WALLY DUGUID

A Church Audio Checklist

ONE OF THE BIGGEST CHALLENGES for a local church sound committee is knowing which questions to ask when working with a system designer. Often, options for functional and technical features are not suggested and at times, the architect and consultant do not even approach the users for their input on the design.

The committee unwittingly approves and purchases a system that in some way is not completely suited to their particular needs.

In our contracting business, a simple, but fairly comprehensive checklist is provided to prospective clients to expose them to the field of available tools and techniques useful in quality sound reinforcement. Some explanations of basic concepts are included. The end result is, hopefully, educated consumers confident of their ability to make accurate choices and who are pleased with the final product.

There are a number of considerations to address when planning a new sound reinforcement system, just as there are when constructing a new building. Four main areas which determine the system's design are:

(1) The environment. What is the physical layout and, more importantly, the acoustic character of the room?

(2) The type of reinforcement desired. Do you want a subtle assist to the natural acoustic performance, or a system where the program's primary link to the audience is through the sound system?

(3) The type of control and functional flexibility desired. Does this system function with or without an operator, or should it do both? What kind of things would you like to be able to do with this system?

(4) Cost. What is the budget allowance and is it realistic in terms of the first three areas?

Within those areas are, of course, many sub-considerations that will be addressed when the design process is underway. The design of the acoustic interface, involving the selection of speaker components and their orientation with respect to the audience seating, is the most important aspect of the system design. The success or failure of the system's performance hinges on this critical factor.

The designer must consider the type of musical and spoken material to be reinforced, the acoustic properties of the room, the requirements of the listeners, as well as other considerations such as operational complexity and budget.

While the acoustic interface and the electronic design are best handled by an experienced sound system designer, the functional aspects of the system have to be chosen by the users. A partial list of considerations follows. Some of these questions do not have simple answers and may require guidance from an experienced designer. This list should help you in thinking about some options that are available and possibly help identify the direction you would like to go in terms of function. Some of these questions relate only to an existing facility, and some to new construction. You decide.

1. TYPE OF REINFORCEMENT PHILOSOPHY

Will this system be invisible and provide subtle enhancement to a predominantly acoustic program or does every instrument, voice, or group of voices need amplification,

or should there be a blend of these two approaches? Is there another facility you know of which has the type of system performance you are looking for?

2. TYPE OF PROGRAM

Will speech, classical music, contemporary music, pre-recorded playback, or video reinforcement be the predominant material in use?

3. PEOPLE

Who uses this system besides the principal preacher/teacher? Musicians, class or seminar teachers, dramatic or touring groups all have special requirements that could be addressed by this system. Have they been included in discussions regarding function?

4. WHY

Do you really need a sound system? Or do you need a new one? Are the existing problems with the old system easily corrected by a professional who can fix a bad design with little capital outlay?

5. DESIGN PHILOSOPHY

What decisions are being made for you by the architect or consultant that you should have some input on? Can you meet with them to discuss all of your needs and how to implement them?

6. ACOUSTICS

Was a plan check and acoustic model executed (or measured) prior to the design? What are the particular acoustic properties of the room, are there problems relating to coverage and intelligibility, and are they being addressed at the source (acoustic treatment) or symptomatically (with electronics)? Is dis-

satisfaction with the old system an electronic or acoustic problem?

7. NUMBER OF INPUTS

How many microphones, keyboards, tape players and instruments do you want to control? What about future expansion?

8. MICS

Who uses mics and where are they used? (Pulpit, lectern, lavalier, wireless, choir [how many?], piano, organ, soloists, baptistry, direct boxes for electronic instruments and congregational response are several examples.)

9. NUMBER OF MIXES

How many different speaker systems do you want separate control over? Sanctuary, choir monitors, pulpit monitor, soloist monitors, instrumentalist monitors, radio/television feeds, tape recordings?

10. MAIN HOUSE SPEAKERS

A central cluster covers the congregation and sounds best in most sanctuaries. How do we make it visually attractive? If a cluster will not fit in a particular room, what are the alternatives and their drawbacks?

11. DELAY SPEAKERS

Are there areas the main house speaker system will not reach? (Under the balcony, transepts, and so on.)

12. NON-HOUSE AND OVERFLOW SPEAKERS

Where do you want speakers besides the sanctuary? (Nursery, cry room, foyer, bride's room, hallways, offices and fellowship hall, for example.)

13. PERMANENT MONITOR SPEAKERS

Do you want monitor speakers in the choir, pulpit, pastoral seating, or hidden monitors in the stage or platform?

14. PORTABLE MONITOR SPEAKERS

These can be used for soloists, choral groups, or special programs. Do you want to finish these in black, wood grain or carpet to match the decor? What about headphones for musicians?

15. EFFECTS, SIGNAL PROCESSING

Do you want to use reverberation or other electronic effects devices (limiters, companders, gates, de-essers, processors)? How about operator training for these?

16. MIX LOCATIONS

The best position for the sound system operator is in a seat where he or she hears what the person in an average seat hears.

Where is the optimum place that would allow practical operation of the system without being too conspicuous from a visual perspective?

17. MIC LOCATIONS

Where would you like to connect mics around the altar/platform area, or have a special location for a bell choir or instrumental performers? What about film or video sound inputs? Is there any need for extra long mic cables?

18. MONITOR LOCATIONS

Where would you like to connect portable monitor speakers? Where should permanent monitors (for example, choir) be located and how should they be trimmed out? Can they be made invisible?

19. RACK LOCATION

Is there a convenient closet or utility area in the vicinity of the altar for placement of the power equipment rack? Is it near convenient electrical power and can it be ventilated?

20. MEDIA MIX LOCATION

Where should the radio or TV audio mixer be placed? What about access and visual monitoring for the operator? Where is the physical interface point for TELCO or microwave connections?

21. RECORD AUDIO

On what type of machines (cassette, reel to reel, R-DAT) do you want to record messages, meetings, or weddings? Do you have a need for a multi-track machine?

22. RECORD VIDEO

Do you want provision for video recordings? Where do you want connections for consumer VCRs?

23. PLAYBACK

Is there a need for playback of pre-recorded tapes? Do you need to connect film or video projectors to the sound system?

24. INTERCOM

Is there a need for communication facilities between parties at various locations like pastoral seating, instrumentalists, sound mixing area, usher station, choir room and so on?

25. HEARING ASSISTIVE

Are there members of your congregation who would benefit from the use of a system for the hard of hearing? Should it be an infrared or radio frequency system? What style of earpieces would the users like to have? Should the users be allowed to purchase their own receivers for convenience?

26. OPERATORS

Is this a system that should have an operator during each public meeting, should it be a set-it-and-leave-it system, or is there a practical way to make it function for both?

27. DEFAULT CONTROL

A default control brings the system up to operation with a few basic mics to pre-set levels. This feature allows the use of a complicated system when an operator is not available, as in the case of a weekday funeral or seminar. Is this necessary or is it possible to have the operators leave some controls at nominal positions for this purpose?

28. PATCHING, TIE LINES

Do your operators have need of and the ability for the inclusion of a patch bay?

29. SECURITY, ACCESS

Should access to the operation of the system be limited by locking cabinets? Should it be tamper-resistant or vandal-proof?

30. CABINETRY

What style of cabinet should be incorporated into public areas? Do you want the consultant or design

firm to submit a design or build from yours?

Should the architect be involved in this design? Does the fire marshall have any interest in access and egress that this cabinet may interrupt? Where can you see samples of cabinets done for other installations?

31. POWER

Do you have a particular choice of a local electrician to supply the electrical power circuits for the system? Does local ordinance require a permit to provide the power for this sound system? Some touring groups carry sound and lighting that requires a connection to 100 or 200 Ampere single or three-phase power.

Would it be practical to have the electrician install a disconnect panel convenient to the stage/altar for this purpose? Is there a potential need for power line conditioning or surge protection? Is there access for an adequate ground source?

32. REMOTE CONTROLS AND INDICATORS

Are there any special custom controls or features you might want on this system, such as remote indicators for wireless mic transmitters, remote projection screen controls, provision for MIDI (Musical Instrument Digital Interface) connections (or other digital interface-RS-232, 422, etc.), or SMPTE time code in order to automate sound or lighting systems?

33. BUDGET

Is there a proposed budget set for this project? Is there consideration for the cost of a comprehensive technical power supply?

34. TIMING

When should this installation be completed? Is there a construction or remodeling project that it should be coordinated with, or a special or seasonal program that needs a new system?

35. PERMITS

Are there building or other permits required by local ordinance for the wiring or structural aspects of this system?

36. WIRELESS MICS

Would one or more wireless mics be useful in this application? Would it be practical to interface a receiver to multiple sound systems (for example, sanctuary and fellowship hall) in order to use the same mic in either room if desired?

37. ACCESS

Is there adequate access to areas needed by the contractor in which to pull cable, mount connector plates, hang speakers and reach cluster components in the future for service?

38. LIGHTING

Is there adequate lighting for the operators? db

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AUDIO FOR THE CHURCH

• Music in worship has changed in the past decade due to a rise in contemporary Christian music. The change has passed the typical quartet to include all musical styles. With this growth and diversification, the typical column speaker and mixer amplifier are being replaced by sound systems with full range, including high powered sub-woofer systems and satellite clusters with digital delays. Churches are bringing in musical groups that have stage shows with riders equal to secular groups with a comparable following. These riders include 32 and 40 channel sound consoles with enough power to handle 90 to 100 decibels at the mixing position, and lighting rigs with computer controllers. Many churches have incorporated these type of concerts into their music programs. In order to reduce the cost of bringing in such concerts, churches are upgrading their sound and lighting systems to meet the requirements of these events.

Churches use sound and lighting systems to make an impact with their message. Easter presentations are becoming well-thought-out and executed productions, relying on current technology to add realism that has been viewed on Broadway or the silver screen.

To meet the needs of church programs, concert halls are converting their venues into houses of worship. Some churches' Easter and Christmas programs, for example,

Figure 1. Sound and lighting is important to church productions. This is at the Columbus Convention Center in Columbus, Ohio.

have outgrown their walls due to production and attendance size. Likewise, when concert halls are not being rented by the local church, the local or regional concert promoter is booking the hall for Christian rock or rap concerts, also known as "music with a message."

THE XENIA CHRISTIAN CENTER OF XENIA, OH

This church is known locally for its concerts. In the past, many visiting artists were traditional southern gospel groups which usually do not require the same type of systems required by today's mainstream Christian music. Xenia Christian Center found their sound system inadequate to handle new programs, and was forced to rent a hall. The church eventually called upon MS Entertainment of Dayton, OH, a sound and lighting rental and sales company that works with medium-to-large concert facilities and has also worked with many national acts. Xenia Christian Center

found itself regularly renting sound equipment and lights from MS Entertainment, so the church decided to purchase a sound system that would meet the needs of regular worship and provide the extended performance requirements of special service programs.

Allen Day, Xenia Christian Center's technical director, and John Youker, owner of MS Entertainment, devised a plan to install a sound system that would be acceptable to the riders of national recording artists; would be flexible and have high intelligibility for regular service; and would be affordable. These requirements were not ranked in priority.

THE EQUIPMENT

The head end of the designed sound system was a Soundcraft 32 channel Delta 200 console. The processing equipment included an Electro-Voice 2710 for the house EQ, an E-V XEQ-3 time-alignable crossover that fits into a Crest 8001 for the sub-woofers, a QSC MX1500 for the mids and an E-V 7300 for the highs.

Youker custom-built the speakers to match the church's interior. The speakers were E-V Delta Max clones using E-V components. The sub-woofers, also E-V components, were built into the platform, and used four 18 in. drivers to drive the low end needed for concerts and

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special music presentations. Outboard processing gear selected was a quad gate from Furman, dbx 160s and a dbx 166. Reverb effects and digital multi-effects processors were selected from Applied Research and Technology and Alesis. A Telex "hard of hearing" system was also installed for regular services. The congregation's response was overwhelming!

Once the system was designed, the church decided to have a volunteer from the congregation help install it to save on cost. I strongly suggest not using volunteer church labor to install a sound system; in my experience, it almost always ends up costing much, much more than is saved, as there is more to installing a professional sound system than there is to installing a home stereo system.

Another example of integrating church programs with hi-tech sound equipment is Stage Tech Inc., of Columbus, OH, who "converts" concert halls into high-powered churches. When I visited Stage Tech, the stage was being set

Figure 2. One of the speaker racks on stage at the Columbus Convention Center.

for Christian recording artist Whiteheart and Steven Curtis Chapman and Band. Stage Tech, who has been associated with Whiteheart's world tours for the past five years, was in control of sound and lights.

The tours use double lighting trust, a 96 channel microprocessor lighting console, 40 channel house, monitor boards and a house speaker that could be found at the Columbus Convention Center at any secular rock concert.

Bill Mayerchak, a Stage Tech sound engineer, took control of the house mix for Whiteheart's concert that evening. The system was headed up by a 40 channel Yamaha PM3000 that drove White 4400s and Crown crossovers. Crown Macro Tech amplifiers drove the custom-designed house speakers that used a JBL sub-woofer, E-V mids, horns and JBL high frequency drivers. (Stage Tech is looking to make an expansion in their house speaker arsenal and is testing concert boxes from Eastern Acoustic Works and E-V, as well as their own new design.)

IN CONCLUSION

The next Whiteheart tour will be a show to see! There will be the technological improvements in the house speakers, and Stage Tech is experimenting with putting the upcoming tour in quadraphonic sound.

"The latest Whiteheart album has such phenomenal layering of both synthesizers and vocals, that quad is the only thing that can do
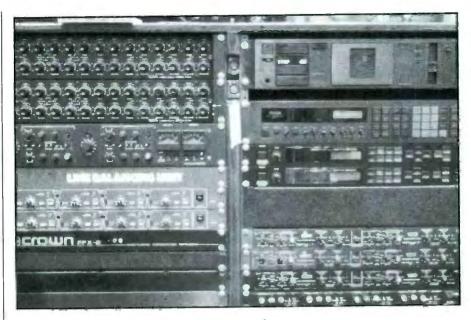

Figure 3. The Stage Tech equipment rack.

the live sound full justice," said Dave Mead, owner of Stage Tech.

With the possibility of Christian musical groups using quadraphonic systems on their tours, and churches bringing in large scale music and drama programs, the

need for sound systems that was once limited to larger secular arenas (pun intended) is becoming commonplace. This brings up having knowledgeable people to operate these systems, which will be addressed in detail next issue. db