

# AUDIO FOR THE CHURCH

0101010101000001 audio, or digital, is this issue's topic.

• Digital is where audio, video and communications will be in the future. Digital audio, video and communication, in general, are already in digital format, but you need to know the basics of digital audio so you won't be left behind.

Digital audio is all around us: in telephone answering machines, voice-mail boxes, camcorders, and yes, even our churches. CD players are already being used by many churches for choral and other accompaniment tracks, while Christian recording artists are including DAT (digital audio tape) machines on their riders for concerts.

Word Music Inc., one of the leading music producers for the Christian market, plans to increase their CD accompaniment tracks for their choral music by 76 percent, this year over last. The advantage is increased sound quality; the clarity and definition of the music can't be touched by analog media in mass duplication.

There are additional advantages as well. For example, Word Music Inc. has added a feature to their choral CDs that allows the choir director to cue the music at different sections. Suppose the choir starts with a verse and has trouble going into the chorus. The director can instantly go back to the start of the chorus with a few key strokes of the CD player. This is accomplished by noting each section of the song with its own track number, and it is also marked in the music. Consequently, the verse would be track 32, the chorus track 33. In this case, the song is track 32; track 33 and other track numbers in

that song are called cue points. What this means is if you want to play the entire song, the director would only select track 32 and play it until ending, while for rehearsal purposes, the director would choose the track for the particular section of the song to be practiced.

There are disadvantages, however, to being able to cue each section. If you want to play the song that is on track 32 and then play it on track 1 via the CD player's memory selection, the CD would only play the section attached to cue number 32 (which, in this case, is also the song number), and then play song number 1, while only playing that section attached to cue point number 1. This is a perfect case for a DAT machine with digital outputs because you can record the two songs in the order you want, much the same way you would change the order from an LP to cassette. The exception is you can transfer the information out of the CD player's digital outputs and go into the DAT machine's digital inputs while losing no sound quality.

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Personally, I would buy my accompaniment tracks on CD because it is a much better long-term storage me-

dium. I would put my working copy on a DAT machine (tape). For this reason, DAT machines are a natural for a church because they come available with recording tape standard in 46, 90 and 120 minutes, with no need to "turn" the tape over.

## DIGITAL AUDIO

After audio is converted from analog to digital, it's digital data, the same data used in your computer. Suppose you plug a microphone into a DAT machine; the mic takes the acoustic sound and changes it into an electrical AC voltage (which is still analog). It then goes into an analog-to-digital converter which changes the analog AC voltage into digital data. Therefore, the DAT machine is not recording analog audio, but data.

Because the audio is now data, you can do various things with it and virtually never lose any quality in the audio as you would with analog duplication. With an analog signal, you have to process the sound by going through another circuit which increases noise and otherwise degrades the signal. With digital, you change the data, or the arrangement of the bits of data, but not the audio signal itself.

This brings us to my favorite way of using digital audio relating to church worship—putting the analog to digital converter on a computer, having the computer record the service, editing the program material on the computer and storing it on a DAT machine (which will be your master for duplication). By using a

computer for editing, you can actually see the audio on the computer screen (providing you have the appropriate software), and have the ability to edit out a word, noise, or any unwanted sound while leaving the program material you want intact. If you make a mistake, simply *undo* the edit and start over.

## DSPs

Digital audio and video capabilities are moving faster and faster every day, due to the development of DSPs (Digital Signal Processors). DSPs let you purchase a card for your computer to make it a complete multi-track recorder, editor and editing system for just a little more money than a similar analog system. It's even less expensive if you use the computer for accounting or other functions, when not recording. You would now have the all-in-one workstation—office by day, recording studio by night.

Our next topic is digital control. With money for community centers diminishing, churches are becoming more than a place to worship by adding education, health and reception/dining facilities to their property. As the facilities grow, the demand for audio becomes greater. This presents problems, such as having people that are dedicated, or have the time, to operate the different sound systems. I know from experience that churches use their facilities simultaneously from Wednesday night on through Sunday. This creates a second problem as this requires multiple sound systems, which can be very costly, besides having someone to make sure they are set up and running properly. When dealing with volunteer labor who have other jobs and families, the time needed to be devoted to the sound systems can add up to virtually that of a second full-time job.

## INTEGRATED SOUND SYSTEMS

The answer, however, is within reach—using integrated sound systems with digital control. There are two companies making great headway into these types of systems: IED of Louisville, KY, and Intelix of Mad-

ison, WI. IED manufactures turnkey computer-based systems, including automatic mic mixers, processing equipment and amplifiers that can run the audio for a complete facility in one- or two-track frames in a single location. Intelix provides similar control and interfaces with your everyday off-the-shelf equipment. IED interfaces with non-IED equipment via the PA-422 serial computer interface, making it useable with other equipment besides IED.

Intelix' system, MIND (Master Integrated Network Device) Control System, is used as a central information and control center for the facilities manager. These systems include audio, video, HVAC, fire, security and computers that can be operated by a single computer from the facilities manager's office. This enables him, for example, to select a room to be used for a meeting and have the heat and audio systems turned on for use 30 minutes before the actual meeting starts.

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IED has introduced a system named UDAPS (Universal Digital Audio Processing System) which is capable of taking up to 504 inputs, changing the mic or line from analog to digital, and then processing each input, such as EQ and digital delay, with a different setting to any or all of the 504 outputs in groups of eight. IED's turnkey audio systems enable you to combine rooms, automatically mix mic and line inputs, and raise and lower the output level according to the ambient noise level of the room(s) being combined. The computer screen IED provides will display an architectural layout of the facility, and show the status of each room.

For example, suppose you have four rooms next to each other, divided by some sort of folding walls, each room with its own color. The rooms you want to "combine" will be

the same color on the computer screen, and the computer system will automatically change the configuration of the inputs and outputs to make all mic jacks in the combined rooms active within that configuration. If you were to combine rooms 1 and 2, then all mic jacks in both rooms will be active, and no matter which room the mic is plugged into, it will play through the speakers in both rooms.

The IED system can combine rooms and turn on or off any input or output at any time in the future. If the pastor decides he wants to hold a conference in rooms 1 and 2 on July 6, 1995, the audio person can set the time and date in the computer and program it to turn all mic inputs off except mic input No. 6, combining the rest of the audio. In four years, the system will automatically combine the amps and speakers in rooms 1 and 2 while turning on mic No. 6. The mic will be raised or lowered, depending on how loud the pastor talks into the mic, and the output will get louder or softer depending on how loud or soft the room is at any particular time during the conference. If the pastor tells a joke and the audience laughs, the sound system will raise the level in that room only, while the level of the system will go down accordingly after the laughter dies down.

An advantage to this type of system is that conferences can occur simultaneously, but its best feature is that it can provide precision automatic system operation without an operator, without someone plugging in a mic at the time of the conference. The IED system also has an alarm that sounds when a component of the system fails, and it will tell you exactly what failed, thus eliminating down time for troubleshooting.

More systems like IED and Intelix will come about in the next few years, so if you are planning a new facility, it would be worthwhile to find out which of these systems would be optimum for your church. Systems like these can only be found either at electronic systems companies or with sound contractors. 