

The Vermont Folklife Center



Audio Field Recording Equipment Guide

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Introduction

This document is designed to offer guidance to researchers interested in obtaining audio recording equipment for conducting folklore, ethnomusicology, anthropology, oral history and other ethnographic fieldwork projects. Before your eyes pop too far out of your head after seeing the prices of the equipment listed below, be aware that almost all this stuff is high-quality, professional or "prosumer" grade. In truth, any cassette recorder and any mic will do the job. However, the better the quality of your equipment, the better the end product will sound.

No matter what kind of equipment you ultimately work with--be it a \$5,000 CompactFlash/hard drive recorder or a \$25.00 tape deck--it is most important that you are well acquainted with it and know how to use it optimally before setting out.

Many of the higher-end machines can be found used for a fraction of their new price. There are many dealers in used audio equipment online these days, and Ebay (www.ebay.com) can be a great place to pick up bargains. When purchasing used equipment be sure the seller will guarantee that the equipment works and that he or she is willing to back up that guarantee with a full refund, repair or replacement. Caveat Emptor!

And, in the end, what matters most is not how fancy your toys are, but the relationships you develop through talking with other human beings and the legacy of their lives that you leave for the future.

Analog Audiocassette Recorders

Although its use is in sharp decline, analog audiocassette is still a standard medium for folklore and oral history field recording. There is an enormous range in price and quality of portable cassette recorders. The machines listed below are some of the highest quality, and therefore most expensive, cassette recorders available. Less expensive machines are certainly out there, and although the quality of the recording will not match what one can do with high-end equipment, they will certainly still get the job done.

The astute reader will note that the two primary manufacturers of higher-end cassette decks, Marantz and Sony, are slowly leaving the business. As a result, I'm limiting this section to currently manufactured and discontinued decks by Marantz and a bunch of discontinued but classic Sony decks. This is not a growth market.

Marantz PMD430 Marantz's top of the line stereo recorder. I'm still a big fan of Marantz cassette decks. A great, less expensive, tape deck if you want to do analog stereo recording. Now only available used or as old store stock. Sold new at around \$530.00, used price varies.

Marantz PMD222 The mono recording version of the machine above, XLR connectors, VU meter and other goodies. My personal favorite for a moderately priced, high-end mono recorder. Priced around \$390.00 new.

Marantz PMD221 As above, comes with mini jack mic input instead of XLR connectors. Now only available used or as old store stock. Sold new around \$370.00, used price varies.

Marantz PMD201 A mono, two-head recorder with a mini mic jack. Retailers around \$330.00.

Marantz PMD101 Similar to the 222 and 221. Has mini jack mic input, lacks record level controls and VU meter. Apparently discontinued. Retailers new around \$235.00.

Sony TC-D5 Pro II The mother of all portable cassette recorders. A mighty, mighty machine. No longer manufactured. Retailers new for \$1,000.00. In my experience, a fairly rare site used, and prices vary.

Sony TC-D5M An analog field recording classic and the machine we still use for analog cassette recording here at the VFC when called for. The D5M was recently celebrated with a review at Transom.com here: http://www.transom.org/tools/recording_interviewing/200502.tcd5m.html. It gives me that warm, fuzzy feeling. Only available used or as old store stock. Sold new for \$700.00. Used prices seem to vary between \$250.00 and \$500.00.

Sony WM-D6 A smaller, less expensive professional quality Sony stereo deck. I like this deck a lot, and on my archivist's salary, it's the one I've got my eye on used. Which is a good thing since that's the only way you can get it. Sold new for around \$350.00. Used prices seem to vary between \$50.00 and \$175.00

Sony WM-D3 Even smaller than the WM-D6--the size of a standard Walkman. Includes most of the features of the WM-D6. Now only available used. Sold new for approximately \$270.00. Used prices seem to vary between \$50.00 and \$120.00

Portable Compact Disk Recorders

Marantz now has three machines out that record to CD. One drawback to these recorders is that they must sit flat and cannot be moved while recording is underway. Another is that they only create CD-DA discs, and as a result one is limited to CD Quality audio (stereo 16bit/44.1kHz) and CD-R record times (74 or 80 minutes per disc). To learn more about the distinction between CD-DA and CD-ROM discs for audio, please see here: http://www.vermontfolklifecenter.org/res_digitalediting.htm#5e.

For a number of reasons I don't love this approach, but the fact that you get a tangible thing at the conclusion of an interview—a CD-R—seems to make some people more comfortable.

Marantz CDR300 CD Recorder The first direct-to-CD field recorder. I know some folks who have been using this machine for several years now and they love it to death. Retails for around \$700.00

Marantz CDR310 Professional CD Recorder A somewhat streamlined version of the CDR300 with the added feature of an internal hard disc drive that temporarily stores audio while recording is underway. At the conclusion of the recording session you write a CD-DA or CD-ROM disc. Limited, as you might imagine, to 16bit/44.1kHz recording. Info here: <http://www.d-mpro.com/users/folder.asp?FolderID=4044&CatID=4&SubCatID=142>

DAT Recorders

DAT (Digital Audio Tape) is a high-quality digital recording medium. Or perhaps I should more correctly say, "was." A discussion on the Association for Recorded Sound Collections listserv in the fall of 2005 suggested, terrifyingly, that the last factory making transports for DAT decks had shut down operations, and as a result no more new DAT machines are going to be manufactured.

If you've got DAT tapes lying around and a reliable, working deck, now's the time to transfer them--first of all, DAT is generally not regarded as particularly trustworthy for long-term storage of audio. And then, without a deck to play it back, a pile of DATs is only so much plastic.

More detailed information on DAT, including equipment reviews and other recommended machines, can be found at the DAT-Heads website:
<http://www.solorb.com/dat-heads/>.

Who knows how long DAT will continue to be with us, but it was a wonderful field recording format in its day.

Here's a sampling of some DAT machines--

Sony PCM-M1 Portable DAT recorder, the best of the Sony DATman machines. Discontinued. Only available used now, possibly as old store stock as well. Seemed to retail between \$700.00 and \$1,000.00. Used prices vary.

Sony TCD-100 Portable DAT recorder. Very discontinued. Available used. Retailed new around \$675.00

Sony TCD-D10 Pro II This is the machine we used, and at times still turn to. It records wonderfully. It does take some time to learn how to navigate, and they have a reputation for being fragile—although we have yet (knock on wood) to have any problems. Discontinued for a while now, but used machines are out there. Retailed new for the slight sum of \$3,000.00.

TASCAM DA-P1 Portable DAT Recorder. For a lot of folks, what the Sony D5M was to analog cassette, this machine was to DAT. A great, sturdy field recorder. Apparently still being manufactured--or in the least it's still listed in the TASCAM catalog. Basically the last man standing as far as new DAT field recorders. Priced around \$1,500.00

Direct-to-Laptop Recording

It is possible to record audio direct to a laptop computer. At the bare minimum all one really needs to do this is a laptop with a sound card that includes a mic-input, a microphone and a sound editing program.

However be fore warned: the microphone pre-amplifiers built into to most stock laptop sound cards are generally pretty bad. Furthermore, the analog-to-digital converters on most stock laptop sound cards are pretty bad as well. If you intend to record via the mic-input on your laptop sound card, this conspiracy of crappiness will definitely have an impact on the quality of the resulting recordings.

To surpass this bare minimum approach one could also employ any one of the gaggle of FireWire (a.k.a. IEEE 1394) and USB-based digital audio interface/microphone pre-amplifier units that have proliferated over the last several years. These devices plug directly into the USB or FireWire port on your laptop and, along with a microphone and audio editing software, turn your laptop into digital recorder of varying quality--varying primarily in relation to the quality of the interface, that is.

Thing is, the quality of the mic pre-amps and A/D converters on these digital audio interfaces range from top-of-the-line to kinda crappy. And, as with most things, you pretty much get what you pay for.

Sidestepping hardware considerations for the moment, there are various other matters that effect laptop recording that one should be aware of as well:

Uncompressed digital audio files are large. By way of example, 80 minutes of stereo audio recorded at 16bit/44.1 kHz takes up 700 megabytes of space. If you intend to record at higher resolutions, the files will be even larger. Be prepared to have ample space available on your hard drive or, better yet, travel with a portable external hard drive dedicated to audio recording.

If you loose power before you save your file, you will quite likely lose your entire recording.

Another huge matter to keep in mind is that laptops tend to make A LOT of noise, noise that will be picked up by your microphone. The careful use of a mic with a directional pick up pattern will limit the amount of machine noise you pick up, as will keeping the PC as far away from the mic as possible--but for sit-down interviews the noise of a laptop fan is hard to escape entirely.

So, do I love this approach for mobile interview recording? Not really. First of all by tying you to a computer/interface combination and the potential need for a reliable power supply, it dramatically limits the environments in which you can record. I'd also rather not have to haul around my a laptop, an external hard drive and an audio interface to each interview and then have wait for the whole mess to boot up before I could get started. And finally, laptop fans really do make a lot of noise--trust me.

However, in a controlled recording environment with the proper sound isolation you could do some first-rate recordings with some of this gear.

Direct-to-laptop recording certainly does have its benefits. For one, when recording directly to hard drive you can exploit all the benefits of file-based digital audio. Since the recording is created as a computer file, it is simple to exchange, edit and burn to CD. Also, if one already owns a laptop, the cost of a decent USB/FireWire audio interface might well be less than buying a comparable stand-alone digital recorder. Finally, many audio interfaces come with audio editing software.

Over the last few years USB/FireWire audio interfaces have begun to proliferate, so there are more options now than ever.

Apogee Electronics Mini-Me Very well reviewed professional USB audio interface/mic pre-amp. USB, S/PDIF and AES/EBU digital input/output. XLR and 1/4" mic inputs. An incredible piece of equipment. Pricey at \$1,300.00. Info here: <http://www.apogeedigital.com/products/minime.php>.

Digidesign Mbox2 Updated version of Digidesign's pioneering Mbox USB audio interface/mic pre-amp aimed at home recording. For those of you not in the know, Digidesign is the maker of the studio-standard Pro Tools digital audio software. The original release of this unit was very well liked. I for one, like the Mbox2 a bit more--especially the new look. A gaggle of inputs and outputs, including S/PDIF, XLR and 1/4" stereo. A good point: comes with Pro Tools LE software. A bad point: That's the only software it will work with. \$450.00. Info here: <http://www.digidesign.com/>.

Edirol FA-101 and FA-66 Edirol's two FireWire audio interfaces. Similar to the Edirol USB unit below, but marketed for music recording and playback. As a result, they have MIDI and a whole bunch of analog inputs (8 or so line-level and two mic-level on the FA-101, 4 line-level and 2 mic-level on the FA-66)--waaay more than most folks need for ethnographic interviews. Still, very nice looking units in the price range. Both include FireWire and Optical digital output, all wrapped up in a sturdy metal cases. Only supported for Mac OS X and Windows XP. FA-101 seems to go in the \$500.00-\$550.00 range, the FA-66 seems to go around \$350. Info on the FA-101 here: <http://www.rolandus.com/products/productdetails.aspx?ObjectId=702&ParentId=114>, and the FA-66 here: <http://www.rolandus.com/products/productdetails.aspx?ObjectId=731&ParentId=114>.

Edirol UA-25 USB USB-based audio/mic pre-amp. The unit can input audio to a computer via USB, Optical and coaxial S/PDIF. Records at up to 24 bit/96kHz. XLR input mic pre-amps with phantom power. All in a sturdy metal case. Looking like this replaced the UA-5, which I heard good things about. The UA-25, I know

nothing about. Around \$240.00. Info here:
<http://www.rolandus.com/products/productdetails.aspx?ObjectId=704&ParentId=114>.

Griffin iMic Really cheap intro point into USB-based laptop field recording. The new version is still a tiny little disc-shaped thing, but this time it's slightly smaller at 2 inches in diameter and a half an inch thick. All you get with the iMic are stereo mini-jack sized mic and line inputs--no external controls. All the other stuff--input levels, etc., must be managed by whatever audio editing software you are using. The old one did analog to digital conversion at CD quality only, 16bit/44.1kHz--not sure about the new version. The old version also had pretty hissy mic pres as well. However, for \$35.00, not a bad place to start. Info here:
<http://www.griffintechology.com/products/imic2/index.php>.

M-Audio FireWire 410 M-Audio is now owned by Avid, which is the parent company of Digidesign. What these means in a practical sense is that there is now a version of Pro Tools, Pro Tools M-Powered, that owners of M-Audio products can use with their hardware. The Fire-Wire 410 features 2 mic inputs and retails for around \$300.00. Pro Tools M-Powered runs around \$250.00. Info here: http://www.m-audio.com/products/en_us/FireWire410-main.html.

M-Audio MobilePre See the Firewire 410 for details on ownership changes at M-Audio. Inexpensive USB audio interface/mic pre-amp. I own one of the original M-Audio versions, and I've been completely underwhelmed. The recordings I've made are a lot noisier than I would like from a digital device. I don't know what, if any, changes have been made to the hardware since Avid took over. Might be a cheaper way to get access to Pro Tools M-Powered software if that's your real goal. Retails \$150.00. Details here: http://www.m-audio.com/products/en_us/MobilePreUSB-main.html.

Mackie Onyx Satellite A new FireWire box from Mackie. I've dropped the Mackie Spike from this list and I'm putting this guy in here instead because I think it's better served to field recording tasks. I must say, it looks pretty dern good: Mackie's Onyx mic-pres, metal case, will work with a slew of different audio editors, it can be bus powered--I'm liking it. Johnny Fenn picked one up recently and his initial reports are quite positive. Comes with Traktion 2 Software. Info at <http://www.mackie.com/products/satellite/splash.html>. Around \$400.00.

Tascam US-122 Tascam's foray into USB-based laptop recording. Really intended for music since it has mic and line inputs as well as MIDI, but will easily work for interviews as well. Comes with TASCAM's GigaStudio 24 software. Records at 16bit/44.1kHz and 16 bit/48kHz. Looks good for the money, but I haven't heard much. Dual XLR mic inputs, Midi, etc. Around \$200.00. Info here: <http://www.tascam.com/Products/US-122.html>.

Sound Devices USB Pre Top-of-the-line USB audio interface with high quality microphone pre-amps and high quality analog to digital converters. Includes USB interface and S/PDIF digital. Has XLR inputs for mics. Retails for around \$595.00. In my opinion, one of the top two units (along with the Mini-Me) in this field. Info here: <http://www.usbpre.com/>.

Standard MiniDisc Recorders

Standard MiniDisc is becoming a thing of the past. In 2004 Sony released a new iteration of the MiniDisc format, HiMD, and essentially ended support for the earlier version which begat it.

So then why maintain a section on standard MiniDisc as a part of this resource? Well, for now at least, the format still has at least one (albeit partially crippled) leg to stand on--you can still buy standard MD blanks, for instance. And some companies, Sharp for example, do still manufacture new recorders. Heck, HHB still has their pro MD unit listed in their catalog.

From another perspective, although MiniDisc never got near to supplanting analog audiocassette in popularity as a recording medium, in certain nooks and crannies (say, for example among radio producers, stealth field recordists, certain bundles of oral historians and even amidst clusters of folklorists, ethnomusicologists and anthropologists) it developed quite a following--a following that to some degree persists.

In its own freakish and small way, and perhaps for reasons that can't be fully explained, standard MiniDisc found a place in the hearts of a lot of field recordists.

As for me, I went back and forth with MiniDisc--there is/was a lot to hate about it. However, ultimately the compromise between recoding quality, cost, and versatility emblematic of MiniDisc eventually outweighed my gripes and won me, however tentatively, over to the Pro MD camp.

Then Sony went and cut the cord, so that was pretty much that.

I guess my decision to keep this section is a kind of homage to the format. Perhaps some day I'll retire it, along with the section on DAT perhaps, but for now it'll stick around.

Standard MiniDisc was a popular format for audio field recording. Although consumer-grade machines are and were inexpensive, there are a host of concerns about the format that continue to fuel endless griping by yours truly.

1. Although MiniDisc is a digital recording format, consumer-grade machines are intentionally designed so that one cannot get a digital line out of them. This feature (or more correctly lack thereof) is intended to control the creation of digital copies of copyrighted material. Great if you're a recording company, a pain if you're a fieldworker conducting interviews and want to make straight digital transfers for creating CDs or mounting audio on the web.

If you want to get any signal off a consumer MiniDisc recorder--analog or digital--you usually need to do so by taking an analog signal out through the headphone jack. From here it's not hard to make an analog copy of the digital audio contained on the MiniDisc by running the signal into a cassette deck. However, if you want to make a digital copy of the digital signal on the MiniDisc using a consumer-grade machine, you need to go through the motions of converting that headphone jack-derived analog signal back to digital using a second analog-to-digital converter (such as a computer sound card or USB audio device). Uck.

In addition to this being kind of a pain, the bigger issue is that the two points of analog to digital conversion--one from the disc to the headphone jack, the second from the analog signal to the next analog-to-digital converter--do degrade the quality of the audio. And depending on the quality of your internal sound card, external analog-to-digital converter or USB audio device, this degradation can be quite pronounced.

2. Another degree of digital copyright control is maintained through the Serial Copyright Management System (SCMS--generally pronounced "scums"). The SCMS limits the number of digital copies one can make of a copied Minidisc. Once more, this is to prevent a user from disseminating copyrighted materials. Of course, this assumes that one even has the capability to make a digital copy in the first place--most of you don't, and probably never will. It's like a special kind of insult that way.

3. In order to fit 74-80 minutes of audio on the tiny Minidisc, the format uses a compression scheme called ATRAC. Although a MiniDisc records at what is essentially CD-Quality--16bit/44.1kHz--that audio information has to be squished down to fit on the 3 inch disc. Part of this squishing involves throwing out some of the audio data. ATRAC is therefore a "lossy" compression format. For this reason many people do not recommend MiniDisc for recording live music.

4. Finally, there's no knowing how long MiniDisc will be a viable format--especially in light the release of Sony's updated Hi-MD (see below).

That's the bad news--now here's the other side. ATRAC compression has only improved over the last 15 or so years since the format was introduced, to the point where most people would have a very hard time telling the difference between an interview recording made at CD-quality on DAT and an interview recording made on MiniDisc. And even keeping ATRAC compression in mind,

with MiniDisc it isn't difficult to match or even surpass the recording quality of a high-end cassette deck, and to do so at 1/3 or so the price. Does this mean I would use MiniDisc to record live music? If I had another option such as DAT or a good Solid State recorder, no. However, if MiniDisc is all you have and/or all you can afford (especially if it won't get recorded otherwise) by all means go for it.

As for the other issues mentioned above, the only way to remedy the digital output and SCMS concerns is to spend big bucks on a pro-grade recorder like the HHB or the Marantz model listed below. However, as far as I'm concerned, if you're going to spend between \$700.00 and \$1500.00 on a recorder, you might as well just buy a Compact Flash card-based machine and record uncompressed 16bit/48kHz audio at the source.

Another way around the problem of digital output and SCMS is to transfer your recordings using a component MiniDisc player equipped with digital output capabilities. At this point you'd be hard pressed to find any that are still manufactured. My personal favorite was a unit made by Sony, the MDS-E10, a charming, rack-mountable MiniDisc player/recorder with both S/PDIF and TOS-Link output that will also "strip" the SCMS out of the digital signal. We have one here at the Folklife Center and I love the darn thing. Good luck finding one now, though. When I trolled Ebay in search of a back up unit a few months ago they were scarce and pricey.

Finally, format obsolescence is a concern for every recording medium to date. In the nearish future I imagine that high-quality solid state recorders will be what most professional folklorists, ethnomusicologists, oral historians, journalists and others will carry into the field. From my perspective, MiniDisc was (and perhaps still is) a relatively inexpensive way to make good quality recordings.

If I were just starting out, would I adopt standard MiniDisc at this point? Unless a decent recorder fell into my lap for free or next to nothing, frankly no. Still, as long as I can continue to get blanks I'll keep using my Sharp MD-DR480, at least for certain applications.

More detailed information on MiniDisc, including equipment reviews and other recommended machines, can be found at the MiniDisc Community Portal website: <http://www.minidisc.org>.

Information on MiniDisc field recording, including details of some of the gripes about the format listed above, and recommended machines from the perspective of radio journalists and documentarians--the format's main boosters--can be found at <http://www.transom.org>

Some recommended recorders:

HHB MDP500 Professional portable MiniDisc recorder. The Mother Ship of MiniDisc recorders. I thought it was discontinued a while ago, but it still appears in HHB's catalog. Retailed/s in the neighborhood of \$1,300.00

Marantz PMD650 Professional portable MiniDisc recorder. Very good quality, highly recommended. Discontinued, but still available used or as old store stock. Retailed for around \$870.00.

Sharp MD-DR7/MD-DR480 Sharp's flagship MiniDisc recorder from several years back, the machine we used when we employed the format and the one I still sport from time to time. Unlike many Sony machines, allows for adjustments to record level to be made while recording is under way, which is a huge plus. The dual model numbers: MD-DR7 and MD-DR480 refer to the versions of the machine sold in Japan (the former) and Singapore (the latter). The only difference between the two is the language in which the manual is written (Japanese vs. English) and the inclusion of a few extra accessories with the MD-DR480. As far as I can tell this unit is long gone, so used is the only way to go. Sold new for between \$260.00 and \$280.00

Hi-MD Recorders

Sony's newest disc recording format, Hi-MD, has been on the street for a couple of years now at this point. As with early info in this section, most everything I've learned about it has come from the Hi-MD FAQ at www.minidisc.org, a few reviews, manuals and periodic email.

When Sony first unleashed Hi-MD upon us it tapped within me a deep vein of sadness. Yet again, the minds of Sony put their paranoia about digital rights management way ahead of making a useful field recorder.

Over the course of the last couple of years my great frustration has tempered a bit, especially as the Sony corporation gradually removed several of the egregious impedances built into the format and its supporting software. In short, Sony's ever-clenched Fist of Control has relaxed a tad, and now you can do things like digitally upload your own field recordings and (gasp) save them in a standard, non-proprietary format and even (shudder) edit them.

No foolin' folks, when the format was first released you were actually prevented from saving your own uncompressed PCM recording--perhaps an interview with your mom or a song you had written yourself--in any format other than Sony's proprietary and un-editable OpenMG format if you digitally uploaded it to a PC.

OpenMG was developed to maintain tight control on use of digital audio to protect copyright. As a result, you can't burn .omg / .oma files to Audio CD, there is only limited support for playback of .omg / .oma files (mainly or exclusively

Sony hardware and software), you can't open and edit .omg / .oma files in any audio editing programs and resave them in a standard format, and you can't share .omg / .oma files with other PCs. Pretty much the worst case scenario from an archival perspective.

So, in response to a rain of criticism regarding PCM file formatting, Sony finally (in Fall 2004) released a piece of software called WAV Conversion Tool that will allow folks to save their original mic-derived PCM recordings as .wav files. According to my contacts in the world of Hi-MD, it seems to work just fine.

WAV Conversion Tool is available at:

<http://sonyelectronics.sonymstyle.com/walkmanmc/wav.html>.

For further information see Sony's WAV Conversion Tool FAQ here:

<http://sonyelectronics.sonymstyle.com/walkmanmc/faq.html>

In the interest of supporting open-source solutions to the problems caused by proprietary software, I would like to point readers toward another option for working with .omg / .oma field recorded files. A gentleman who goes by the handle of Marcnet created a piece of software called Hi-MD Renderer, a program that will also let you resave .omg / .oma files as .wav files.

For what it's worth, this method is not 100% Andy approved.

First off, doing this sort of thing with copy protected music is outright illegal, and I take no responsibility for people abusing this approach to illegally duplicate copy protected music. The method for doing this is a bit complicated (it requires some level of comfort with DOS, for example) and apparently might: render the file un-openable; affect the audio quality of the resulting file in a negative way; or, due to the innate bugginess of SonicStage, actually delete your files outright. However, reports from users have been quite positive.

In any event, should you be interested, info about and a link to the software can be found at: <http://www.minidisc.org> and <http://www.marcnetsystem.co.uk/himd/>.

So if you've got a Hi-MD recorder that you're using for field recording and you're interested in creating standard PCM files, try out both approaches and see which one works better for you.

So if you've got a Hi-MD recorder that you're using for field recording and you're interested in creating standard PCM files, try out both approaches and see which one works better for you.

In any event, my feelings on Hi-MD can still be summed up with a proverb: Too Little, Too Late.

Here's what I don't dislike about Hi-MD:

1. The pricier models have mic inputs, so you can use an external mic.
2. You can upload recordings to your PC at faster than real time speeds via USB.
3. Unlike standard MD, you can to record uncompressed linear PCM audio at CD Quality (16bit/44.1kHz), in addition to ATRAC compressed audio.

Here's what I don't like about Hi-MD:

2. USB transfer can only be made easily using Windows PCs and must be done through Sony's SonicStage software. Although I've learned that Mac uploading support is out there, from what I've heard, it doesn't work all that well. Details on Mac support here: <http://forums.minidisc.org/index.php?showtopic=11840&hl=>
3. Although linear PCM is a standard way of encoding uncompressed audio data, PCM recorded files made with Hi-MD equipment are (apparently) created as, and must first be saved in Sony's proprietary OpenMG (.omg / .oma) file format once they are uploaded to a PC via SonicStage.
4. The discs are around \$7.00 bucks each--about as much as a blank DAT.
5. As with Sony's standard MD units, one cannot adjust the record level while recording is under way.

In Conclusion:

What does all this mean?

Well, the ability to digitally transfer analog-source recordings at high speed to a PC via USB is great, but...

Although the option to record uncompressed, CD quality audio is a boon for field recordists, the fact that these recordings must exist initially in a proprietary and heavily copy protected file format (.omg or .oma) if you digitally transfer them to PC is extremely annoying. Furthermore, we don't know what problems (if any) WAV Conversion Tool might introduce into your audio as a result of the conversion process from OpenMG to WAV.

And frankly, if you've got go through all these gyrations just to get a digital recording in a standard file format, why not just use something else to begin with?

Some Sony Hi-MD recorders:

Sony MZ-M100 \$400.00

Sony MZ-M10 \$300.00

Sony MZ-RH10 \$260.00

Sony MZ-RH910 \$200.00

.mp3 Recorders

It is possible to create decent quality digital field recordings using certain consumer-grade recorders intended for music--in particular, .mp3--playback. In fact, any .mp3 player with a mic input can be used for this purpose to a greater or lesser degree. Because of my obsession with creating high quality recordings, I'm only inclined to recommend this be done using equipment that can record uncompressed .wav files in addition to the various compressed music playback formats out there: .mp3, .rm and .wma. Although using various compressed file formats will save space, the quality of your audio will suffer.

These machines come with several concerns--first, they're not really intended for this purpose, so although they will work, professional equipment designed for field recording is better suited to most tasks. Second, if you lose power before wrapping up your recording, you stand a good chance of losing the whole thing. Third, since the primary intention of these devices is music playback and the upload and download of digital audio files, there's no knowing the quality of the mic preamps in them. Fourth, I don't know how much faith I have in their internal storage drives for long, mic-input derived recordings.

However, with .mp3 players growing in popularity, many folks might be in the market for one or have one around already. If you are looking to buy an .mp3 player and you are also interested in conducting audio field recordings, consider buying one with a mic input that can record uncompressed .wav files--that way you kill two birds with one stone, so to speak.

For the record, iPod really isn't the best way to go here. Although wonderful in many respects as a player, the iPod really falls short as a field recorder. Sure there are (at least) two microphone interfaces for the iPod--Belkin's Universal Microphone Adaptor and Griffin's iTalk--and sure the iPod records WAV files. However, at this point the iPod records 16 bit/8kHz WAV files. 8kHz is a pretty dern low sampling rate for digital audio. Especially when you consider that most digital field recorders with any chops record at a minium of 16 bit/44.1kHz. So, for now at least, iPod isn't a great, or even a good, field recorder.

Note that these devices should not be used for long-term storage of your field recordings. They will serve you best if you promptly upload your recording to a PC and burn a CD.

I don't keep up on this stuff at all. The equipment listed below was bandied about on various listserves several years back. In the intervening years since I added this section, chatter on the use of .mp3 players for field recording has diminished greatly. Does that make this a vestigial section? Although there are new digital music players out there with WAV recording functions, I'm thinking so. I imagine I'll keep it active for a little while longer, and perhaps I'll even update it eventually.

As far as I can tell all these units are discontinued by their various manufacturers. They're pretty cheap used, though.

Some recommended recorders:

iRiver iHP-120 20 gigabyte hard drive .mp3 music player. Can record and play .wav files, has a mic input and USB 2.0 for file up and download. Sold new for around \$360.00.

iRiver iHP-140 40 gigabyte version of the above. Sold new for around \$500.00.

Nomad Jukebox 3 Manufactured by Creative Labs, the makers of the SoundBlaster series of PC sound cards. You want to make sure you buy one of the hard drive-based models in the Jukebox series as opposed to the flash card recorder/players, and be sure to ask about a mic input and the ability to record uncompressed .wav files. Word is that this unit is actually quite sturdy. The 40 gigabyte model sold for around \$400.00, the 20 gigabyte model for around \$200.00.

Solid State PC Card Recorders

Over the past few years solid state field recorders have come to the fore. These machines contain no moving parts and record audio directly to memory cards such as CompactFlash (CF) cards of the sort used in many digital cameras. From the cards, recordings can be directly transferred to a PC and stored on hard disc, redundant file storage servers, burned to CD-R, etc. The cards can be re-used over and over again. Best of all, when using Flash cards, there are no moving parts. No moving parts means less power draw on batteries and fewer things that can jam, bend, wear or break! No moving parts also means there is no machine noise to intrude upon your recording!

On the downside, with an hour of CD-quality audio (16bit/44.1kHz stereo) requiring 630 megabytes of memory, even a 512 megabyte CompactFlash card would allow for less than an hour of uninterrupted, uncompressed audio at these settings. However, PC cards are both expanding in size and dropping in price. For instance, 1 gigabyte cards are becoming much less expensive--at the time of this writing (January 2006) 1 gig CompactFlash cards can be had for between

\$60.00 and \$75.00 if you shop around, and 2 gig (and higher) cards are becoming cheaper and more common.

Also, keep in mind something we learned the hard way: not all brands of CompactFlash cards will work well with every brand of recorder (or vice-versa!). Before dropping bucks on a CompactFlash card, contact the manufacturer of the recorder you are interested in to obtain a list of compatible cards.

If you are contemplating a solid state recorder for your work, there are some practical considerations. Since you need to upload the data off the card and securely store the audio, you need to have access to a PC with ample storage space and, to be more safe, some kind of optical disc burner to create additional back ups. With that in mind, if you're going to be living in a tent off in the bush for 6 months, a solid state recorder might not be the best choice for you. However if you have regular (or at least semi-regular) access to a computer and reliable power, a flash-memory based recorder is a great recording option.

For more details on working with CompactFlash recorders, please see the page we created on working with the Marantz PMD660, Field Recording in the Digital Age. Although it focuses on the PMD660, the suggestions provided will transfer to any solid state recorder.

The solid state recorders discussed below are **very** different from the smaller digital voice and dictation recorders available at office supply stores. While the smaller digital voice recorders create sound files in heavily compressed, proprietary formats (such as the Olympus .dss file format), these pro machines can record in uncompressed, standard formats such as .wav and broadcast wave, and do so at resolutions ranging from at least 16bit/44.1kHz to, in some cases, even 24bit/192kHz. My advice: from both audio quality and digital file management perspectives, stay the heck away from rinky-dink digital dictation and voice recorders if you have an interest in creating quality audio.

Solid state recording technology is one of the best digital audio field recording options currently available, and may well represent the future of field recording in general.

Edirol R-1 I haven't heard much direct feedback on this unit yet, so I still don't have much to say outside of what gets parroted off Edirol's press releases. On the plus side, according to such sources, it can record .wav at up to 24bit/44.1kHz, has an input for an external mic, can take up to 2 gig flash cards, has USB for fast file transfer, and is pretty small--on the largish side of "hand-held." A few immediate drawbacks are as follows: the mic input is a stereo mini-plug. I hate that. Also it looks like you can only record in stereo--which 1) eats up space and 2) I don't think it's all that necessary when recording interviews. It also features a mini plug for the mic input. Sigh. Seems to be selling for around \$420.00.

Edirol R-09 New kid from Edirol. 24 bit like the others. Writes to SD cards instead of CF, which I find annoying. Those little cards make me nuts. Has a built in stereo mic, which I think is lame too. Doug Boyd has one and he doesn't seem too hot on it. I'll see his at AFS and OHA, but it will be hard for it to impress me. Check it out here: <http://www.edirol.net/products/en/R-09/>. Sells for around \$400.00.

Fostex FR-2 Portable solid state/hard drive recorder that can record at up to 24bit/192kHz in standard broadcast wave format. Keep in mind that audio recorded at such high bit depth/sampling rates takes up A LOT of space, and there isn't a storage card out there right now that sports the necessary capacity for longer recording. Use of a portable hard drive will mitigate field recording and short-term storage issues, but introduces moving parts into the equation--overriding one of real virtues of memory card-based field recording. However, it's not like one must record at 24bit/192kHz. Lower bit depths and sampling rates will, as you probably realize, take up less storage space. The FR-2 will support recordings made at a variety of bit depths/sampling rates, from CD quality (16bit/44.1kHz) on up. Feedback thus far has been good, and it strikes me as a quality, professional piece of gear. For an interesting review, see here. Without the optional hard drive it sells for around \$1,100.00.

Fostex FR-2LE Holy Cow! If this little guy performs as well as it specs, look out! This thing looks AMAZING--24 bit, BWF recording, decent mic-pres, all sorts of great stuff. If only it were available! If only I could find some information on the Fostex website! Forthcoming recorder due out (according to B&H) in December. Don't hold yer breath, but do keep your fingers crossed! For those interested in some pictures, you can check the unit out at Oade Brothers (http://www.oade.com/digital_recorders/hard_disc_recorders/FR-2LE.html) for now. Here's the best part: list is \$499.00.

Marantz PMD-660 Portable hand-held PC card recorder. Marantz foray into the field of hand held recorders. The PMD660 can create WAV files encoded at 16 bit/44.1kHz and 16 bit/48kHz in mono or stereo. It has XLR jacks for mic input (yeah!), mini plug for line level analog in and outs (boo!), and USB in/out on the unit (whoopie!). Thanks to the intrepid research of VFC internship alumnus, Mr. Stuart Burrill, we now also know that the unit has only two .mp3 encoding options (64kbps mono and 128kbps stereo only) and doesn't have a limiter. I'm not bummed about the .mp3 thing, but I can see why no limiter might be troubling to some people. In the words of a Marantz rep, "The 660 is not a replacement for the 670, it is a lower cost, more basic unit."

Opinions on the machine tend to vary. I received word from Dr. Doug Boyd (fellow IU Folklore alumnus and Oral History/Folklife Archivist at the Kentucky Historical Society) regarding some testing he conducted at a recent folklorists gathering: "Andy, I did a workshop in Alabama this weekend and conducted an

A/B test on the 660 and 670 at 16bit/48 and the 660 was significantly quieter. Surprised the heck out of me." So far, so good. A thorough review of the unit from the perspective of radio journalists resides on the Transom.org site here: http://www.transom.org/tools/recording_interviewing/200503.pmd660.html and another thorough review by Bartek Plichta of Michigan State University aimed at researchers in linguistics can be found here: <http://www.bartus.org/akustyk/pmd660/>.

We picked up a PMD660 several months ago, and I've found it decent but, by my standards, the mic-pres are somewhat noisy. I also discovered, much to my chagrin, that the mic-pres are easily overwhelmed by sensitive mics. I recently had a conversation with Marantz technical support about this matter and they reiterated the comment made to one of my chums earlier: the PMD660 is a lower cost unit. Part of this lower cost includes fewer features than the other machines in the line. Part of this lower cost also includes lower quality electronics when compared to the other CF recorders in the line.

Still, despite the things that bug me about the unit there is a heck of a lot to like in the PMD660. No other solid state recorder in its price range has XLR inputs, and unlike similarly priced machines such as the M-Audio MicroTrack and the Edirol R-1, you can record in both mono and stereo. Battery life in my experience has been great, and I find the recording controls to be well laid out and easy to use. Furthermore, Marantz technical support is stellar--and the value of good technical support should not be underestimated. Not only do they actually answer the phone, they're damn good about actually answering your questions.

So overall I favor the unit and tend to recommend it ahead of comparably priced machines. You can check the PMD660 out at the Marantz website here: <http://www.d-mpro.com/users/folder.asp?FolderID=3629&CatID=19&SubCatID=180>. Retailing between \$450.00 and \$500.00 or so.

Now, the good stuff. There is an interesting solution to many of the problems I have with the stock PMD660. Oade Brothers (www.oade.com) performs a low-cost modification to the PMD660 that greatly improves the unit's performance. The difference is quite remarkable, actually. Their "Basic Mod" replaces the problematic mic-pres, which in turn cleans up the sound noticeably. Me and the fiancéé, the Mighty Dr. J, picked up one as our family field recorder, and down at the VFC we bought a few as well. Info on the mod can be found here: http://www.oade.com/digital_recorders/hard_disc_recorders/PMD-660MODS.html

Oade Brothers sells the PMD660s with the Basic Mod for around \$560.00, which isn't all that much more than a stock unit. So far I'm a very big fan—it's a lot of bang for the buck.

Note: interested parties should be aware that performing the modifications renders the original manufacturer's warranty invalid, so if you buy a modified unit you can't go crying to Marantz for help if it breaks. However, Oade Brothers does provide a 90 warranty, so you are not totally on your own.

Marantz PMD-670 A stereo/mono recorder that records both compressed .mp3, and .mp2, and uncompressed .wav and broadcast wave at up to DAT (16bit/48kHz) quality. Uses CompactFlash cards and comes with a USB interface. We bought one in July 2004 and a second later that fall. After monkeying with the unit for, Jeez--going on three years now, I'm still generally impressed, although my once blinding enthusiasm has dimmed. It is not a super-quiet recorder, for instance. However, when all is said and done, it's good field recorder in this price range--and that's where its strength lies. We generally use it to create 16bit/48kHz mono or 16bit/44.1kHz mono WAV files using both the mic and line inputs, and have been satisfied, if not thrilled, with what can do. 1.5 hour recording uploads in approximately 11 minutes via the USB on the unit from a standard (as opposed to high speed) CF card. And please note: at 16bit/48kHz mono you can get around 3 hours on a 1 gig card! Whoa! Compared to the PMD660, it has a greater range of recording options and different, electronics. These days it seems to list for between \$650.00 and \$700.00

Marantz PMD-671 This tough guy is the 24bit/95kHz recorder of the PMD line. In addition to this, from what Marantz says, compared to both the PMD660 and the PMD670, it has much-improved mic-preamps. Marantz seems to be working a three-tier marketing plan with these machines, with the PMD671 at the top of the heap. I have not heard much about it, but have talked with people who use it and like it a lot. Info on the unit here: <http://www.d-mpro.com/users/folder.asp?FolderID=3689&CatID=19&SubCatID=180>. Last I checked it came in at \$999.00.

M-Audio MicroTrack 2496 M-Audio enters the Solid State fray with a handheld 24/96 CompactFlash recorder. This unit was initially brought to my attention thanks to a post by Andrew Offenburger on the H-Net Oral History listserv. Based on the info on the M-Audio website I am struck by both the good and the bad. For instance, I like the fact that it uses CompactFlash cards as the storage medium, but I don't like the fact that it uses a 1/4" TRS plug for the mic input rather than an XLR. Sure, 1/4" TRS input is much better than the dreaded stereo mini plug, but still. A thorough Transom.org Tools pages review of the MicroTrack here: http://www.transom.org/tools/recording_interviewing/200512.maudio_microtrack.html.

I've recently learned a few things that bug me: 1) the phantom power output comes in at a low 30 volts—lower than the standard 48 volts needed to power most condenser mics, and 2) You can only record in stereo. Bad! 3) It has a built-in lithium-ion battery, so, much like the iPod, when the battery craps out I imagine that you'll have to replace the unit.

For the record, I kinda think most M-Audio stuff is junky, so it's going to take a lot for this unit to impress me. Going for around \$400.00.

Sound Devices 702 Oh boy! Remove the internal hard disk drive from the Sound Devices 722 (see below) and you have the Sound Devices 702, a slightly cheaper, pure solid state audio recorder. THIS is really exciting. If I wanted a 722 bad, I want this one worse. Thank Crom for my sensible fiancée, for without her wise counsel I would probably own one of these already, rather than save money for the new car I really need. Details here:

<http://www.sounddevices.com/products/702.htm>. List is \$2,175.00, and I recently saw it at B&H for \$1,850.00.

Tascam HD-P2 OK, here's where I get disappointed again. Doug Boyd--the perennial canary in the field recorder coal mine--picked one of these up and was pretty let down. Among his complaints were the need for the CF card to go through a "mounting" process before the recorder can be used. There were a few other things he had to say, but me being me I failed to write them down. I will gather more data the next time he and I speak. 24bit/192kHz recorder, cool looking too. Additional info here. In the area of \$1,000.00.

Zoom H-4 Handy Recorder To be honest, I have zero interest in this recorder. Pretty much the same way I have zero interest in the Edirol recorders and the M-Audio unit listed above which--like this recorder--are just on the list because I feel like I have to include them. I do not like them. Zoom (a division of Samspon) makes cruddy guitar effects pedals and junky home studio equipment, and I am assuming that the H-4 Handy Recorder will continue in this tradition by being either cruddy, junky or both. I also really do not like anything that has built in X/Y pattern external mic capsules. Could my opinion change? Sure, I guess so. For now, however, I don't have high expectations. Info available here: <http://www.samsontech.com/products/productpage.cfm?prodID=1901>. Lists at \$400.00, seems to retail between \$270.00 and \$300.00.

"Hybrid" Recorders

This category includes digital recorders that record to more than one format--hard disc and CD-R or CompactFlash and built in hard disc, for example. It's kind of a place to fit stuff that doesn't fit neatly elsewhere, so I didn't know what else to call it. I'm open to suggestions.

Marantz CDR420 Portable CD Recorder Basically a hard drive recorder with a built in CD burner. Although you apparently can't record to CD-R in real time, you can burn CD-DA and CD-ROM discs after the recording session is finished, upload via USB to a PC, output in real time via S/PDIF. Limited, as you might

imagine, to 16bit/44.1kHz recording. Info here: <http://www.d-mpro.com/users/folder.asp?FolderID=3639&CatID=4&SubCatID=142>.

Sound Devices 722 The object of my latest audio recorder love affair. Writes to either (or both at once) Compact Flash cards and/or an internal HDD. I dream of it at night. Info on this most splendid of things can be found here: <http://www.sounddevices.com/products/722.htm>. I want one. Bad. A steal at \$2,375.00.

Motherships

What do I mean by "Motherships"? These are currently the Mothers-Of-All-Field-Recorders out there. This is fantasy stuff for most of us, me included, so they're here mostly for voyeuristic fun.

Aaton Cantar-X Oh boy. Info here: <http://www.aaton.com/products/sound/cantar/index.php>. Lists for \$14,000.00.

HHB Portadrive Wow. Lush detail here: <http://www.hhb.co.uk/hhb/usa/hhbproducts/portadrive/index.asp>. A minimal expenditure at around \$13,500.00

Nagra V 24 bit HDD-based recorder. Nagra, Nagra, Nagra. Learn a bit more here: <http://www.nagraaudio.com/pro/index.php>. Lists at \$6,100.00, streets around \$5,900.00.

Sound Devices 744T A four channel version of the 722 above. An exciting little number. Info here: <http://www.sounddevices.com/products/744t.htm>. Around \$4,000.00.

Zaxcom Deva IV 6 channel 24 bit HDD recorder. Pretty too. Info on the Deva line can be found here: <http://www.zaxcom.com/audio/devas.shtml>. Lists for \$10,950.00.

Microphones

Using an external microphone is vital to making high-quality recordings. This is something we cannot stress enough. Built-in microphones complicate recording by requiring one to place the machine as close to the speaker as possible, they limit the amount of monitoring one can do to the recording because any contact with the machine while recording is underway will be picked up by the mic, and internal mics pick up an enormous amount of machine noise from the recorder itself.

Two distinct classes of microphones are dynamic and condenser mics. While condenser mics tend to be more sensitive, they also require a power supply (either a battery or what is called "phantom power" which is drawn from the recording device) to function and tend to be somewhat fragile. Dynamic mics are generally not as sensitive, but are more durable and do not require additional power of any sort.

Another distinction in mics comes in the way they pick up sound--the distinction between "directional" and "omni-directional" mics. Directional mics of various stripes pick up audio in an area directly in front of the microphone. Omni-directional mics pick up audio equally from all directions. The most common sort of directional mic is called a "cardioid" mic because it picks up audio in a somewhat heart-shaped pattern emanating out from the front of the microphone.

A further distinction can be made between mono and stereo mics. Mono mics record a single channel of audio, stereo mics record slightly different signals to each channel of a recording, creating a stereo effect when used with a stereo field recorder. With stereo recording devices, a stereo signal can be created through the use of two appropriately positioned mono mics or with a stereo mic. Those of you interested in recording live music should consider the merits of a stereo mic (assuming, of course, that you will be using a recording device that can record in stereo to begin with!). Although stereo mics are more expensive, a field recording of a musical event made with stereo equipment will more faithfully reproduce the experience of the live performance than will a mono set up.

On another note, we advise against using lavalier mics--the tiny clip-on lapel mics one often sees on television. Although they have the virtue of being less-obtrusive, the tiny electronics in most lavalier mic can't match the dynamic range of larger, hand held mics.

For most ethnographic and oral history interviewing a decent dynamic mono mic, whether directional or omni-directional, will work great. They are sturdy, less expensive and, since they don't require an external power supply, less of a potential hassle than condenser mics.

For a more in-depth discussion of microphones for field recording, including comparisons between various models, visit: www.transom.org

Mono Dynamic mics:

Audio Technica AT804 Omni-Directional. A good, sturdy field recording microphone. Runs between \$78.00 & \$90.00.

Beyerdynamic M-58 Omni-Directional. Well regarded mic for field recording. \$200.00

Electro-Voice 635A Omni-Directional. Nicknamed "The Hammer," the EV635A has been a staple in field interviewing, particularly broadcast journalism, for decades. Excellent sound, dependability and virtually indestructible. Sells new for \$100.00, used for around \$50.00.

Electro-Voice 635A/B Omni-Directional, identical to the above, but in black. \$100 new.

Electro-Voice 635N/DB Omni-Directional handheld dynamic mic. Another macho member of the EV635 family, a tad meatier than the A and A/B on account of its "neodymium magnet structure." Retail for \$120.00

Electro-Voice RE16 Supercardioid—a vocal mic marketed for public speaking and as a less-expensive option for broadcast use. I'm curious. Around 200.00

Electro-Voice RE50 Omni-Directional mic with a well insulated handle to reduce handling noise. Around \$140.00

Electro-Voice RE50N/DB Neodymium magnet equipped version of the above. A whole lotta mic. \$160.00

Sennheiser MD421 II Cardioid mic. The one we use at the VFC. A great mic, but somewhat pricey for most folks. \$450.00.

Shure SM58 Cardioid microphone. The familiar ball-top style mic that looks kind of like an ice cream cone. Around \$100.00

Shure SM63 Omni-Directional. Classic news gathering mic used for years by broadcast journalists. Approx. \$120.00

Shure VP64A Omni-Directional. Affordable, solid Shure mic. Priced between \$65.00 & \$90.00.

Mono Condenser mics:

AKG C535EB A cardioid condenser from AKG. Looks good and the price is right, but, as with most of the stuff in this category, I have no direct experience with it. Runs only on phantom power--not battery. Retail for around \$230.00.

AKG C900M Another cardioid condenser from AKG. As above, looks good. Phantom power only. \$200.00

Audio-Technica AT813a A cardioid condenser. We just picked one up and so far I like it a lot--it has a nice warm sound. Battery or phantom power. Same mic as the ATM31a below, just with a different name. Around \$150.00

Audio-Technica ATM31a A cardioid condenser, see above for details. Battery or phantom power. Same mic as the AT813a above, just with a different name. Around \$150.00.

Audio-Technica ATM10a An omni condenser, comes well recommended and looks good for the price. Around \$130.00

CAD Equitek E-100 A warm, wonderful, and odd-looking cardioid condenser. Scott Gillette, VFC field recording workshop guru, loves this mic, as do many others. Sturdy, great sounding and pretty cheap. Only available used, and it seems to go for between \$100.00 & \$150.00.

CAD Equitek e100² The second generation of the mic above--a few changes for a higher price. \$250.00

Electro Voice RE410 A new release by Electro Voice for the mighty RE microphone family. A cardioid condenser vocal mic. Looks good, but I have no additional info. Lists for \$300.00, retail will be lower.

Electro Voice RE510 Another new addition to the Electro Voice RE family. A supercardioid (a much tighter pick up pattern than a standard cardioid) condenser vocal/instrument mic. As with the above, looks good but I have no additional info. Lists for \$300.00, retail will be lower.

Shure SM86 A cardioid condenser from Shure's SM family of microphones. Don't know much about it at all. Retail for around \$180.00

Shure SM87A A Supercardioid condenser from Shure's SM family of microphones. As with the above, I don't know much about it at all. Retail for around \$220.00

Stereo Condenser mics:

AKG C-1000 A matched pair of mics for stereo recording. AKG makes top quality stuff, and VFC field recording workshop instructor, Scott Gillette speaks quite highly of these. A lot of mic at this price. \$300.00 for the set.

Audio Technica AT825 My ethnomusicologist buddy, Dr. Johnny Fenn, spent several months with this mic recording music in Malawi, South Central Africa. It took a beating and persevered. A great, dependable stereo condenser mic. Costs around \$340.00

Audio Technica AT822 Little brother/sister to the AT825. Retail for around \$240.00

Rode NT4 The mic-beloved of our summer 2003 intern, Stuart Burrill. Makes really nice recordings and looks like a medical device from the original Star Trek show. The price seems to range between \$450.00 and \$350.00

Rode NT5 A set of two matched mics for dual-point stereo recording. Dr. Doug Boyd of Kentucky Folklife likes 'em, and that's ok by me. \$300.00 for the set.

Microphone Stands

Microphone stands make the job of interviewing and music recording much simpler, and can greatly improve the quality of the audio you record. Most mics will require a clip or adaptor to attach to any stand. New mics frequently come with the proper stand adaptor. If not, any retailer from whom you buy your mic should sell appropriate adaptors. Radio Shack sells a clamp-on adaptor (catalog number 33-372) for \$5.00, which will clamp on to most smaller and larger microphones.

Atlas DS7 Desk stand. It's designed to sit on a flat surface but can pick up noise easily (for example, fingers drumming on the table, bumps against table legs) and limits where you are able to set up your interview since it must rest on top of something. Noise from table bumps can be reduced by folding up a towel (or sweater or foam mouse pad or what-have-you) and placing it under the base of the stand. \$15.00 - \$20.00.

AKG KM2210/9. High quality mic stand that won't suffer from the jitters prone to cheaper stands. Price really does matter with these things. Around \$75.00.

AKG KM251 stand plus the **AKG KM211/1** boom arm. My favorite stand/boom combo. The rig gets really small—around 2.5' when fully compacted. Sturdy too. We've been getting the pair for around \$97.00 total.

Cables and Accessories

Cable: Prices on cable vary depending on the brand, the quality of the cable, quantity of cable and types of connectors, but on average good cable seems to cost in the range of 75 cents through \$2.00 or so a foot. Make sure you tell your salesperson what mic and recording deck you will be using so you end up with the right connectors.

Windscreens: A windscreen is a foam or fabric cover that one pulls over the top of a microphone to reduce noise caused by air blowing across it. A windscreen is a necessity if you will be doing any recording outdoors. They are also very useful for reducing breath noise and "puh" sounds associated with pronouncing words beginning with the letter "P." Windscreens are generally made of one of two kinds of material: foam or a fuzzy stuffed animal/shag carpet-style fabric. The

fuzzy kind are much more effective at reducing wind noise. Unfortunately they also tend to be more expensive and will not necessarily fit every mic. Foam windscreens are frequently sold by manufacturers as matching accessories to particular mics, so there will generally be a proper foam windscreen available for any new mic you purchase. The fuzzy fabric screens and foam screens can also be used in conjunction with one another. Original manufacturer's foam windscreens generally run in the neighborhood of \$30.00-\$60.00 or more, depending on the microphone model. Rycote makes a line of good-quality fuzzy fabric screens that will fit many mics out there. Prices vary, but windscreens suitable for mics such as those listed above seem to fall in the \$60.00 range. Talk to a salesperson to be sure any windscreen you purchase will fit your mic.

Headphones: We strongly recommend using headphones, at least at the start of the interview and periodically throughout, to monitor environmental noise, sound levels and overall recording quality. Better headphones will certainly do a better job, but what is more important is that you simply use them at all—in other words, almost any pair is better than none. So if you've got a pair of old Walkman headphones, iPod ear buds, a half-way decent set of monitor headphones such as Sony MDR-7502 (around \$45.00) or a good set of monitor headphones such as Sony MDR-7506 (around \$99.99), bring them along and use them. The one tricky part to using headphones is being sure the plug on the end of the cord matches the input on your recorder. Thankfully RadioShack sells all sorts of inexpensive adaptors to facilitate this process.

Other Accessories: There are a few other odds and ends that might be useful depending on the type of equipment you choose. A microphone pre-amp boosts the signal from the mic to the recorder, and is a good piece of equipment to consider if you are using a professional-quality microphone with a consumer-grade recorder such as an inexpensive MiniDisc machine, an .mp3 player/recorder or even a laptop soundcard mic input. Of the gaggle of such devices out there, we have worked with two--both are small, inexpensive and do a good job of compensating for the lower-quality pre-amps built into less expensive recorders.

Shure A96F Line Matching Transformer. Not technically a mic pre-amp, however the A96F will give about a 12db boost to your incoming signal. The A96F is an in-line device--one end has a female XLR connector, the other a mini-plug. You plug your mic or mic cable into the XLR end, and the mini-plug end right into your recorder--MiniDisc, tape deck, lap-top mic-input port, etc. Wala. For more info, see Transom.org's MiniDisc guide which includes a good discussion of the A96F. Costs around \$45.00.

Fel Communications 35MX. Mono microphone preamp (Fel also makes a stereo version) that gives a 20db signal boost and reduces noise problems created by cheap built-in preamps in the aforementioned inexpensive MiniDisc, tape deck and lap-top mic inputs. We use them here and I'm quite impressed. An in-line

device like the A96F above. For further info, check out their site here:
<http://www.felmicamps.co.uk/Products/3.5seriesrange.html>. A neat little doo-dad.
Made in the UK and apparently only available in the US directly from the
manufacturer via the web. Around \$80.00.

Equipment Suppliers

Advice on buying this kind of equipment is pretty simple--check prices everywhere, ask a lot of questions and, as always, if something sounds too good to be true, it probably is. Prices on professional audio equipment can vary greatly from retailer to retailer, as can shipping charges. Many retailers will match another store's prices as well. To get the best deal, shop around. Additionally, the more questions you ask, the more you will learn. A good salesperson will have thorough knowledge of the equipment she or he is selling and be able to answer all or most of your questions. Finally, Caveat Emptor--let the buyer beware. Inclusion on this list of retailers does not convey an endorsement by the Vermont Folklife Center or me. At one time or another we have, or someone I know has, ordered from each of them. All the retailers below feature good prices, quality customer support and have good reputations, many of very long standing. We present this list to serve as a strong starting point for purchasing field recording equipment and not as the final statement on the matter. Good luck!

B & H
1-800-947-1181
www.bhphotovideo.com

Bradley Broadcast
1-800-732-7665
www.bradleybroadcast.com

Broadcast Supply Worldwide
1-800-426-8434
www.bswonline.com

Full Compass
1-800-356-5844
www.fullcompass.com

Markertek
1-800-522-2025
www.markertek.com

Minidisco.com
877-MD-ROBOT
www.minidisco.com

Oade Brothers Audio Inc.
229-228-0093
www.oade.com

Radio Shack
www.radioshack.com

Other Online and Print Resources

There's a whole lot more to say on this subject than what's here on this page. The websites and books listed below offer a great deal of additional advice on field recording equipment and ethnographic/oral history research in general, and have helped shape my thinking and discussion. Check them out.

Online Resources

Folklife and Fieldwork: A Layman's Introduction to Field Techniques

Updated (as of 2002) online version of the American Folklife Center's classic introduction to folklore/folklife fieldwork. <http://www.loc.gov/folklife/fieldwork/>

Historical Voices

An online component to the excellent work being done by Matrix at the University of Michigan. Both the general Historical Voices section and the education-focused Spoken Word Project tutorials have excellent information on field audio recording. Both pages seem to contain identical text with varied design, so I'm not sure if one version is being considered for retirement. If you happen to know, drop me a line. Great discussion of microphone pre-amps, stereo mic techniques, recorders and gobs of other stuff.

Field Audio Tutorial
<http://www.historicalvoices.org/oralhistory/audio-tech.html>

The Spoken Word Project Audio Technology Tutorial
http://www.historicalvoices.org/spokenword/resources/audiotech/audio_technology.php

Bartus.org's "Audio Technology" and "Recommendations" sections

Linguist Bartek Plitcha's website for Akustyk, a piece of linguistic analysis software, contains a wealth of information on field recording technology, digital audio, analog-to-digital conversion fundamentals and other related stuff in the "Audio Technology" and "Recommendations" sections--as well as full info on Akustyk software itself.

<http://www.msu.edu/~plichtab/index.html>

Transom.org's Tools pages

Transom.org maintains a great set of guides and other terrific informational sundries in the "Tools" section of their website--equipment, recording techniques, audio editing, etc. It's aimed at independent radio producer-types, but is quite useful for the rest of us as well. While you're at it, explore the Transom Talk forums--they contain a lot of good first hand reports about experiences with various pieces of equipment, among other stuff.

<http://www.transom.org/tools/index.html>

UCLA Oral History Program Magnetic Recording Equipment Guide

An oldie, but a goodie. A very good resource on analog cassette tape recording. <http://www.library.ucla.edu/libraries/special/ohp/ohpmag.htm>

Print Resources

Bartis, Peter. 2002[1979]. *Folklife and Fieldwork: A Layman's Introduction to Field Techniques*. 38pp. Print version of the website listed above. The long awaited revision of the 1979 classic is available free from the American Folklife Center at the Library of Congress. Seek it out here.

Fargion, Janet Topp, ed. 2001. *A Manual for Documentation Fieldwork and Preservation (2nd Edition)*. 91pp. A terrific book published by the Society for Ethnomusicology (SEM). If I have a favorite book on fieldwork equipment, this is the one. It fits in your shirt pocket, and can travel with you in the field for research or shopping excursions. A splendid publicaiton. Available directly from SEM here. \$12.00 for non-SEM members, \$6.00 for members.

Ives, Edward D. 1995. *The Tape Recorded Interview: A Manual for Fieldworkers in Folklore and Oral History (2nd Edition)*. 112pp. An oldie (the original edition was published in 1974), but a classic. Easy to find both new and used. List price is \$13.95.

Some Final Words

We hope you have found this resource useful. If you have any particular questions or comments about this page, field recording equipment or ethnography/oral history, feel free to drop me--Andy--a line and I'll do my best to help you out: akolovos@vermontfolklifecenter.org. This material is updated every few months, so check back from time to time.

Best of luck in your research!

**This document is also available via the World Wide Web at:
www.vermontfolklifecenter.org/res_audioequip.htm**

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