of worship down the street that offers a highly contemporary or experiential type of music in their services.

The designer must first weigh those programmatic requirements versus the relative importance of speech intelligibility, loudness requirements, overall range of frequencies of interest, mono versus stereo, sound quality, how the loudspeaker system interacts with the room acoustics, and several other measures.

Then those elements need to come together within the available budget. The convergence of each of those criteria may point to one type of system as being more appropriate than another, and of course that varies with each project.

We could talk all day about the technical issues at stake, but what truly matters is the end result; how the system performs. So what are your expectations? It seems to depend on whom you ask. In fact there may be a disconnect in a committee meeting on the topic because each individual sees the objectives from a slightly different perspective.

The responses from that poll of Senior Pastors and Music Pastors mentioned earlier were very telling, and I believe that everyone at the table can agree on those basic measures of its performance. Their heartfelt, core desire for the sound system to “work properly every time” is part science (its design and installation) and part art (its operation).

In that survey, cost was considered important, but secondary. Sound quality was mentioned third. That’s interesting to me. As a system designer, the fact that the system is going to “work” well

and have long term reliability is a given. I’m well past that before I even begin the design. What I focus on early in the project is what is needed to fulfill the technical requirements, and the level of quality that the budget will allow us to achieve.

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*...with even the best quality sound system in place, the skills, training, experience and knowledge of the operator and, frankly, of the musicians still have a direct impact on whether the sound system “sounds good” or not.*

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In fact, of the concerns expressed in that survey, several are a function of the sound system design and installation, others are the responsibility of those operating the system or the musicians, and still others are affected by more than one factor.

For example, the music pastors responding to this poll said it was important for the sound system to “sound good”. Well, in order for it to sound good it needs to be designed properly, installed properly, and have an adequate budget behind it to deliver on the technical requirements. Yet with even the best quality sound system in place, the skills, training, experience and knowledge of the operator and, frankly, of the musicians still have a direct impact on whether the sound system “sounds good” or not.

The respondents offered up what their expectations are for a good sound system, and what it means to them. I’ve categorized their responses according to what or who would be responsible for that trait.

### Performance Expectations of a High Quality Sound System.

Expected Quality & Performance Traits	Affected by System Design & Installation	Affected by Operator Knowledge & Training
Sound Good	•	•
Be Durable	•	
Easy to Use	•	•
Within Budget	•	
No Equipment Failures	•	
No Feedback	•	•
Does Not Distract	•	•
No Missed Mic Cues		•
No Problems		•
Not Too Loud		•
Not Too Soft		•
Intelligible Speech	•	•
Clear Music	•	•
No Complaints	•	•

## Install-It-Yourself or Call in The Pros? Worth the Liability?

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I mean, I know what you're thinking. You're ready to renovate the sound system in your worship center, and you're starting to get concerned about how expensive equipment is these days. Or maybe you're finally embarking on that new construction project and facing the challenge to ensure the needs of all the individual ministry areas are addressed within the shrinking budget. So you've been looking for a way to trim costs. If only you could install the sound system yourselves. I mean, it couldn't be that hard, could it!?!

Well, could it!?!

If the results of your last MRI came out fine and you're still thinking about installing your own sound system, please develop a contingency plan now for all of the things that are going to go differently than you plan, because trust me – they will. Step back and think it through before your eagerness gets the best of you.

What are you going to do when things go wrong? No, really. Tell me what you're going to do. Because if you're installing the sound system yourself, you ARE the sound contractor. It's your job to make sure the installation and every device in the project is working correctly and installed properly. You are the individuals taking responsibility for the liability should those heavy loudspeakers ever fall. And if you're like most houses of worship, you're not only installing the sound system, you're also installing the video system, and the stage lighting system, and...the size of the task can mushroom beyond your wildest expectations in no time.

Do your best to step away from the project long enough to see the big picture, and then ask yourself – is it worth it!?! Look, I know your team will end up with an award-winning sound system despite my rant here. But, just humor me. Tell me you're at least going to consider hiring a first rate Sound Contractor to install your next sound system. It will make me feel better.

See, I'm more relaxed already. Now, let's move on to budget.

## Pulling a Budget Figure Out of Thin Air.

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You think I'm joking. I've actually had religious leaders, building committees and architects admit to me that they chose the budget figure for the sound system "because it sounded like it should be enough". In other cases, they based the budget off of a figure for the sound system from a previous project, not realizing that the previous job had completely different technical requirements. It's done out of expediency and ignorance of the facts. Both approaches invite frustration and an inadequate sound system. Why not just get the facts first?

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*If... you're still thinking about installing your own sound system, please develop a contingency plan now for all of the things that are going to go differently than you plan, because trust me – they will.*

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Here's an important point to plan for. Don't be surprised if the projected cost of a quality sound system is more than your committee anticipated. In fact, be pleasantly surprised if you get it right

the first time. On a new construction project, a reasonable rule of thumb is to set aside at least 15% of the construction budget to cover the cost of the sound, video and theatrical lighting systems.

I can feel it. You're about to ask me how much a sound system should realistically cost, aren't you? Sure, make *me* the heavy! Oh well, I'm used to it. The problem is that's an unanswerable question. The variables are too numerous to answer it. How large is your sanctuary? How high is the ceiling? How many seats are there,

### One Budget Does Not Fit All.

I remember my recommended budget figure for one project being vigorously challenged by the General Contractor, whose wife had visited a similar church in another state and had come home with the news that they had spent a certain amount for the sound system, had not needed any acoustic treatment and everyone was happy. Through a little investigating of my own, I realized that the sound contractor on the project was an old friend, so I called him to ask about these claims. He broke out laughing at the story. Turns out what the GC's wife didn't know was that the church had brought several major pieces of their old sound system with them to be installed as part of the new church building, including their large sound mixing console, their entire stage monitor system, microphones, stands, cables, and so on. She also didn't realize that the church leadership was actually very disappointed in the room acoustics. As it turned out, the people she was talking with didn't know the whole story. And that's not uncommon.

and how are they arranged? Does the room sound good from an acoustics standpoint? What style of worship music is performed? What musical instruments are used for that worship style? How loud do you want your music services to be? The list goes on and on. You need a capable designer to help you work through those details in order to arrive at the optimum solution and best choices for your available budget.

And remember that the budget figure for the sound system equipment and installation does not include the infrastructure to support those systems, nor does it account for construction techniques or materials related to the room acoustics. Conduit, technical power, and additional air conditioning requirements to keep the amplifier rack or lighting dimmer cool can add up quickly and often catch the uninitiated off guard. Also, remember that the theatrical lighting fixtures themselves will add to the heat load of the auditorium as well.

#### Budget vs. Expectations.

Whether they realize it or not, each member of your project team, house of worship staff, your musicians, your tech team, and some members of the congregation may have a preconceived notion of what the new system will sound like, look like, and even how much it should cost.

Your congregation has likely given sacrificially toward this effort. In their mind, they have charged their leadership with the task of bringing this project to life while staying within budget.

The design phase is moving along great, everyone on the project team is excited about the future. And then the day comes when you learn that the budget figure for the sound system

needs to be scaled back. You find yourself between a rock and a hard place. Even as the cost of everything from steel to copper to tar rises over the course of the project, your congregation's expectations of what the finished project will look like or sound like don't change. Who will manage their expectations when the budget is scaled back?

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*You need a capable designer to help you work through the details in order to arrive at the optimum solution and best choices for your available budget.*

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Trimming the budget, by definition, trims the equipment list, and may lessen the sound quality of the finished result if not handled properly. A seasoned sound system designer has the experience to trim features, not quality; to make strategic adjustments to the equipment choices that will have the least impact on the sound quality of the finished system. And they can explain to you what you are giving up by making those changes.

For example, rather than downgrade the quality of the main loudspeakers, consider using your existing sound mixing console for a season rather than replacing it right away. It's easy to add a new sound mixing console or other device later. However you may find it difficult to replace the main loudspeakers at a later date.

Resist the temptation in the building committee to make arbitrary cuts. Instead, trust your sound system designer to develop either an alternate solution or a plan to prioritize the purchases in a way that retains as much of the quality on Day One as possible.

## **A No Surprises Project Schedule.**

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Once you have decided to get a new sound system, you may be surprised to learn that it can take several weeks before you can realize that dream. Let's say that you're ready to upgrade your existing sound system. You've engaged the services of a capable designer. Then what happens?

Depending on the complexity of your design requirements and the current workload of your designer, their work on your project may take anywhere from three to six weeks to complete. At that point you will have in your hands the set of CAD drawings and written specifications that detail the sound system design. These comprise the bid documents that can then be sent to a handful of pre-qualified Sound Contractors who are capable of installing the system.

You should allow a minimum of two weeks for those companies to develop and return their bid to you, more if the system is very complex and/or if the project involves more than just a sound system. (If you choose to work with a design/build sound contractor, you can forego this bidding process, although it may take just as long to negotiate the final equipment list and settle on the price.)

Once they are all in, it may take your project committee a week or more to comb through those bids (with the counsel of your Consultant) and choose which company should be awarded the project installation.

When you are ready to proceed with the project, the Contractor will request a deposit check (usually 1/3 to 1/2 of the contract amount) to engage their services for the project. They do not typically stock the equipment required for your project in their inventory, so with your deposit in hand they will start to order that gear.

Depending on the product in question, delivery time could be just a few days to as much as six weeks, and sometimes longer if it's a newly released item or in high demand. The bottom line is that, since each manufacturer is different, you should plan your schedule to allow at least six weeks for the Sound Contractor to receive all of the gear for your project into their shop.

Their installers will be on site as soon as the building is ready for them. That can be right away if you are not renovating your auditorium as part of the upgrade. On a new construction project, they will usually start after

the building is closed in and the AVL (audio-video-lighting) conduit is in place. Their first trips will likely focus on establishing the rigging points in the ceiling from which the main loudspeakers will be suspended, and possibly to run all of the wire through the conduits and across the ceiling.

The installation schedule requires a lot of coordination either with scheduled services and events and/or with other trades on the project. Assuming your chosen Sound Contractor is a well respected company, you can expect that their installers are running from one job to the next. Their project coordinator will hopefully have the install crew for your project scheduled to be on site soon after all of the equipment is delivered to their shop.

The most sensitive technical equipment, like the sound mixing console and CD players, will be installed only after the room is essentially complete, all painting done, carpet installed, etc. In other

words, only after the primary culprits for creating dust that might settle on the gear and ultimately cause failures have been eliminated.

With all that said, you begin to realize that from the day you engage the design for your new sound system to the first worship services that you enjoy using it may be anywhere from 60 to 120 days for a renovation project. Of course on a new construction project the sound system installation will track along with the building construction itself.

Let's say that you have decided to renovate the sound system in your existing auditorium. Here is an idea of how the schedule might look using a Consultant to develop the design, and a Sound Contractor to install the system. The schedule is basically the same if you choose to work with a Design/Build Sound Contractor instead. Note that this is a fairly aggressive schedule, with little room for error.

### Sound System Renovation Schedule.

Time Before First Worship Service	Action Step
14 Weeks	Hire the System Designer
10 Weeks	Approve Design / Release Bid Documents to Contractors
8 Weeks	Receive Bids from Contractors / Award Install Contract
7 Weeks	Deliver Deposit Check / Equipment Ordered by Contractor
4 Weeks	Installers on Site (Pull Wire, Establish Rigging Points)
3 Weeks	Position Loudspeakers, Start Connecting Equipment
1 Week	System Commissioning / Loudspeaker Voicing / Sound Checks

## Who Drives the Project?

The myriad of details involved in completing a sound system installation are enough to make one's head spin. Good communication is pivotal to a successful project. Toward that end, you may find it helpful to identify one individual on your staff to serve as the Project Manager. This individual serves as the primary contact point, as the liaison between the Owner and the other parties involved – the Consultant, the Systems Integrator, the Construction Manager, the Architect, and other trades.

## Who Gets to Drive the System?

To “train” is a verb, and it means to *teach a person a particular skill through practice and instruction over a period of time*. Your musicians have been instructed in how to play their particular instrument. If they are accomplished musicians, they have practiced their instrument for countless hours over many years to reach that level of skill. And of course your congregation is blessed whenever they hear them play or sing.

So are you blessed when you hear your sound tech mix a great worship service? If not, I hope you'll remember that phrase “instruction over a period of time”, because becoming a skilled sound mixer doesn't happen overnight either. Rather than hire a trained professional sound tech, most houses of worship still today depend on their volunteer sound operators who very likely do not have training in driving the sound system that parallels the training that your musicians have, and yet they are expected to deliver a polished, high quality mix every service. Does anyone else see the problem with that?

If your sound techs don't have the seasoning you expect of them, be prepared to continue investing in them for the long term. It's not unlike learning how to play the piano or guitar. You didn't master your instrument in a few weeks did you? And did your parents have to get after you to remind you to practice every day? Compare what you sounded like during your first music lesson with how you could play after a year of lessons and practicing daily. And what did you sound like after ten years of lessons? In the same way, becoming a sound mixer requires that kind of understanding and seasoning that is only developed over a period of years.

There are ample opportunities to train sound team volunteers today. However, it does cost money. Rather than expect your sound team volunteers to pay for that training on their own, wouldn't it be appropriate to channel some funds annually from the operating budget to honor the commitment of time and dedication that your volunteers have given tirelessly over the years by providing a means for them to receive that training?

## **Summary**

We've reached the end of this conversation today. We've talked about a lot of details and made some important distinctions. And while all of them are highly valuable points to remember, if you were to ask me what one thing I hope you will take with you, it is the concept that a quality sound system is a genuinely important investment in the future of your house of worship, and a tool that equips and enables your leadership to more effectively minister to your congregation.

Now, go forward and rest in the knowledge that you can achieve technical excellence in your worship services. Remember that the first priority of your new sound system has to be the loudspeakers. Properly chosen loudspeakers installed in the right location and tuned for the best sound quality by someone who truly knows what they are doing are the key. Make sure you get that part right, and the rest of it will follow.

Realize that achieving this goal is a process, not an event. Use the recommendations offered in this paper as a guide. Remember that working with a design professional can ensure that you acquire the right system for your needs the first time. Then once the new sound system is in place, please follow through by investing in training for your sound techs as well.

*"Is Sound Quality Important in a House of Worship? And if So, How Do You Achieve It?" was sponsored by Bose Professional Systems Division. To contact Bose Professional Systems Division, please call **800-428-BOSE (2673)**.*

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