

# Music Educator's Recording Resource Guide by Jon H. Hodge

Prepared for the 2002 ECIS Conference, 25 November, Berlin, Germany. A resource guide designed for Music Educators interested in recording, or improving their ability to record individuals or ensembles.  
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This guide is organized into two sections: Resources and Applications. The Resource section discusses some of the equipment that might be considered by educators for use in the school music program. It provides product information for music programs on very limited budgets and those where money is not a serious limitation. The Application section discusses effective use of the equipment outlined in the resource section, with particular focus given to the preparation of audition tapes.

## RESOURCES

### The Limited Budget Plan (\$300-\$500)

Marantz PMD series recorders (formerly made by Superscope) have for decades had an excellent reputation with professional musicians. These textbook size recorders are favored by Jazz musicians for their half-speed and variable speed features which make possible transcribing those blazing-fast Cannonball Adderly solos. The recorders are made of very solid materials, with heavy duty motors, multiple heads, and an above average built-in condenser mic. They have a variety of useful inputs and line outs, that allow for connecting microphones, headphones, and audio systems. The sonic qualities are about the best available in a portable recorder under \$500.00 dollars. The popularity of these recorders are such that Marantz has expanded the line to include four models ranging in price from: \$199 for the PMD101, \$299 for the PMD201, \$359 for the PMD221, or \$519 for the PMD430. The 101 and 201 record in mono, and the 221 and 430 can both record in stereo. These are not "high-end audiophile delights" but rather very good "all-in-one" boxes for the program on a budget or the individual who does not want to mess with a lot of components.

Another excellent choice for the program on a budget is the Sony Professional Recording Walkman (WM-D60). This is the best portable stereo recorder available for under \$400.00 (It lists at around \$300.00). Every recording engineer I know owns or has owned one. It is small, slightly longer than the average Walkman, has a limited number of knobs and buttons, is easy to use, and when combined with one of Sony's ECM series stereo condenser mics the sound is very good. I actually prefer the sound of my Sony Cassette Walkman to the sound of the Sony mini disk recorder, (MZ-R55, @ \$250.00).

A mini disk recorder of any brand is another good choice in this price range. This choice moves you into the digital realm. It is not, however, CD quality. I don't find the sound as robust as a good quality cassette recorder. But, for what it lacks in audio quality it makes up for in functionality. Selecting, editing, and transferring recorded information is easy and does not degrade the quality of the original recording.

Combine any of the above choices with a good quality stereo mic. These can be found at most larger electronics stores that cater to home audio enthusiasts. Look for brands by Audio Technica and Sony. I use the Sony ECM series stereo condensers microphones which start in price at about \$60.00 and end at the top of the line at about \$300.00. I especially recommend the ECM-MS907 and ECM-MS909.

### The Moderate Windfall (\$750-\$1,500)

In this price range there is now one important addition you can make; a good quality mixing console and Two to Four microphones. For \$400.00 you can add a very high end console made by Mackie (1202 VLZ) or the Soundcraft Folio Lite. These mixers can be used for live (PA) sound reinforcement (with an amplifier), or for recording soloists or an entire ensemble. They come with four professional quality mic preamps which is what makes them such a valuable addition to your audio collection. The addition of a mixing console adds a dimension of flexibility in recording that you cannot achieve with an all-in-one box or a stereo condenser mic as described previously.

Combine one of these boards with a pair of medium quality microphones like the Shure BG4.0 (\$200.00) or the Shure SM81 (\$400.00) or just a pair of the Shure SM-57s or 58s (\$146.00-160.00) and you will vastly improve the sound of your recordings. Audio Technica sells some very reasonably priced studio condenser mics for general use such as the ATM-10a (\$200.00), the ATM-31a (\$250.00) or if you are looking for an excellent instrument mic the ATM-33a (\$290.00) is excellent for recording wind and percussion instruments. You can use this setup to mix down to any of the portable stereo recorders described in the previous section, or you can mix down to a commercial home stereo cassette deck. If you want to invest in an inexpensive rack mount recorder designed for the project studio consider the Tascam 102MKII for \$350.00. It is a full featured mastering deck with outstanding sound quality.

### Your Ship Just Came in Budget (\$2,500- \$5,000)

In this price range you can seriously explore the wonders of the digital recording revolution. Combining the mixing consoles discussed in the previous section with a DAT recorder and about \$1,000.00 worth of microphones will not only give you the ability to produce really pristine audition tapes, but will provide you with the basics of what you might use to master a CD of your ensemble. DAT recorders start at around \$700.00. I like to recommend the Sony TCD D8. It is a Walkman size unit with few buttons to confuse the user, and after all, Digital is pretty much digital. The information this unit produces will not differ from that produced by a unit costing half again as much, it just does not have all the bells and whistles. There are now available a wide range of CD and hard disk recorders. Once again I cast my vote in favor of the line of products available from Marantz. The CDR300 (\$700.00) provides you with a portable professional quality CD recorder that can function on its own or with a mixing console and microphones. Like the other equipment recommended here it is designed for the music teacher/musician on the run. Being a textbook size unit, you can take it to whatever room is available, and be ready to record in minutes. Marantz has also developed a line of portable CD players that allow you to change tempo without changing the key, or change the key without changing the tempo of any commercial CD or CD-RW. Pretty cool.

Most of us have as good a digital recorder as we need sitting right on our desks, and that is our computer. Almost all computers allow 16 bit CD quality audio recording. The trick is having or finding software that is reliable and easy to use. Avoid shareware. There are lots of things floating around, and some may actually be reliable, but I have been disappointed more often than not. Don't overbuy. Don't purchase a piece of software that allows for 24 tracks of audio and a thousand options for editing. The learning curve on this kind of program is steep. There are two programs I love to use. One is just a simple two track recorder that is quick and easy to use and will integrate with much more complex programs. It is called SPARKle by TC works. It is inexpensive and can often be bundled with CD burners when purchased from the sources listed in this manual. The big brother versions of this program, SPARK and

SPARKXL offer support for 24 to 96 bit recording, more processing power and some very cool de-noising and de-clicking features that allow one to take an old vinyl recording and convert it to Digital while removing the snap, crackle and pop common to that old medium. For those who want more than two tracks of digital recording I recommend the program DECK as an excellent entry level multitrack digital recording program. It's price is more accessible to the school teachers budget and the learning curve is really much more manageable than the larger, more popular and more expensive products that you may be familiar with.

To actually burn your CDs you will need a product like Adaptec's Toast or Jam. I've never used anything else, and I've never had a problem with this particular software. Once again, avoid shareware solutions to burning CDs. This is probably the most important step in the process of creating the CD. Don't skimp. Look for something that meets "Redbook Standard," which is the standard set by the recording industry for the data that goes on commercial CDs. Having that will assure you a very high level of reliability.

In this price range one can begin to look at many of the new less expensive studio large and small diaphragm condenser microphones. These begin in price at about \$300.00 each and are commonly included in the microphone collections of major studios. Some excellent choices are: AKG C3000, Audio Technica AT4040 (my favorite vocal mic), and the CAD Equitek E-200 (superior instrument mic). For vocal recording a pair of large diaphragm condenser mics like the AT4040 and the AKG C3000 are a must. These work well for instruments as well, but there are better choices for wind, percussion and string instruments. I own a pair of Nuemann KM 184 (\$500.00 ea.) and have been amazed at the quality of sound I get from them on wind, percussion and especially piano. Other excellent choices in this area of application are AKG's C451, Sure SM81, and for those on a budget the AKG C1000S. There are as many different kinds of microphones as there are flavors of ice cream. Many of them are designed for a specific use, so check the manufacturers specifications before buying. The difference this quality of mic will make in the sound of your recordings will be noticeable to even the inexperienced.

If you are seriously interested in recording your ensembles for posterity, then I strongly suggest purchasing some kind of signal processor that you can use to "sweeten" the sound of your group. There are a wide range of "effects boxes" that provide rather transparent sound enhancement starting as low as \$200.00 (Behringer Dualflex II) or the Alesis MicroVerb III. Ahpex and Lexicon products are also highly regarded and make good units for programs on a budget. Avoid units that are designed for use with guitars or that have a lot of presets you will never use. I recommend a simple unit that employs a lot of preset effects that make sense to us as conductors/educators, like "Large Hall," "Recital Hall," and "Jazz Club."

## APPLICATIONS

Now that you know what you need, (and what you can afford), here are some suggestions about how to make even the simplest recording better.

### *Maintain your gear*

Whatever unit you use to record with, get it cleaned and have the record and play back heads adjusted. Most of the really poor tapes I have listened to were the result of a recorder badly in need of some inexpensive maintenance. Really high end recorders provide you with a knob to adjust the heads yourself, it's called azimuth and it is worth considering when you purchase. Don not attempt to clean the heads on digital recorders yourself, nor should you use tape head cleaners that you buy at the local computer store. If you own a DAT recorder, let the manufacturer or a qualified service agent clean and adjust it for you.

### *Buy good tapes.*

Normal bias tapes are fine for recording speech or dubbing your favorite Nickleback tape for Mom, but they will not withstand the kind of overtones produced by a clarinet sounding that high E. Invest the extra \$2.00 and buy a high bias, high position cassette. The people who listen to the result will be able to distinguish whether it's a sax or a trumpet playing. Digital media is pretty consistent across product lines. Shop for bargains

### *Transformers are Death.*

Try to avoid using units that require you to use a transformer. If the recorder can operate on batteries then do that. The transformer hum will creep into the recording somewhere, it never fails. Rooms with fluorescent lighting, especially those that operate on dimmers will always add noise to your recording. Find a place with natural lighting, or turn out the lights and plug in an incandescent lamp from home. A simple test for dimmer or transformer noise is to take an AM radio and tune it to a spot were there is no station. If you hear anything other than plain-old white static, then something in the area is producing a signal that will interfere with your recording.

### *Eliminate ground loops.*

Plug everything into the same outlet (circuit). If your recorder is plugged into a different outlet than your mixer, and your monitor amp, then you will get that all too familiar hum that has mystified so many novice engineers since the dawn of recording time. This is called a "ground loop" and occurs when your equipment finds access to more than one grounding source.

### *Control levels.*

This is really important. Most all-in-one boxes trim the levels for you. These are the worst, but it may be all you have to work with, I'll offer solutions to that later. Gain or trim on a mixer adjusts the channel sensitivity which controls the strength of the signal going to the mic preamp. Too strong a signal will cause the preamp to distort. Too weak of a signal, and you hear more background noise than the sound you are recording. Learn to optimize these controls to get the most sound with the least amount of noise/distortion. Test it before you record. It's amazing how easily a clarinet can saturate the tape and produce a really ugly sound at the record head while in the room they sound lovely. If possible monitor your recording with a pair of closed ear headphones plugged into the recorder so you are hearing what the musician sounds like after the signal has reached the tape or disk. Listen to a bit of the recording on a second machine before finishing the recording. If the playback sounds distorted then turn down the record level or the gain or trim on your recorder. If you use a mixing console, learn how to optimize the channel signal. This is usually done using the solo button or PFL and adjusting the gain or trim until the signal level averages about zero db. Your manual may explain this in terms you actually might understand.

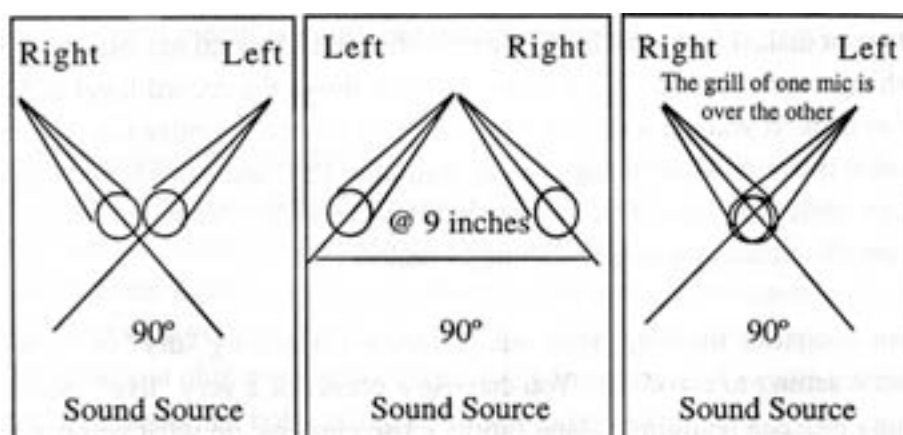
### *Room acoustics matter.*

Seek out or create a relatively "dry" or "dead" acoustic setting to record in. You can use a corner of a very "live" room if nothing else can be found. Hang fabric, close curtains, do what you can to eliminate a lot of reflection or echo. The best place to record in my school is on the stage with all the curtains drawn. It really makes a huge difference. If a dry room cannot be found then control the amount of room reflection by placing your microphone(s) closer to the sound source.

### *Microphone placement.*

If you are lucky enough to have them use two microphones, preferably a pair that match. Place one near (2-3 feet) the musician and another about 5-7 feet away. The close mic provides good articulation and the room mic will capture many of the overtones that form farther away from the musician. Whatever you are using to mic the musicians don't aim them directly at the sound source. Place them off-axis somehow to the musicians. Think about your ears - they are not aimed directly at what you listen to. Use mics the same way. Back off from instruments with more complex overtone series, i.e. clarinet, trumpet, trombone, some sopranos. If you use an all-in-one box move it farther away from these instruments and lower the record level.

Use a pair of matched microphones as a stereo pair. There are several ways to accomplish this and all yield good results. Place the microphone so they are crossed off axis to the sound source by 90 degrees in one of the following configurations:



### *To EQ or not to EQ.*

If you have this capacity to change the relative strength of a certain frequency, use it very judiciously. Tampering with someone's sound could be considered unethical in audition situations. But if the microphones, acoustics or the recording equipment you are using tend to squash or exaggerate certain frequencies then learn to control that with your EQ for a final product that sounds more like the original.

### *Practice.*

Don't wait till auditions to record your students. I have found recording my students to be one of the best teaching strategies I have ever employed. It really gets them on task. It's kind of like picture day when they all try to look, dress, do their makeup, all in a way that will make them appear at their best. Record them regularly and make them listen to it. They learn wonderful things about themselves, while you learn how to make better use of your equipment.

**Jon H. Hodge** is Mr. Music at Heidelberg High School, a US Department of Defense school. The curriculum at HHS includes two Bands, two Choirs, Guitar, Jazz Band, and a music technology class. We produce a musical each year, and I also organize and conduct orchestras for two theaters in the area, so I can talk at great length about theater technology and how to do musicals so they don't "do" you. The school facility sports a seven station computer music lab, a 24 channel eight track digital recording studio, a fully digital theatrical lighting system and a theatrical audio/mic system that most professional theaters would be happy to have. I designed and supervised the construction and renovation of the music facility and the auditorium at HHS and can offer useful suggestion to those who might be confronted with that kind of task. I am a member of AMIS and can be reached through that web site, or you can contact me directly at [jjhodge@t-online.de](mailto:jjhodge@t-online.de) or at [jon\\_hodge@eu.odedodea.edu](mailto:jon_hodge@eu.odedodea.edu). My phone numbers are: (49) Germany, (0)6221-578004 (school) or (0)172-622-6127 (mobile).

***Recommended Sources in the U.S.***

Thoroughbred Music (813)-889-3874.

Sweetwater Sound, FAX (219)-432-1758  
sales@sweetwater.com <http://www.sweetwater.com>

Musicians's Friend, FAX, (541)-776-5173  
[http://www,musiciansfriend.com](http://www.musiciansfriend.com)