

Welcome To

THE USER'S GUIDE TO

NATHAN SEIFER

AUDITORIUM

This document was written by James Feinberg in 1997 as his Senior Honors Thesis. It began as a proposal to buy some new lighting and sound equipment for Nathan Seifer, but it quickly became apparent that something more than just equipment was needed. There needed to be instructions for the people who would use the equipment so that neither they nor the equipment would get hurt. From came the idea for a "User's Guide," which evolved into what you see here.

The guide is divided into sections, one each for Lighting Designers, Sound Designers, Stage Managers, and Technical Directors. There is also a section for things that apply to more than one group, including opening up Nathan Seifer. At the end there is a list of where to buy the supplies you need, and a section describing the equipment changes that were made and improvements that can be done in the future. Finally, there are copies of the manuals for the sound board, the MiniDisc player, and the amplifier.

I hope that you will find this useful and that it saves you some time and aggravation in working in the less-than-ideal conditions that are Nathan Seifer.

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SOUND DESIGN IN NATHAN SEIFER

Sound is a field that is just now beginning to come into acceptance as a serious design element in the theater. Few directors fully understand its potential to influence the audience's perception of a production. But a carefully crafted sound design can offer a show elements that no other design medium can approach. In some productions, the silences can be just as powerful as the sound.

This guide will focus more on the technical aspects of producing a sound design than on the artistic. If you are taking on the daunting task of creating a complete sound design, I highly recommend seeking out Professor David Wilson in Spingold. He has been working in Sound Design at Brandeis since 1984, and is very talented. He offers an undergraduate class in Sound Design, and if you have the chance to work with him on a show in Spingold, you shouldn't pass it up. Professor Wilson can also recommend some good reading on the subject, including one of the books used in his class, *Sound and Music for the Theater* by Deena Kaye and James LeBrecht.

Sound in the theater can take many forms for many tasks. It may be as simple as pre- and post-show music for the audience's entertainment and to set the mood for the show. Or it may be as complex as an original composition to underscore the entire performance. It can also include live and recorded effects to motivate action and to set the scene. And it may include using microphones and voice processors to affect the sound of an actor's voice.

Just like a Lighting Designer, a Sound Designer must start by reading the script several times and developing an emotional response and a design concept. This concept, along with your meetings and discussions with the Director and other designers, will form the framework on which you will build your sound design.

In reading the script, you should look for textual clues indicating what sound effects are called for in the show. You are in no way bound to these cues, but they can provide an excellent starting point. Look not only for cues in the stage directions, but also in the actors' lines. For example, if an actor enters from the garage, it would be logical to consider including a recording of a car parking in a garage.

You may also want to include music to underscore a scene, or to mask a scene change. Most shows will also call for preshow music and sometimes curtain call and exit music.

Assemble this list of cues into a preliminary **sound plot**, including the page number, the effect you are considering, and any notes you might want about the action on stage or other motivation for the cue. Eventually, this plot will grow to include cue letter, page number, cue name, description, playback source and track, duration, speaker used, level, and fade time. Most of this information will not be available until much closer to the production, so just start with the essential information that you will need to begin assembling your music and effects sources.

BUILDING A SHOW DISC

Once you have a list of what cues you will need in the show, you are ready to start putting together a show disc. Put simply, a show disc (or discs) is a MiniDisc containing all of the cues used in a production. The first step in assembling a show disc is picking out sources. If you are including music, either preshow or in scene changes or even underscoring, you should spend time in the various libraries in the area, especially the Waltham Library, listening to recorded music. Bring a portable CD player to the library and just pick out discs at random. You can also use the Brandeis library computer system (LOUIS) to connect to the Boston Library System and Minuteman (suburban Boston-area libraries) to search for different kinds of music. If you are using recorded effects, look in the BBC sound effects library in the Brandeis library. You might also want to contact the Special Productions Director at WBRS and ask to use their collection.

As you are picking out recorded effects, try to create the story behind each cue. If you need a recording of a car horn, decide what kind of car is honking. Is it in traffic? Are there several horns? Is it honking to get the attention of a pedestrian, or because another car just swerved into its lane? If you need a bird chirping, what kind of bird is it? Answering these kinds of questions can make the difference between just some sound effects and an integrated sound score for the show.

Using the preliminary sound plot, you will need to make choices about which playback deck (MiniDisc or cassette) each cue will be recorded on. Generally, it is better to use the MiniDisc whenever possible. There may be times, however, when two cues are very close together or you want to crossfade from one cue to another, and the operator needs to be able to set up one cue while the previous cue is still playing. In that case, one cue will need to be on the cassette deck (or another MiniDisc, if you have one available). You may also want to put long cues, such as preshow music, on cassette to conserve space on your MiniDisc. This will allow you to avoid changing discs in the middle of the show, eliminating one potential problem and making the job of the sound operator much easier.

It is a very good idea to make backup copies of all MiniDiscs and cassettes that are used in the production, in case something happens to the originals. Especially with MiniDiscs, if the playback machine overheats or otherwise malfunctions, it is not uncommon for the disc in the machine to be damaged and become unreadable.

WRITING CUES AT TECH

Unlike the Lighting Designer, who must wait until the lights are focused onstage before he or she can write cues, most of the Sound Designer's work is done long before the show enters tech. Decisions like which speakers to use for what cue have already been made, and all that remains to do is to set the level at which the cue will run through the sound system.

Before tech, you should give your sound board Operator a list of cues including the cue letter, the source deck, the track number, the speaker assignment (remember, you can assign a cue to only one speaker, or both), and a brief description of the cue. Sound cues are generally referred to by cue letter instead of number to differentiate them from lighting cues and avoid confusion. If you need more than 26 cues, use double and then triple letters. You may also wish to skip some letters, such as I (which can easily look like a 1) or N (which often sounds like M).

During dry tech you will set the levels at which the cue will play during the show, as well as the speed of the fade into or out of the cue, if needed. Make sure that the ventilation system is off while you are setting levels, unless it will be on for performances, in which case you should have it on while setting cues. The operator will combine this information with the paperwork you gave him before to create a sound cue sheet for the production.

You will find at the end of this section a sample cue sheet. I recommend using colored pens or highlighters to mark the different input devices. For example, all cues that run on the MiniDisc could be marked in red, while all cues on cassette are marked in green and all cues with the backstage mic are marked in blue.

You will probably find that the levels you set during tech are too low once the show begins performing for an audience. This is due to the acoustical properties of human beings -- they absorb sound. It is a good idea to try to compensate for this by setting levels just a little bit higher during tech.

TECHNICAL INFORMATION FOR SOUND DESIGNERS

THE SOUND SYSTEM

The sound system in Nathan Seifer consists of four main components: the MiniDisc and cassette tape players, the mixer, the amplifier, and the speakers. To use the sound system to its fullest potential, you need to understand how the components work together. One way of explaining a system is in terms of the **signal path**, which refers to the path the signal (the electrical form of the sound) gets from your recording to your audience.

In Nathan Seifer, the signal usually begins at either the **MiniDisc player** or the cassette deck. These devices serve as your inputs. A microphone could also serve as an input device. All of your input devices feed into a **mixer**, which is the heart of the sound system. Using the mixer, you send your sounds to the right places at the right volumes. Coming out of the mixer, the signal goes to one or more **amplifiers** (or amp for short), which convert the line level signal produced by the mixer into a higher level signal powerful enough to drive a speaker. The amp in Nathan Seifer sends the signal to two **speakers**, mounted on the side walls near the front of the stage. The speakers convert the electrical signal into vibrations which we hear as sound.

When turning on the system, you should follow the order signal path. When an audio device is turned on or off, it will generally send out a signal spike. To protect the other devices, you should not turn it on until the devices that feed into it are already on. Thus, in Nathan Seifer, you would turn on the MiniDisc and cassette players first, then the mixer, and then finally the amplifier. When turning the system off, work backwards. Turn the amp off first, then the mixer, and finally the MiniDisc and cassette players.

USING THE MACKIE MIXER

Nathan Seifer is equipped with a very nice Mackie Microseries 1402-VLZ mixer, purchased in the fall of 1996. Mackie sent along a truly wonderful manual with the mixer, which you will find a copy of at the end of this document. It explains all of the nifty things you can do with the board (another term for mixer is "sound board") and even some technical things like a glossary of pro-audio terms, diagrams of various audio connectors, and a section entitled "Balanced Lines, Phantom Powering, Grounding and Other Arcane Mysteries". In fact, the Mackie manual is so well written that there is really no reason to say anything further in this section of the User's Guide to Nathan Seifer.

USING THE MINIDISC PLAYER

MiniDisc (MD) is rapidly becoming the playback medium of choice for Sound Designers. It offers more control than cassette, is cheaper and smaller than reel-to-reel, and is easier to use and quieter than both. MiniDiscs offer instant-start of cues so a designer can count on cues coming at the right spot every time, and auto-pause so that you don't need to worry that an operator will forget to bring down a fader before the next cue plays unintentionally. Newer MiniDisc machines also add the capability of very precise editing built-in to the machine, so some changes can be made on the spot in the theater. With

analog recordings, a change generally means a trip back to the sound studio after rehearsal and hours more work after everyone else has gone home.

To build your **show disc**, the MiniDisc or discs containing all of the cues for the show, you will need to schedule some time with the MiniDisc player/recorder. Nathan Seifer currently only owns one machine, so if there is another show using the deck for performances, this could be difficult. You can use the machine in the booth, which will let you use the Mackie mixer for more precise level controls and involves you bringing your source materials and playback units into the theater. Or you can make arrangements with the UTC coordinator and the other shows' designers to borrow the machine and take it to your room or wherever you are working.

You record music onto the MiniDisc just like you would onto a cassette or any other medium. Connect the output from the source to the input on the MiniDisc, press record on the MiniDisc, and then press play on your source. In that respect, it's pretty easy. Once you've got your cues onto MiniDisc, though, you can start doing new things. There is a copy of the MiniDisc manual at the end of this guide which explains in detail exactly how you go about executing the procedures described below.

The first thing to do is to divide each cue into its own track on the MiniDisc, if that hasn't been done already by the machine. (Each time you start recording from stop, it will create a new track number, and if the level drops to zero during recording, it will also create a new track number.) Tracks on MiniDiscs work the same way as they do on CDs, another advantage of MiniDisc over cassette.

Then you can start **editing**. It is a good idea to edit your cues so that there is no silence at the beginning. This way, when the operator presses play, the cue will go without pause. You do this by dividing the track at the instant the sound starts, and then deleting the first part (containing only silence). You can also cut off the end of the track the same way, as you might if the piece of music you are using is too long for your needs. It is generally a good idea, though, to leave more music than you need and to let the operator fade it out, unless the piece needs to end at a specific point. This will leave some flexibility in case something goes wrong on stage or you or the director decides to make a change. Once something is deleted, it is gone.

One of the other very nice features of MiniDisc is the ability to name your tracks and the disc as a whole. You can label the tracks with the cue letters to which they correspond, or a descriptive title of the cue, or anything else you might like.

MiniDisc machines come in two flavors: Professional and Consumer. Since the Professional decks cost about five times as much as the Consumer models, Nathan Seifer has a consumer model. In general, this is just fine. However, the consumer models have a tendency to **overheat** and fail and corrupt your disc if you leave them on for too long without adequate ventilation. To avoid this, don't leave the MiniDisc player on for more than four or five hours. If you must use it for longer (like during tech), try to spread out the equipment stack so that the MiniDisc deck can get some cool air. For best results, do not cover the vents on the top of the MiniDisc player.

USING MICROPHONES

At some point, you may need to use a microphone with the sound system. This may be to record a voice for playback in the show, or to allow an offstage voice to be heard through the speakers (also known as a "God Mic"), or simply to amplify a person or sound

onstage. Using the Mackie, this is relatively simple. The first six inputs on the board have XLR connectors to take a mic input. The thing to remember here is that microphones work at "mic level", while most playback units work at "line level", which is much higher than mic level. So you can't use a mic where a line level signal is expected, and vice-versa. In general, an XLR jack will take a mic level signal and a 1/4 inch will take a line level signal. (There are exceptions to this rule, however, especially on professional gear like the amplifier, where an XLR jack will be used for a line level signal.)

There are several SM-58 microphones (manufactured by Shure) in Nathan Seifer's inventory. These mics are excellent for vocal work, and will serve just fine to pick up any other sounds you might need them to, as well. They have a cardioid pickup pattern, which means that they will pick up sounds in an extended heart-shaped field in front of the microphone. Ideally, the mic should be about six to eight inches in front of whatever is producing the sound. You will need a mic cable (with a 3-pin XLR connector on each end) to connect the mic to the sound board. The female end of the cable goes at the mic and the male end goes at the board. If you are using the mic on stage, you'll need to use a longer cable to run out of the booth and down along the side of the seats.

TROUBLESHOOTING

Troubleshooting a sound system is a fairly complex problem, but with a basic understanding of the signal path it can be accomplished quickly and easily.

The most common problem is not getting any sound at all.

First, make sure that everything is plugged in and turned on. Check for power lights on all of your input devices (MD, cassette, etc.), the mixer, and the amplifier. If something is plugged in and turned on but there is no power light, check the fuse.

Make sure the deck is playing properly by watching for levels on the output meter on the MD or cassette deck. You can plug in a pair of headphones to the jack on the deck to double check. If you're not getting signal out of the deck, try a different tape or disc.

If that's not the problem, check to make sure the signal is getting into the mixer. Press the "Solo" button on the playback channel, and make sure the channel fader is up, the trim knob is up, and the mute button is out. Check for levels on the meter on the Mackie. If you don't have levels there, check your connections between the deck and the mixer. Then check to make sure that the trim is turned up, and that the EQ is not turned all the way off (to the left). If you're using a channel without a trim knob, check to make sure that the level button is set for -10, unless you are using some rented professional equipment that is designed to work at +4.

If you're getting levels on the channel in solo, make sure the main mix faders are up. Take the channel out of solo and make sure no other channels are solo'd (if anything is in solo, the "Rude Solo Light" will flash). With the channel fader up and the Main Mix faders up, you should get levels on the meter on the Mackie. If not, make sure the button labeled "Main Mix" under "Source" to the left of the meters is in.

If everything is fine through the board, check the connections to the amp. Make sure the levels are up on the amp. Then check the connections to the speakers. They could have come loose at the amp or at the speakers. Also trace along the speaker cable through the booth. Each cable has at least one splice in it which may have come apart.

If you are getting sound but it doesn't sound good, there are different things to try. First, check all of your connections to make sure they are secure. This should eliminate some potential problems in drop-outs or static. If you're getting hiss from your playback devices, especially the cassette deck, try re-recording at a higher volume. Also try turning down the amps. Adjust the trim on the input channels so the channel and Main Mix faders can run at "U" (Unity) levels. The higher the signal you are sending to a device, and thus the less amplification the device has to provide, the better the audio will sound.

If you are getting a hum through the sound system, it is probably caused by interference from the lights or other power sources. See if the hum changes when the light levels change. If it does, make sure that none of your audio cables are run next to lighting or other power cables. Plug all of the sound equipment into one power circuit, preferably one that doesn't have anything else on it. Make sure all of your cables are properly grounded and shielded (check the Mackie manual). This will eliminate most hum problems.

ADDING MORE EQUIPMENT

The Mackie mixer offers lots of room for expansion, allowing the Sound Designer more creative flexibility. The board can take up to 16 channels of input, and direct it to 6 separate outputs. In the existing sound system, it is only using four channels in and two channels out.

By renting or borrowing more equipment, you can add effects speakers on stage, or in the back of the house, modify and distort voices, or play back complex cues from more than one source at once. See the Appendix for a list of vendors and rental houses.

If you want to add more input devices, such as another MD or cassette deck, or some microphones, just plug them in to the back of the board.

If you want to add more speakers, you can do one of two things. First, you can split the signal from the amp to more than one speaker or daisy-chain the speakers on each amp channel. This gives you more speakers, but limits your control over any individual speaker. Your second option is to add more amps. You can connect the second amp to the Alt 3/4 bus on the Mackie, but then you could not send a channel to both sets of speakers at once. If you want that capability, then your best bet is to use the Aux sends to feed your second amp.

To use an external effects processor, you can either use the channel insert or, preferably, use one of the aux sends and route the return either through two channels on the board or the separate Aux Return inputs.

LIVE EFFECTS

There are some sound effects which are easier to produce live than to try to create using a recorded cue. Very often phone rings and doorbells fall into this category, as do door slams and sometimes footsteps off stage.

Doorbells and buzzers can be created using off-the-shelf parts from a hardware store, wired just as the would be in a house. The only difference is that the ring button is generally located in the booth instead of on a door frame and the bell is somewhere backstage instead of in the front hallway.

Phone rings can be created using an electric bell from a hardware store, or using a working phone and a telephone ring-voltage generator, such as a **Tele-Q** manufactured by CEI Inc. The Tele-Q is a little black box that takes a nine-volt battery and has one button on top and a standard modular phone jack on the end. Any modern phone will ring when connected to the Tele-Q. This unit costs around \$120 and is available for sale from places like Norcostco, but you may be able to rent it from a rental house. (See the Appendix for Vendors and Rental Houses.)

APPENDIX B: SUGGESTED READING

Backstage Handbook (Third Edition) by Paul Carter. © 1994. Broadway Press: Shelter Island, NY. 800-869-6372

Theatrical Design and Production (Second Edition) by J. Michael Gillette. ©1992. Mayfield Publishing Company: Mountain View, California.

Stage Lighting Revealed: A Design and Execution Handbook. by Glen Cunningham. ©1993. Betterway Books: Cincinnati, Ohio. 800-289-0963

Sound and Music for the Theatre: The Art and Technique of Design by Deena Kaye and James LeBrecht. ©1992. Back Stage Books: New York, NY.

Sound Design in the Theatre by John L. Bracewell. ©1993. Prentice-Hall: Englewood Cliffs, NJ.

Sound for the Stage: A Technical Handbook by Patrick M. Finelli. ©1989. Drama Book Publishers: NY, NY.

The Stage Management Handbook by Daniel A. Ionazzi. ©1992. Betterway Publications: White Hall, VA. 804-823-5561

Stagecraft: A Handbook for Organization, Construction, and Management by David Welker. ©1987. Allyn and Bacon, Inc. Newton, MA.