

Audio Recording: Frequently Asked Questions and their Answers

All of the questions below were submitted during 2003 through the web site www.soundrecordingadvice.com. John J. Volanski provides the answers.

The Questions: (click on the indicated link to go to the full question and the answer below)

Question #1: What kind of equipment (drum machine, recorder, etc) do I need if I am trying to make original beats, loops and songs at home? [*read question & answer below*](#)

Question #2: A guy who is going to do some recording for me said he could record the music, but it would not be a good place to mix the music. He also said he could master it though. What is "mixing" and how is possible to not mix but be able to master? What or how do we need him to record the songs so we can send them to someone to "mix"? [*read question & answer below*](#)

Question #3: I have set up a Gospel musical Group and I would like to start up a home-based recording studio. Please can you advise me on all the information required?
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Question #4: I need to connect my computer (which has analogue and SPDIF connections), a professional dual CD player, two studio ref monitors, an amp, and an EQ. What device(s) do I need to connect all these components together? I want the equipment to be expandable.
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Question #5: We have an U87ai microphone going into a Focusrite Platinum Vocal Master. We are experiencing "audible" modem noise from a Cellular telephone relay tower. Can you suggest something to help? [*read question & answer below*](#)

Question #6: For my home studio, I am looking for what I need to get a REALLY GREAT WARM vocal sound like the vocal sounds of Shania Twain and Faith Hill (I'm recording onto a Roland VS-2480). I'm trying to decide between the Neumann TLM-103 and the Manley Reference Cardioid mic. What do you think? [*read question & answer below*](#)

Question #7: How do I know if my optical digital cables have failed or on the verge of failing?
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Question #8: My son is in a rock band and they practice in my garage. I am building a 12'x18' room in the garage for them. Do you have some inexpensive tips to make it acoustically sound for sound leakage and reflection dampening? [*read question & answer below*](#)

Question #9: I'm considering buying an Alesis Masterlink. Any thoughts on the subject?
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Question #10: I have an Akai GX370D tape deck, but just recently I have started to have some trouble. When I play one side (FWD) the sound comes out fine. When I play the other side (REV) there is minimal sound. Also when the machine is playing reels, suddenly it will stop but the play

button is still switched on and lighted up. Do you service tape decks? Also, my Akai amplifier makes a lot of scratching noise when I adjust the volume, high or low and when it is switched on. Any ideas? [read question & answer below](#)

Question #11: I am thinking of starting up my own home recording studio. If I go digital, is my Packard Bell PC with a Celeron processor sufficient for recording?
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Question #12: I am thinking of buying a Kurzweil 1000GX module for the guitar samples in it. Can I control this with my guitar? [read question & answer below](#)

Question #13: Someone just gave me Cakewalk Home Studio 2002 as a present. I know nothing about this program. Any suggestions for a barely-beginner? Also, since the program is for my computer, will a microphone work on my computer? [read question & answer below](#)

Question #14: I have good mixers, good microphones, etc., but I am constantly upgrading as the money comes in. As far as a good monitor amp and speakers are concerned, would you buy pro gear or can top end hi-fi gear be used? Also, would you recommend outboard hard disk recorders or PC based multi-trackers? [read question & answer below](#)

Question #15: I play piano and drums but would like to include an array of other instruments and effects in the songs I record, so I'm wondering what pieces of equipment you'd recommend me buying in order to do this. [read question & answer below](#)

Question #16: I was reading recently about a program Paul McCartney uses where you just sing into a computer and a piece of software translates your singing into written music. Do you know anything about this? [read question & answer below](#)

Question #17: I am 16 years of age, and am researching into working with a record company or in a recording studio, and then maybe moving on to opening my own recording studio. How do I go about getting the qualifications and the knowledge I need to get into this career?
[read question & answer below](#)

Question #18: I am a beginner and I'm trying to start recording and creating tracks at home. I have the following items but I don't know actually how to put these items together: an MPC 3000 MIDI processor, a 12-channel mixer, 2 CD players, an audio receiver with monitor speakers, microphone, and a Pentium 233 computer with 40GB hard drive. Where do I start?
[read question & answer below](#)

Question #19: I am using a Sony stereo system as a monitoring system in my 24 track home studio. Is there any way I can modify the system for serious recording use? Is there anyway to make home studio monitors? [read question & answer below](#)

Question #20: My girlfriend is a vocalist. She is very good, but just really starting out, as we have just really got the studio up and running. Do you know where she can really get noticed?
[read question & answer below](#)

Question #21: I am currently running a hardware mini studio comprised of a drum machine, a sampler and a synth module. I would like to add a computer to this setup up, but I am a bit unclear

as to how this works. I would like everything to run through a hardware mixer. Any suggestions on how to configure everything? [read question & answer below](#)

Question #22: I'm planning to buy a Focusrite Platinum Penta for my home studio because I don't get satisfactory compressing from my Roland VM-3100Pro compressor. I read on your website that RNC 1773 is better, was it written after the Penta came out? Do you advise me to buy RNC1773 compressor? The compressor I want is basically for drums, and the Penta seems to be the most appropriate to process the sound before entering my mixer and recording to the computer. Another case I'm considering is to buy a Mackie UAD-1 and process audio after recording. What is the best solution for my problem? [read question & answer below](#)

Question #23: How do I get the professional sound that I hear on the radio? I am recording some R&B material and hip-hop and the recordings you hear on the radio sound so full - what is the main element to get that full sound? [read question & answer below](#)

Question #24: I was in a couple of bands back in the late 60's and early 70's, and have a couple of buddies who are spread around the globe. Given our extreme distance apart, is there any software out there that would let us record our individual tracks and combine them for a final mix? [read question & answer below](#)

Question #25: I've been looking at many mixers, many with "MAIN outputs", "Sub outputs", "Control room out", and "Monitor 1". What the heck do I need all these outputs for? [read question & answer below](#)

Question #26: I sometimes have trouble deciding if I have a good mix for a song. What should I do? [read question & answer below](#)

Question #27: I read your comments about the Fostex A-8 reel/reel on www.tapeop.com. I just saw one today that looked absolutely mint in a used electronics store. Are there other reel to reels I should consider? How about the Fostex model 80 or Tascam 388? How about maintenance? Should I go with a digital multitrack minus the CPU? [read question & answer below](#)

Question #28: How can I pass real time MIDI data between two different software applications executing simultaneously on the same PC? [read question & answer below](#)

Question #29: I need to know exactly what I equipment I need to get to set up a studio at my home to record gospel rap. I don't have a lot of money but if I can get all the things I need for \$400 or \$500, I would sure be grateful. [read question & answer below](#)

Question #30: I have a PC-based sound card (Audiophile-Delta 2496), a Behringer Ultra Curve Pro EQ DSP8024 and a Behringer MX2004A mixing desk. I cannot figure out from the manuals how to connect the three things together. Can you please help? [read question & answer below](#)

Question #31: What is ATRAC when referring to a MiniDisc (MD) recorder or player? [read question & answer below](#)

Question #32: I've just purchased a Korg Triton music workstation/sampler, Phonic MM1002 Mixer, AKG C1000S microphone, and a Dell Dimension 2350 PC with 6 USB ports and an Intel

Celeron Processor. I'm running Acid Pro 3.0 on the computer. How do I connect all this together to form a home studio? Do I need to purchase anything else? [read question & answer below](#)

Question #33: What is the difference between balanced and unbalanced audio lines? Why is this important? [read question & answer below](#)

Question #34: Should I put a couple of monitors in the drum room for the drummer to hear a mix or run some headphones over to that room (about 20 ft or so from the control room)? If I put monitors in there for the drummer, will they bleed off into the drum mics?
[read question & answer below](#)

Question #35: I've built a 20 x 25 ft recording studio. I have a lot of music equipment, but so far I only have a Zoom 1266 12 track digital recorder. I was about to buy a Carvin 16 channel (4-bus) mixer with a power amp included (\$1,099), which would allow me to use it in the studio as well as take it to gigs and use as a PA system. I assume I need to have a couple of speakers in the open room of my studio so the musicians can hear the mix. Do these need to be higher wattage speakers than those used in the studio control room? If so, do I need a separate amp for each set of monitors or is there an amp that will run the control room monitors and the open studio recording room monitors? [read question & answer below](#)

Question #36: I'm thinking I need about 7 mics for my new studio. 1 good vocal mic, 4 mics for drums, a bass mic and a guitar mic. Given my \$700 budget, could you make recommendations?
[read question & answer below](#)

Question #37: It is my intention to film & record a live band on stage in a Liverpool theatre later this year. Past experience has led me to use SVHS video recorders for capturing sound but I have always had difficulty in capturing ambient and general front of stage sound. Are you able to give any pointers as to a good miking system and type of mike for capturing such a sound?
[read question & answer below](#)

Question #38: How do I connect my Voice Processor to my mixer? The AVP (voice pro) has one main out and one line in. Where should I connect to the mixer?
[read question & answer below](#)

Question #39: I've been reading *Sound Recording Advice* and I'm trying to piece together a home studio. You recommend the BBE 264 Sonic Maximizer, and the Toshiba 512W VHS recorders, both of which have been discontinued and are pretty difficult to find. Can you give some comparable devices that are still available? [read question & answer below](#)

Question #40: I'm interested in building a home studio. I have experimented in the past with digital and analog and my preference is the latter due to its warm and live sound. Although the recordings sound great, I often find that they are too polished. I want to explore a more vintage sound, so our band can capture a more raw feeling in our recordings. Particularly, I would like the bass drum, bass guitar, and lower frequencies to come through clearly rather than muddy and distorted. I have found that 4 channel reel-to-reel recorders are ideal when recording bass and drums. Since I'm fairly new to the game would you suggest that I buy a reel to reel and begin here or go digital or both? [read question & answer below](#)

Here are the answers along with each full question:

Question #1: What kind of equipment (drum machine, recorder, etc) do I need if I am trying to make original beats, loops and songs at home?

Answer #1: You can take two different paths here. If you have (or want to buy) a good computer, you can buy a loop-based recording software package for it (such as Cakewalk Fruity Loops, Sonic Foundry Acid Music, Aturia Storm, Cakewalk Plasma, Ableton Live) and record your loops and beats on the computer. These software packages are all under \$100 (except Ableton Live). You will find that editing on a computer is the easiest way of creating your own music. As you get more money, you can add software synthesizers to your computer and do everything within the computer. Note that you need to have a capable computer (fast processor, plenty of RAM memory, large disk drives, etc.) as you add more and more applications to it. And you will need to be somewhat computer savvy to deal with crashes and other maladies of owning a computer.

The other path available is to go with all standalone hardware equipment, then you can buy any of several new or used drum machines on the market (Boss DR-770 or DR 670 or DR-3, Alesis SR-16, Zoom MRT-3) and perhaps a synthesizer (a good one would be the Korg MS2000) and record your loops to a digital recorder (perhaps the Fostex VF-80 or VF-160). This will be fairly pricey, and you might also need a mixer, depending on the recorder you use. Optionally, you could also buy one of the Groovebox workstations like the Roland MC909, which records audio and MIDI and syncs your loops automatically (approximately \$1500; see <http://www.harmony-central.com/Synth/Data/Roland/MC-909-Groovebox-01.html>).

Question #2: My friend is going to get 4-5 songs recorded for a demo album. The guy who is going to do the recording said he could record the music, but it would not be a good place to mix the music. He also said he could master it though. My question is what is “mixing” and how is possible to not mix but be able to master? What or how do we need him to record the songs so we can send them to someone to “mix”?

Answer #2: There are 3 distinct operations in making a record or demo.

Tracking is the act of recording one or more separate tracks to some sort of recording medium (such as reel/reel tape, a computer or some other standalone recorder). Each track could be a different instrument or vocal. Mixing is combining the individual tracks that you recorded during tracking into (usually) a stereo recording. During mixing, you set the relative volume levels of the tracks and add EQ or echo or reverb or whatever sounds right to make the tracks into a coherent song. You also "steer" the tracks somewhere in the panorama between the left and right speakers. Mastering is the act of taking one or more mixed songs and adjusting the volume, compression and EQ on all of them so that they hang together in a group for the desired effect. Also during mastering, you will choose the order of the songs and how much silence is between each song. When this is all determined, the songs are then written to a final master recording (a CD-R, a cassette, MiniDisc, DAT or whatever).

If your friend is not going to mix your songs, then he needs to track the individual tracks to a portable medium so that the songs can be taken somewhere else for them to be mixed. Find out what type of recorder he is going to use to track the songs. Ask him what type of media he is going to put the tracks onto for you to take to a mixdown house. If he is using a computer to

record the tracks, ask him what particular software application he is using to track the songs (Cubase, Pro Tools, Cakewalk, Bias, etc). You will then need to find a mixdown house that can handle that particular format.

Question #3: I am based in Uganda and a Gospel music singer. I have set up a Gospel musical Group and I would like to start up a home-based recording studio. Please can you advise me and send me the necessary documents and all the information required?

Answer #3: This is a question I receive often: *Where Do I Start?* So, here are some questions you need to answer for yourself. What are you intending to record in your home studio? Mainly vocals? MIDI instruments? Guitars, basses and drum kits? Do you have access to buy equipment there in Uganda (or wherever you live)? (Are you in a city or out in the sticks?) What kind of budget do you have for the equipment, furniture and studio furnishings? Do you want a computer-based system (are you computer savvy) or a system based on standalone hardware recorders, mixers, effects devices etc?

There are about 1,000 different questions to be asked....in fact I wrote a book about it!

The first thing to do is to start becoming educated in the art of home recording with free info on the web.

Go to these web sites and learn all you can before you start to buy equipment!

<http://www.soundrecordingadvice.com/>

<http://www.recordingwebsite.com/>

<http://www.musicianstechcentral.com/>

<http://www.homerecordingconnection.com/>

<http://www.harmony-central.com/Recording/>

You will find many more sites listed here: <http://www.harmony-central.com/Recording/sites.html#general>. In addition, get yourself signed up for a free copy of *Tape Op* magazine (<http://www.tapeop.com>).

Question #4: I have a question- I need to connect my computer (which has analogue and SPDIF connections), a professional dual CD player, two studio ref monitors, an amp, and an EQ. What device do I need to connect all these components together? Is it a mixer? Does it need to be analogue or digital? I am going to be previewing many CD's and will soon be involved in recording and production of the music, so I want the equipment to be expandable.

Answer #4: Sounds like you intend to do recording to the computer and you intend to monitor the audio through your amp/studio monitors. Is that correct?

If so, then yes you will need a mixer. The mixer will allow you to connect multiple analog sources together, mix them to a stereo signal and send them to the computer for recording through your hardware interface (where I presume your analog audio and digital audio connections are located). The mixer will also allow you to impart EQ on the mixed signal or to any one of the separate signals before they are mixed together (using a connection on the mixer called INSERT). Some mixers have separate MONITOR outputs where you can connect an amp and monitor speakers. In the mean time (before you buy the mixer), if you just want to play CD through you amp and monitor speakers, you can connect the output of the CD player right in to the amp line level inputs. If the amp does not have it's own volume control, you may be able to control the volume

with the CD Player. If the CD Player does not have its own volume control, my book shows you how to build a simple linear fader volume control for about \$5. See the block diagrams on my web page for info on how to hook up various devices.

You may also be able get away with not using a mixer if you record your instruments and vocals one at a time through your computer's hardware interface to an appropriate software recording program. The software recording program will need to have the ability to mix the recorded sounds together inside the computer and output a stereo mixed signal. Then you can plug the stereo audio outputs from your computer into your amp and monitor speakers.

Question #5: We have an U87ai microphone going into a Focusrite Platinum Vocal Master. What we are experiencing when recording or when we have the mic on, is "audible" modem noise from a Cellular telephone relay tower. It is about 300 yards from our house where we have a home studio. I have tried it in several rooms to no avail. The house is mostly brick. Can you suggest something to help?

Answer #5: Remind me not to move next to any cellular relay towers! The problem with these types of issues (noise induced in your home electronics from cellular, television, radio, radar and even ham radio transmitters in your area) is that it is incumbent upon *YOU* to fix the problem, not the owner of the offending transmitter. The FCC expects your equipment to have the proper filtering and shielding to prevent this type of unhappiness.

This might be a tough problem to solve, since you have a high-energy transmitter so close to your house. The offending RFI (radio frequency interference) could be coupling into your system in any number of ways. You may need to try a number of different things to eliminate it.

First, check the AC power to your studio. Does the RFI noise appear in any other equipment or in any other groups of connected equipment? Make sure you have high quality RFI filters in between your AC source and your equipment. I'm talking about professional equipment here (e.g., Furman), and not the \$4 power strips from Home Depot.

Next, make sure you have high quality cables and connectors throughout your system. In your case, you can't afford to use the cheap ones, because the shielding in them will be inadequate to stop the RFI penetration from such a strong nearby source. For the cable between the U87 mic and the mic preamp, swap it out with several other makes of high quality mic cable to see if the coupled RFI disappears.

The RFI might be coupling right into the U87 mic electronics. Does the RFI noise appear if you swap out the U87 with a different mic but keep everything else the same? If the problem really is the U87, then it is going to be a tough one to solve. One thing you could try is to construct what is known as a Faraday Cage for the mic. A Faraday Cage is used in certain sensitive (and Top Secret) electronic laboratories to prevent the coupling of radio energy into and out of the lab through the air. In those cases, the whole lab is enclosed in a fine copper wire mesh that is grounded with copper straps or braids; none of the RF energy can penetrate it through the air. I'm suggesting you try something similar by building a small wire mesh cage that can enclose the mic. It won't interfere with the audio being picked up by the mic, because the mesh will be acoustically transparent. (It might look funky though!) Construct the cage with 1/4" wire mesh (which should protect up to wavelengths of about 50GHz). Construct it to fully enclose the mic except for a small

hole where the mic cable emerges. Find some copper braid and solder or weld the braid onto the cage. This braid will then need to be grounded to a known good ground. Don't just tie it to the center screw on an AC receptacle unless you know that the screw is actually grounded. See my book for more info on how to handle grounding in the studio and installing a good ground.

The Focusrite preamp could be a suspect also. Do you have another mic pre you could try in place of the Focusrite just to verify that it is not the source of the noise? If it turns out the Focusrite is the culprit, you can try running a copper braid from the Focusrite metal chassis to a known good grounding point, or you could construct another Faraday Cage for it.

Question #6: For my home studio, I am looking for what I need to get a REALLY GREAT WARM vocal sound (I'm recording onto a Roland VS-2480). I should point out that I really, really like the vocal sound of Shania Twain and Faith Hill which is basically the sound I'm going for and who I understand use the Manley Gold Ref mic (although I have no idea what preamp or other producer/engineer techniques might also be employed). I'm trying to decide between the Neumann TLM-103 and the Manley Reference Cardioid mic. What do you think?

Answer #6: The TLM-103 is a great very low-noise, high-sensitivity flat response mic. I don't know that it will impart "warmness" to a vocal recording though. Perhaps it's crystal clear response coupled with the tube electronics in the Manley VOXBOX will do just that. I think that the Manley Gold Ref Mic might be a better vocal choice, however. I've heard about people getting good results in recording instruments with the TLM-103s. I don't see how you can possibly go wrong recording your vocals with a Manley Gold Reference Mic through a Manley VOXBOX. Your checkbook might be sore for quite awhile though.

Question #7: How do I know if my optical digital cables have failed or on the verge of failing?

Answer #7: That's a good question, since there is no way to connect a digital volt meter (DVM) to them and measure continuity. Photons travel through optical cables, not electrons! Once, I had an optical digital cable start to fail and then completely fail. It drove me nuts trying to figure out where the problem was when it first started to happen. The failure started as small "ticks" or "crackles" in the audio. I checked all the electrical cables in the chain and even cleaned their connectors with contact cleaner. This didn't fix the problem. Eventually, I tried to replace a certain optical cable in the chain with a different one. As soon as I grabbed the cable, the noise ticks turned into a loud noise hash and the cable failed completely. I replaced the cable with a new optical digital cable, and all was well. Note that the failed optical digital cable still was able to pass red laser diode light from one end to the other, so this is not a reliable way of determining if an optical cable is ok or not.

Question #8: My son is in a rock band and they practice in my garage. I am building a 12'x18' room in the garage for them but don't have a clue how to make it acoustically sound. Do you have any tips for sound leakage and reflection dampening that are relatively inexpensive?

Answer #8: Yes, I do, but doing acoustics the correct way is rarely inexpensive! My book has about 40 pages on studio acoustics, layout and furniture. Here is a short course for you:

- You can only stop sound with mass. Putting up egg cartons or foam on the wall will not stop sound leakage out (or into) your garage.
- A cubic room (like a garage) is worst for standing waves. You want to break up the standing waves somehow.
- You can treat the inside of the room with acoustic foam, diffusors and bass traps to absorb the reflected sound within the room. This will tighten up the response of the room.
- Go here and download/read this primer on acoustics: <http://www.acoustics101.com/>. This primer will get you up on the learning curve about acoustics in the studio. The folks at Auralex (www.auralex.com) are a great resource for acoustic products.

Question #9: I'm considering buying an Alesis Masterlink. Any thoughts on the subject?

Answer #9: I think it is a killer piece of equipment, especially for folks who do everything with outboard equipment. If you do everything inside a computer using Pro Tools (or the like), then the usefulness of the Masterlink is questionable. With the computer, you have hard disk recording, plug-ins for mastering (and just about anything else you can imagine) and the ability to write the songs in any order to a CD in the Red Book standard, so you probably wouldn't need the Masterlink. But if you use standalone hard disk recorders or multitrack reel/reels, hardware mixers, outboard effects boxes, etc., then the Masterlink looks like a real nice mastering tool. I notice the price has come down recently also, which makes it even more attractive. I recommend it.

Question #10: I have an Akai GX370D tape deck, but just recently I have started to have some trouble. When I play one side (FWD) the sound comes out fine. When I play the other side (REV) there is minimal sound. The sound is very low. And I have to turn up the volume quite high to get a higher output of sound. Also when the machine is playing reels, suddenly it will stop but the play button is still switched on and lighted up. I then have to stop playing and re-play. But sometimes it does not play straight away even though the play button is lit up. I have to wait for a while until it starts to play again. This is becoming a major problem. The pinch roller is still pinching the tape. The two slim levers on right and left fall down, but everything else remains in tact. Power is still there. Do you service tape decks? Finally my Akai amplifier makes a lot of scratching noise when I adjust the volume, high or low and when it is switched on. Can that be fixed or is my amp on its way out?

Answer #10: Reel/reel machines are fun aren't they? I've had at least one in my possession since the late 60s. However, they do have a few problems that creep up from time to time, and it looks like you found out about that!

The probable reason that one side of the tape sounds good (lots of high frequencies) and the other side of the tape does not (muddy or low volume) is that the tape head is out of alignment with the tape that is playing. At this point, you don't know if the tape was recorded with an out-of-alignment record head or if the playback head now has moved out of alignment. Did the tape ever play correctly? If it did, and now the tape sounds muddy, then most likely the playback head is out of alignment or it has a big glob of oxidized tape material deposited in the playback tape head gap (which will prevent proper tape-to-head contact). Give the tape heads a good cleaning with the proper cleaning solution and a Q-tip. There is a good description on how to do that here: http://arts.ucsc.edu/ems/music/equipment/analog_recorders/Analog_Recorders.html. (Print that

out and READ it!) If it appears that the problem is tape head alignment and you don't know how to align tape heads (don't ever touch them with a magnetized screwdriver!), I highly recommend that you leave that task to a trained technician. The less likely problem is that the playback head has become worn out and will need to be replaced. Take a close look at the surface of the tape heads with a dental mirror. If the metal of the head appears worn down into the gap, you may need a new set of heads. You will find that these are not cheap, especially for old multitrack tape decks. You will need to refer this to a qualified tech unless you are a tech or engineer yourself.

The problem with the stopping of tape play even though the pinch roller is engaged sounds like the drive belt has become old/stretched/cracked (just like all the rest of us eventually) and may need to be replaced. If you dare open up the unit, observe the drive belt when this stopping phenomenon occurs. If the pinch roller is engaged and the drive motor is turning, but the drive belt is NOT turning, you need a new drive belt! See the text in my book on page 290 on how to fix this. You should be able to do it yourself, as it isn't really that big of a deal.

I personally do not service tape decks. Try doing a Google search for "audio technician <your city>" or perhaps "music equipment repair <your city>" and see if someone pops up in your neighborhood. Also, check the Yellow Pages. A less desirable solution is to pack it up and send it somewhere else via UPS or some other carrier, but then you are at the mercy of the delivery guys who can be very brutal with delicate electronic equipment.

The scratchy volume control problem can be easily solved if you know what cleaners to buy and how to use them. See page 288 in my book for the complete lowdown on how to solve this problem.

Question #11: I am thinking of starting up my own home recording studio. I haven't decided whether to do it in analogue or digital and don't really know if my computer has the capacity for handling digital recording. It is a Packard Bell PC with a Celeron processor. Do you know whether this computer is sufficient for recording?

Answer #11: You need to find out what speed the processor is, how much RAM memory you have, the speed of your hard disk drive and how much hard disk space you have available. All of those will affect the computer's suitability for home studio use. Have you selected a software application yet for recording (i.e., Cakewalk, Bias, Sonic Foundry, Pro Tools, etc.)? You should first check the web site for the application you are thinking of buying and see what the minimum system requirements are for your computer if you decide to run that program. Your computer may be ok for audio recording, or it may be that the increased processing load on the computer will bring it to its knees.

Question #12: I am thinking of buying a Kurzweil 1000GX module for the guitar samples in it. Can I control this with my guitar?

Answer #12: The Kurzweil 1000GX is a MIDI module, so you need to control it with a MIDI-capable instrument such as a MIDI keyboard. The only way you can control it with a guitar is if it is a MIDI guitar (i.e., a guitar with a MIDI digital output). You can find more info here on the Kurzweil 1000 series of modules: <http://www.sospubs.co.uk/sos/apr00/articles/kurzweilretro.htm>

Question #13: Someone just gave me Cakewalk Home Studio 2002 as a present. I know nothing about this program and all of the loops and acid files that they are talking about. I want to learn everything I can about it. What do I do? Also, since the program is for my computer, will a microphone work on my computer? Any other suggestions for a barely-beginner?

Answer #13: The first thing to do is check to make sure your computer has enough horsepower to run Cakewalk effectively. Check the side of the Cakewalk box for Minimum System Requirements to see if your computer measures up. Does it?

To use a mic with your computer, you will need a sound card that has a mic input. What sound card do you have in the computer? Hopefully it is something like a Creative Soundblaster 16-bit Live or 24-bit Audigy (or better). If you are going to buy a sound card for your computer, get at least a Creative Soundblaster Live 5.1 or better. The Soundblaster Audigy or Audigy 2 would be even better. If you want a more professional hardware interface for your computer, see my book.

As for learning more about Cakewalk, I advise you to read the manual and any help pages that came with the Cakewalk program. See if you can find a Cakewalk User's Group or a list that discusses Cakewalk on the Internet and join it. Lurk on the list for a while and see what people are doing with Cakewalk and how they do it (or check their archives if they have them). Then, send in some of your questions and the "Cakewalk Pros" will answer them for you.

You need to buy yourself an informative book that describes how to record and how to set up a home studio. Get one that is written in a simple straightforward manner so that non-professionals can understand it. Find that book here: www.soundrecordingadvice.com/!

Question #14: I have good mixers, good microphones, etc., but I am constantly upgrading as the money comes in. As far as a good monitor amp and speakers are concerned, would you buy pro gear or can top end hi-fi gear be used? I know pro audio is designed to be tough, but this is based at home where things stay put. Would professional sound dampening in the monitor room affect the relative sound of the pro and high-end units? Lastly, given PCs these days, would you recommend outboard hard disk recorders or PC based multi-trackers? So far, I have my doubts about PCs, as mine with a 1.2 GHz processor and 768Mb of RAM struggles to keep up when external MTC is used to sync a mix.

Answer #14: The difference between pro gear and high end hifi (as far as a power amp and monitor speakers go) is not only that pro gear is generally more rugged, but that pro gear is generally designed to give the most flat response across the audio spectrum. The idea is to give the audio engineer a neutral tool so that he can determine what is missing or out of whack with a mix. This is not necessarily the design goal for hifi speakers, although many of them do offer amazingly flat response, especially when you get up in the \$5000 level. My advice would be to stick with the equipment that is designed for the specific studio mixing application. That said, I am using hifi speakers in my home studio, but they are a special case. The NHT Superzeros are known to be ruler flat from 100Hz up to 20kHz, plus they are only about \$200 each in price. In addition, they are small, so I can monitor them in their near field. (You have to use them with a subwoofer though, because there is no bottom octave reproduced in them.) I recommend them to anyone who is establishing a budget home recording studio. If you *know* of a set of hifi

speakers that are designed to be ruler flat across the audio spectrum, then I can't think of a good reason why you couldn't use them in your home studio.

I highly recommend that you go for some acoustic treatment in your monitor room. It makes a big difference and really tightens up the response of the room. Look into the Auralex Roominators at www.auralex.com. This is also very dependent on what you intend to do for your monitor speakers. If you listen to small speakers in the near field (like I do with my Superzeros), then the room response becomes less of an issue. What you hear is maybe 80% near field speakers and 20% room. However, if you listen to bigger pro or hifi speakers from some distance away, say 8 feet, then the room response becomes a very big deal. It can ruin the response of an otherwise flat set of speakers at the particular point where you are monitoring. This is because of an acoustic phenomenon known as room modes.

You can read more about room modes here or in my book:

<http://www.kuro5hin.org/story/2002/6/9/15027/40923>

<http://www.avroomservice.com/glossary/room%20modes.htm>

<http://www.asc-hifi.com/articles/ht2.htm>

<http://www.mcsquared.com/metricmodes.htm>

I use my Mac for a computer-based MIDI sequencing program, but I use outboard digital recorders for any audio recording. I don't like all the hassles with computers, especially the crashing and hang-ups, etc. So, I sacrifice some of the editing and plug-in flexibility on a computer for a rock-solid recording platform that never crashes or hiccups. I use MTC to sync up the Mac sequencer as a slave to one of the digital recorders (or vice-versa). If money is no issue, then I guess it all comes down to what you feel most comfortable with. You can turn out pro quality recordings with either method. If you use a digital recorder with a digital mixer that has onboard digital effects, then you might never need to leave the digital domain. You can then make a CD-R of your mix in the digital domain and never incur another A/D and D/A conversion. This can result in cleaner recordings with less noise and signal distortion.

Question #15: I play piano and drums but would like to include an array of other instruments and effects in the songs I record, so I'm wondering what pieces of equipment you'd recommend me buying in order to do this. I haven't got too much money at the moment, so would it be possible for me to just buy a keyboard that could synthesize the sounds of loads of different instruments and then record from that onto a four-track recorder?

Answer #15: Yes, the best way to do what you are describing is to get a keyboard instrument that is capable of playing back multiple simultaneous voices (instruments). I think the best thing for you to do is to get a keyboard instrument that has an onboard sequencer. The sequencer will allow you to record the performance (as opposed to recording the actual audio) of each part in perfect sync with the other parts of your composition. You will be able to edit the performance for wrong notes, durations of notes that are too long or short, locations of notes in the measure, etc. It gives you much more control than trying to edit something in the audio domain on a tape recorder. Plus, if you record a part as a tenor saxophone and later want to change it to a soprano sax, you can easily change the voice associated with that part, something you can't do on an audio recorder. Once you get all the parts recorded into the sequencer, you could play back the sequence and record those parts in stereo onto 2 tracks of your 4track recorder. Then you can add some other sounds on the other 2 tracks of the recorder if you want, and then mix the 4 tracks down to stereo. Be aware that if you are using a cassette 4 tracker, the sound quality will most likely be less than

stellar. One thing you can do is record the entire performance in the keyboard sequencer and then go directly to a CD recorder for the master. Direct to digital! This will give you the best sound quality and will be the easiest and cheapest solution to start (as long as you are not trying to add vocals and other acoustic instruments like a real piano, real drums or acoustic guitar).

You can save some money by looking around for a used keyboard instrument that has an onboard sequencer, plenty of RAM memory for onboard samples of real instruments, large amount of polyphony (the ability to play multiple instruments at the same time), and the ability to mix them all together into a stereo output. Something like the Kurzweil K2000S or K2500S are examples of this type of used instrument. Check out these links for more info:

<http://www.harmony-central.com/Synth/Data/Kurzweil/K2000S-01.html>

<http://www.computer-music.com/articles/artcl002-05.htm>

http://www.kurzweilmusicsystems.com/html/k2000_series_comparison.html

http://www.kurzweilmusicsystems.com/html/k2000_k2500_comparison.html

<http://www.kurzweilmusicsystems.com/html/k2500.html>

http://www.kurzweilmusicsystems.com/html/k2500_demos.html

This will give you an idea of what you can do with just this one keyboard. Hopefully, those links will give you some idea of what to look for in a keyboard of this caliber. To find representative used prices on any home studio equipment, go here: <http://www.prepal.com/>.

Question #16: I was reading recently about a program Paul McCartney uses where you just sing into a computer and a piece of software translates your singing into written music, which you can then play around with and make the software play on different instruments. Do you know anything about this?

Answer #16: For information on singing-to-notation transcription software, check out these links:

<http://www.recognisoft.com/info.htm>

<http://www.wildcat.com/Site/Reviews/JazzEducatorsJournal.htm>

Plus there are plenty more links at this spot:

<http://www.thesingingspot.com/links/musicsoftware.html>

Question #17: I am 16 years of age, and I currently am looking into my future career. I am researching into working with a record company or in a recording studio, and then maybe moving on to opening my own recording studio. I was wondering how I would go about getting the qualifications or the knowledge in which I may need to get into this career.

Answer #17: The first thing you should do is start reading everything you can about audio engineering and recording. Get yourself some subscriptions to magazines such as Electronic Musician and Mix (for example). Mix is good because it often gives the insights of different record producers and other movers in the industry. Get yourself a free subscription to Tape Op magazine (www.tapeop.com). Get some informative books on the subject and read them. Learn how to solder, recognize electronic components, and what those components do. Get a few audio-related kits and put them together (see www.paia.com). See if you can get an internship at a local recording studio in your area. Tell them you are interested in it as a profession and see if they will let you help out around the studio so you can figure out what's going on (and if you actually like that kind of work).

Question #18: I am a beginner and I'm trying to start recording and creating tracks at home. This is the equipment that I have but I don't know actually how to put these items together: an MPC 3000 MIDI processor, a 12-channel (8 primary channels) mixer, 2 CD players, an audio receiver with monitor speakers, microphone, Pentium 233 computer with 40GB hard drive and CD-R burner capabilities. My intent is to be able to record and sample audio sound through the MIDI processor and come out of the MPC run into the computer and record through the CD-R burner. Additionally, I have a version of Cakewalk (I don't know the version). Please help me in this matter, for I've been stifled for months and know one seems to be able to break this down to me in a way (simple) that I can understand.

Answer #18: First of all, find out what the recommended *minimum* computer capabilities are to run your version of Cakewalk. I am guessing that the 233MHz Pentium is at the very bottom of the level of acceptability. I am concerned that the computer will be brought to its knees if you try to do any kind of serious recording with it. But maybe not, so check it out. It should tell you on the box Cakewalk came in (if you still have it) or send an email to Cakewalk's customer service folks and ask them. Optionally, you could join a Cakewalk discussion forum on the Internet somewhere.

Next, the MPC is good for what you want to do in collecting sampled sounds. I suppose you can play them back by assigning them to pads on the MPC, but aren't you going to need a keyboard/synthesizer also (to play back pitched sounds/samples) like bass guitar and other chords? You should think about what you want to accomplish musically here.

Your PC is going to need some sort of hardware audio interface that will allow you to get your audio sounds from the MPC or possibly from the mic/mixer combination into the computer so that Cakewalk can record it. Take a look at this diagram on my web site:

<http://www.johnvolanski.com/studio7.html>. It shows a hardware interface for the computer. Basically, this consists of A/D and D/A converters to get the analog audio into and out of the digital computer. At the cheapest, this is a Soundblaster audio card (not recommended by me for serious audio work, but it can perform ok until you get \$\$ for something mo better). A much better solution would be something like this: <http://www.m-audio.com/products/m-audio/quattro.php> or any of these interfaces:

<http://www.edirol.com/products/info/ua5.html>

<http://www.edirol.com/products/info/ua20.html>

<http://www.edirol.com/products/info/ua700.html>

Also, check out the MAudio Audiophile 2496, which was about \$150 the last time I checked. You can get audio interfaces that interface to your computer thru the USB, Firewire or PCI buses.

Once you get all that together, you will be able to record tracks from your MPC or your analog mic/mixer into the audio interface and then into Cakewalk on your computer. You will be able to build up tracks in Cakewalk until you have some sort of composition (or until you have reached the performance capabilities of your computer, whichever comes first!!). I am not entirely sure how you will be able to use your Computer's CD burner to record your final mix from Cakewalk. Check out the Cakewalk manual, and see what it says about recording Cakewalk's mixed output to the CD burner without leaving the computer. It seems like you should be able to do this. Most likely you will need to create a WAV file of the song using Cakewalk, store it on your hard drive and then burn it onto a CD-R with the software that came with your CD-R drive.

Question #19: I am using a Sony stereo system (amplifier, 5 band EQ, and two 4 foot speakers) as a monitoring system in my 24 track home studio. Is there any way I can modify the system for serious recording use? (My studio budget ran out). Is there anyway to make home studio monitors?

Answer #19: Well, the problem with those big speakers is that you need a room that is "big enough" for them to play correctly. And the room will need to be acoustically tight so that it doesn't contribute too many unwanted colorations to the sound. Those 4' Sony speakers won't do for near field sound monitoring because they are too big (the closer to a point source, the better). I think that you could use those speakers as an alternate pair of monitors to check out your mixes (especially if you are very familiar with the sound of those speakers and know how other program material sounds on them). Be advised that most all commercial stereo speakers are not optimized for flatness across the audio spectrum- they usually have a bump in the lower frequencies and some unevenness in the high frequencies. Building an accurate set of studio monitors yourself is notoriously difficult, because you want to achieve a transparent sound and flatness (i.e., no coloration) across the whole frequency spectrum. This is going to be tough without a lot of sophisticated tools and experience (even I would not want to attempt it).

Question #20: My girlfriend is a vocalist. She is very good, but just really starting out, as we have just really got the studio up and running. Do you know where she can really get noticed?

Answer #20: A good place to start for getting noticed is to make some demo recordings. The next thing to do is to contact TAXI (www.taxi.com).

Question #21: I need some advice if possible. I am currently running a hardware mini studio comprised of a drum machine, a sampler and a synth module. I would like to add a computer to this setup up, but I am a bit unclear as to how this works. I would like everything to run through a hardware mixer. So is this correct: Instrument and computer audio outs (from sound card) go in to separate inputs into my mixer. MIDI outs from the USB MIDI interface go into the MIDI inputs of the instruments, and the clocks are synced with my PC sequencing software. I then have my audio going through my mixer and all the instruments controlled from my PC sequencer. Does this sound OK??

Answer #21: Yes, you what you describe will work just fine. In fact, it is similar to the way my home studio is set up. I am guessing you will do the audio recording on the computer using an audio recording software program of some sort (which also does your MIDI sequencing, correct? - or are you just using a sequencer only on the computer?). That computer program will act as your master for sync purposes. You could also add an outboard multitrack hardware digital recorder if you wanted and sync it up to the computer using MIDI Time Code (MTC). The connection scheme for this is shown on this page at my web site: <http://www.johnvolanski.com/studio7.html>.

Question #22: I'm planning to buy a Focusrite Platinum Penta for my home studio because I don't get satisfactory compressing from my Roland VM-3100Pro compressor. Surfing your site I read that RNC 1773 is better, was it written after the Penta came out? Do you advise me to buy RNC1773 compressor? Since I'm planning to buy Voicemaster Pro for voices, the compressor I

want is basically for drums, and the fact that I'm no expert on compressor tweaking, Penta seems to be the most appropriate to process the sound before entering my mixer and recording to the computer. Another case I'm considering is to buy a Mackie UAD-1 and process audio after recording. Please give any advice of what you think to be the best solution for my problem.

Answer #22: The Penta is a great machine, and is a Swiss Army knife in functionality as compared to the RNC1773. It has the tube emulation mode, which is a nice feature. It also costs twice as much as the RNC1773! I suspect (although I have never compared them head to head in the same room) that the RNC has a cleaner audio path. It is +/-0.5dB all the way out to 100kHz, which the Penta is not. If you can afford the extra money, the Penta might be a better choice for your drums with its tube emulation mode. You might be able to impart a "fatter/thicker" sound on the snare/toms/kick with that tube emulation mode.

I don't think you can go wrong with either one, though. If you were going to use the compressor for program material (i.e., running the final mix through it), I would go with the RNC and use its Super-Nice Mode. The Voicemaster Pro will be a nice addition to your system, that's for sure!

Question #23: How do I get the professional sound that I hear on the radio, I am recording some R&B material, with some hip-hop and the recordings you hear on the radio sound so professional and full, they don't sound weak, what is the main element to get that full sound, is it in the levels and how they are set?

Answer #23: Well, that is the million dollar question, isn't it?!! There are a number of different elements that contribute to that spectacular sound. First of all, the mics that are used. For the most part, high quality mics are used, and the people that use them know how to place them to get the best performance out of them. Moving a mic's placement just a little bit can result in a huge sound change. For that matter, the acoustics in the recording space can also make a large contribution to the overall sound. Then those mics are run through high quality mic preamps. Just the type of mics and the preamps that are employed can make a huge difference in the sound, all other things being equal. Secondly, good clean compressors are used to control the dynamics of the sound and give immediacy. Thirdly, all of the equipment in the signal chain must be of high quality, including the mixers, the cables and connectors, the patch bays, the signal processors like reverb/EQ/chorusing, and the recorders (whether they are analog tape, digital standalone or computer-based recorders really shouldn't matter). Fourth, the engineers can add some sweetening/EQ/more compression to the tracks during the mixdown and mastering process many times that makes the overall sound brighter, clearer, punchy and less muddy. The current pop and rock hits are generally mixed very hot (maximum recording level without distortion) with plenty of low frequency energy. Fifth, the pro studios have engineers and producers that do this stuff every day and they are experts at it. So, couple expertise with high quality equipment, and you get high quality recordings. And let's not forget the main ingredient: it certainly doesn't hurt to have a performer that knows what he or she is doing!

Question #24: I was in a couple of bands back in the late 60's and early 70s, and have a couple of buddies from that era who are spread around the globe. We keep in touch via email and we had a brainstorm that we should try and do some home-type recording of our old band songs. Here's the question, given our extreme distance apart (one in Asia, one in Europe, one in the U.S. and one in Canada) is there any software out there that would let us record our individual tracks and combine them for a final mix?

Answer #24: Sounds like you need to check out this site: <http://www.rocketnetwork.com/>. A friend of mine used to use it to collaborate on songs with other musicians located elsewhere in the country. I have not tried it, but he said it worked well for him.

Question #25: I've been looking at many mixers. But I have seen many with "MAIN outputs", "Sub outputs", "Control room out", and "Monitor 1". What the heck do I need all these outputs for? I'm very confused. I'm trying to find the best bang-for-my-buck mixer, and most of them have these features. Any help would be appreciated.

Answer #25: Actually, it is a good thing when a mixer has all these different outputs. It makes it more useful- like a Swiss Army Knife. When a signal comes into the mixer and goes through its amplification stages, it can be assigned one or more of several different buses. The MAIN output is just what it says- this is the main output used for mixing the various input sounds together into a stereo mix. The SUB output is an entirely separate set of mixer outputs that can be used for grouping together a related set of mixer tracks and controlling their volume as a set. For example, assume that a group of 4 background singers are singing into 4 mics. You might want to group these together on a SUB bus, so that when you adjust the master volume on the SUB bus, you affect only the volume of the background vocals and not any other instruments. You can use this technique to bring up the background vocals on a chorus, for instance. Having the SUB bus and MAIN (or MASTER) bus is like having two separate mixers in the same box. The Control Room Out is generally the signal that is sent to the amp that drives the speakers in the studio Control Room. Sometimes there is a switch on the mixer to select what is actually sent to those Control Room speakers. A Monitor Mix output is usually a separate mix output that feeds the stage monitors for the musicians (so that they can hear what each other is playing on stage) or perhaps a feed for musicians' headphones. Flexible mixers often have other outputs and inputs known as SENDS and RETURNS. SENDS are signals that can be taken from the audio of each mixer channel and sent to an outboard processor (such as a reverb, chorus or echo) for processing. When the processed signal needs to return into the mixer, it comes in on a RETURN. Other common I/O used on mixers is the INSERT (allows an effect device such as an EQ to be inserted into the signal line of that mixer channel) and DIRECT OUTS (allows outboard processing of just one single mixer channel by itself).

Question #26: I sometimes have trouble deciding if I have a good mix for a song. What should I do?

Answer #26: It can be difficult when you have been working on a song for several days straight and you get to the point where you can't see the forest for the trees. A good way to self-check your mix is to set it up to play in your studio, then go out of the room and just leave the door open a crack. Now, listen to it. This will let you hear what *really* is dominating (or sometimes just as importantly, NOT dominating) the mix. Even better is to do this the day after you mix the song, after you have had time to get away from it for a while. Also, don't forget to collapse the mix to mono to see if it still holds up.

Question #27: I read your comments about the Fostex A-8 reel/reel on www.tapeop.com. I just saw one today that looked absolutely mint in a used electronics store. The guy said he replaced all

the vu lamps and cleaned it up and that it is running great. I currently have a fairly nice digital set up with a MOTU 828 and Powerbook G4, but I find myself more often solving CPU/software problems than making music. It has come to the point where I am ready to switch to analog or at least make a slow move over in that direction. I want to be inspired and hit play and record at the same time and record my inspiration. Are there other reel to reels I should consider? How about the Fostex model 80 or Tascam 388? Also how about maintenance? I hear the A-8 has a drive belt that is hard to replace- should this be a factor in deciding? Should I go with a digital multitrack minus the CPU?

Answer #27: Just like everything else, there are plenty of pros and cons involved with analog reel/reels. The stated specs on a properly tuned Fostex A8 are 45Hz-18kHz +/- 3db with a 72dB signal-to-noise ratio. So, compared to a digital recorder, you are going to get a fair bit less frequency response and definitely more hiss (even with the onboard Dolby C engaged). And just as you stated, there are maintenance issues. I have not replaced the belt yet on mine (now that you mention it, I wonder why it hasn't failed after 18 years?), so I don't know what a hassle that is. Then there is the normal head cleaning and demagnetizing you must do just to keep the signal patch sounding clear and clean. You will definitely want to check the condition of the heads on that used deck. They may be on their last leg. I don't know what a new record/play head costs for the A8, but I wouldn't be surprised to see a \$200 trip to the repair shop. I'm just trying to prepare you for the realities of an old reel/reel versus a new digital recorder. On the plus side of tape, you can drive the tape into saturation, giving you a slightly fatter sound to bass and drums. The A8 is simplicity itself, and it never crashes like Windows (or whatever OS you happen to love/hate). You can even play some games with the pitch control during recording and playback.

Here is an idea- why not have the best of both worlds? Use the A8 with your existing digital recorder. That is what I do sometimes. I have 2 Fostex VR800 digital 8-track recorders that I synchronize to the A8. I use the A8 as a master (it *has* to be the master since it has no capabilities to be a slave) and stripe one track (use an outside track such as Track 8) with SMPTE time code. This is an audio code that is recorded to tape that gives a count in hours/minutes/seconds/frames for sync purposes. You will need something like a JL Cooper PPS2 sync box to accomplish this. Then when you play the tape back, the JL Cooper box can read that SMPTE time code and generate a MIDI Time Code output. I then route this MTC to the 2 digital recorders, and they sync up to wherever the tape is at any moment. That gives me 24 tracks. Then I can also send this MTC to the Master Tracks Pro sequencer running on my Mac. The sequencer will also sync to the A8, and I can record unlimited virtual MIDI tracks on the sequencer, all in sync. I can generate some big orchestrations this way.

As far as a digital recorder with no computer CPU, I have had great success with those VR800s. They operate like a tape deck, but without the tape deck hassles. And they don't crash or freeze up like a PC or Mac will. They have full 20Hz-20kHz bandwidth, 90+ dB signal/noise and 96dB dynamic range. That performance is tough to beat!

So, the bottom line comes down to \$\$\$. If you only have a couple of hundred bucks, then get a used reel/reel. If you have more, I think you will get much better results and enjoyment out of a standalone digital recorder.

Question #28: How can I pass real time MIDI data between two different software applications executing simultaneously on the same PC?

Answer #28: If the two software programs aren't designed to use some sort of scheme to internally pass MIDI data between themselves, then you need to rig up some physical cable connection between MIDI input and MIDI output. That could be as simple as just connecting the computer interface's MIDI OUT to its MIDI IN with a MIDI cable. Alternately, if both programs operate under the Windows OS, you can use software called "MIDI Router" by Zoltan Janosy, or Hubi's "Loopback", or MidiOx. These programs feature a special MIDI device driver that you install (just as you would any other Windows audio/MIDI driver) which makes a software "MIDI connection" between any Windows program outputting MIDI data and any Windows program inputting MIDI data. (It connects the first program's MIDI OUT to the second program's MIDI IN). Note that this isn't a perfect solution. For one thing, you may now have trouble using a MIDI program that does simultaneous MIDI input and output (i.e., because now it's connected to itself, and feeding back upon itself). In that case, you'll have to disable MIDI Router's function whenever you don't need it. Secondly, this extra software layer does slow down MIDI input and output. It's always something, isn't it?

Question #29: I need to know exactly what I equipment I need to get to set up a studio at my home. I want to record gospel rap. I don't have a lot of money but if I can get all the things I need for \$400 or \$500, I would sure be grateful.

Answer #29: Are you planning on recording multiple tracks and building up compositions that way, or are you going to record a live band to a stereo master? It is going to be tough to get all the things you need for \$500. If you buy new equipment, you will be relegated to using a 4-track cassette recorder. My book shows you the equipment to buy for a \$500 home studio based on a multitrack cassette deck.

If you buy used equipment, look for a used Fostex reel-to-reel such as the A8, A80 or R8. You may be able to find one for \$250 or \$300. The cheapest 8-track digital recorder is the Fostex VF80 at \$500 (don't bother with the Fostex MR-8). You will still need a mixer (look at the Behringer MX802A, UB1002 or UB1202-Pro models all under \$100). And you will need at least one good condenser mic. Look for a used AKG C1000 (\$130), a Behringer B1 (\$100 new), or a MXL 990 (\$70 new). You will also need an effects box. Look into a Behringer DSP1024P for \$80 new. You still need a deck to mixdown and master onto. That's about as low as you can get for a home studio.

You can get all the new stuff at www.musiciansfriend.com, www.samash.com, www.zzounds.com, and other places. My book lists many online sites that sell used equipment. The book also instructs you on how to mix songs, conquer acoustic problems and power distribution, and a million other things you'll need to know.

Question #30: I have a PC-based sound card (Audiophile-Delta 2496), a Behringer Ultra Curve Pro EQ DSP8024 and a Behringer MX2004A mixing desk. I cannot figure out from the manuals how to connect the three things together. Could you please help?

Answer #30: With those 3 pieces of equipment, you may want to hook them up in different configurations, depending on what you are doing at the time. I am guessing that you have some sort of software program running on your PC that you use to record multiple tracks of audio or sequence MIDI tracks (or both). If you want to record one line-level instrument at a time (such as

a synthesizer, sampler or the output of a guitar amp modeler) into the PC, then I would not use the mixer at all in the connection. It will just add more noise and not really accomplish anything. Plug the line level output of your instrument directly into one of the analog inputs of your sound card (or two inputs if it is a stereo signal) and then record. I would not add any EQ when you record, since you can add it later when you mix down. If you add it when you record, then it is in there permanently.

If you are recording something from a mic, then you will need to use the mixer to give you mic preamplification. Plug the mic into the mixer mic input. Run one of the mixer main outs to one of the sound card's analog audio inputs and then record (use 2 connections if it is a stereo signal). If you want to use the Behringer EQ on that signal while you are recording it, then plug the Behringer EQ into the Channel Insert for that particular channel. The signal will be routed out to the EQ and then back into the mixer in a loop.

When you mix down the recordings you have made on the PC, you have a choice. You can mix all of the audio in the PC and then just run it out of the soundcard and into your master recorder (whatever that is- a cassette deck, a DAT, a CD recorder, or whatever). Or, if you want to mix the audio tracks that are in the PC with some external audio tracks, you can use the MX2004A mixer. Connect the analog audio outputs from the PC soundcard to 2 line input channels of the mixer. Connect your other mic or instruments to other mic and instrument inputs on the mixer. You should now be able to mix all those signals down into a stereo master recording.

Question #31: What is ATRAC when referring to a MiniDisc (MD) recorder or player?

Answer #31: The MD format is a slick little digital recording system, but it also has some drawbacks. Sony is able to fit 74 or 80 minutes (or more in some cases) of audio on those little discs, because they throw out approximately 80% of the digital information in the audio signal. The process of reducing the data to 20% of its original size is called lossy compression. The lossy part is the bad news, because once that 80% of data is thrown out, it can never be recovered and transformed back into 100% of data again. Sony has developed an algorithm (and Sony's name for it is ATRAC) that analyzes the original analog audio and detects what frequencies will be masked by other frequencies (and therefore not able to be heard by the normal human ear); the algorithm then deletes the information associated with these masked frequencies. This is how the data reduction is accomplished. Nevertheless, the final compressed result is still impressive when compared to other mediums such as MP3, cassette, AM and FM radio.

Question #32: I've just purchased a Korg Triton music workstation/sampler, Phonic MM1002 Mixer, AKG C1000S microphone, and a Dell Dimension 2350 PC with 6 USB ports and an Intel Celeron Processor. I'm running Acid Pro 3.0 on the computer. Could you tell me how to connect all this together to form a home studio and if I need to purchase anything else?

Answer #32: Sounds like you are on your way, but you are missing the I/O interface for the computer. You need a way to get your analog audio into and out of the computer. I am guessing that you are going to use Acid on your Dell to set up loops and record the songs, correct? Additionally, the Korg has some sophisticated features onboard such as a sequencer. Were you intending to somehow sync the stuff happening in Acid with the onboard Korg sequencer? Are you planning on mixing the audio from the computer with any audio coming out of the Korg for a

final mix thru the MM1002? What device are you planning to use to record your final mix on? (Do you have an outboard CD recorder or is one built into your computer?) Let me know those answers, and then I will make additional recommendations to you.

Question #33: What is the difference between balanced and unbalanced audio lines? Why is this important?

Answer #33: It is very important to understand the difference between balanced and unbalanced audio equipment. Most consumer and lower-cost semi-pro audio equipment uses unbalanced signal connectors. These are generally the RCA type (also called phono connectors) or 1/4" phone type of connectors. An unbalanced signal has one of its conductors (the shield) connected to ground, and the other conductor carries the signal referenced to ground. This is a cheaper circuit to produce, hence its use in consumer equipment. The problem with unbalanced connections is that they are susceptible to hum and noise because the shielded conductor can allow ground currents to flow between the interconnected pieces of equipment.

Balanced signal connections solve the ground current problem because they have two opposite-polarity, non-grounded conductors (with equal impedances referenced to ground) to carry the high and low side of the audio signal. Plus, they have a separate third conductor that acts as a shield for the other two conductors. Balanced signals typically appear on XLR type of 3-pin connectors or TRS (Tip-Ring-Sleeve) phone jacks. For balanced signals, ground noise and induced magnetic noise or RF noise should appear on both non-ground signal conductors in equal amounts, and when those noises are processed by the electronic circuits downstream, the net effect is that the noises cancel out because they are of opposite polarity. This is called Common Mode Rejection. Of course, the balanced circuits are generally more expensive (as are the balanced cables that interconnect the equipment), and therefore balanced signals generally only appear in pro or higher-end semi-pro equipment. If you can afford to do it, implementing balanced signals in your home studio is definitely the way to go for increased signal performance and integrity. If you have a mix of balanced and unbalanced equipment, you can connect them together, but you will need to purchase or build special adapters to do so.

Question #34: Should I put a couple of monitors in the drum room for the drummer to hear a mix or run some headphones over to that room (about 20 ft or so from the control room)? If I put monitors in there for the drummer, will they bleed off into the drum mics?

Answer #34: I would definitely go with headphones. Get a pair of closed-back cans that are comfortable to wear for extended periods. The closed-back feature will prevent bleed into the several mics in the drum room during non-drum passages. The comfortableness (is that a word?) will allow the drummer to keep drumming for extended periods without whining about cauliflower ears. Also, see if you can get a set of cans where the cord comes off of just one side- that will make it easier to keep the cord out of the drummers way as he accesses all the drums in the kit. The low cost Carvin H40M headphone fits the bill at \$50.

Question #35: I've built a 20 x 25 ft recording studio. In it, I have a 7.5 x 7.5 ft separate room for drums, a 7.5 x 10 ft control room and a 3 x 6 ft closet that can be used to close in a guitar or bass amp if needed while recording. I have a lot of music equipment, but so far I only have a Zoom

1266 12 track digital recorder. I was about to buy a Carvin 16 channel (4-bus) mixer with a power amp included (\$1,099), which would allow me to use it in the studio as well as take it to gigs and use as a PA system, and the salesman kept adding things on and finally I backed out due to lack of knowledge. I assume I need to have a couple of speakers in the open room of my studio so the musicians can hear the mix. Do these need to be higher wattage speakers than those used in the studio control room? If so, do I need a separate amp for each set of monitors or is there an amp that will run the control room monitors and the open studio recording room monitors?

Answer #35: That Carvin C1644P you are looking at has a built in power amplifier with 4 output channels. This looks like a good deal. Carvin equipment is always solid and well-priced, as I mentioned in the book. You could use the built-in amp to independently drive the 2 monitors in the control room and the 2 monitors in the open studio room. Since your control room is 7.5 x 10, I would go with near field monitoring in there. It is too small of a room to let the bass develop and to avoid deleterious room effects if you were to use large monitor speakers. Then check your mix on good headphones, the near field monitors and in mono when you mix down. As for the open studio recording space, I would get speakers that will let you do double duty. They can reside in the open studio space as playback monitor speakers for the musicians while you are in the studio. You can then also use them as PA speakers and take them out on the road with the C1644P. The C1644P puts out 200WRMS/channel into 8 Ohms with all 4 channels driven. It can also operate in a bridged mode where the amps are ganged together for even more power. However, it is unclear to me whether the amp can handle stereo material in bridged mode or if it just becomes a mono amp. (Call Carvin and find out). Carvin has a package with the C1644P and two 1584 monitors and speaker bales for \$1930. The 1584 monitors have a bit better freq response than the cheaper 832 monitors, so they might be worth the extra \$300 (especially since you are going to get double duty out of them). On the other hand, if you still need to round out the equipment in your studio, you may opt for the cheaper package of the C1644P and two 832s for \$1630. This leaves \$870 for the rest of the studio. That's going to be tough to do, especially if you want to buy 7 mics and you still need 2 sets of headphones at least and near field monitors. I assume you can start out using the 1266 onboard effects for reverb, etc., so you won't need to buy an outboard effects unit right away.

Headphones for you: Sennheiser HD280 (\$100)

Headphones for drummer or singers: Carvin H40M (\$50)

Nearfield Monitors: This is a tough one with your budget restriction. You may need to go low cost here for now until you get more money. Probably the best solution is to buy a set of Alesis Monitor One MkII monitors for \$200 for the pair. Later, when you get more money, sell them and get something better. (They are 200W peak, so don't blow them up with the C1644P!!).

If you need to reduce costs even further, you could opt for the Behringer UB2442FX-PRO mixer at \$350 and then add the Carvin DCM-1204 Amp (\$470- the same amp that is built into the Carvin C1644P mixer) and the Carvin monitors. That saves about \$280 over the Carvin mixer solution.

Question #36: I'm thinking I need about 7 mics for my new studio. 1 good vocal mic, 4 mics for drums, a bass mic and a guitar mic. Given my \$700 budget, could you make recommendations?

Answer #36: Vocal: AKG C3000B (\$300) or Rode NT10000 (\$300), or for less money, the Rode NT-1A (\$200)

Guitar: Shure SM-57 (\$80)

Drum Mics: The Samson 7-piece kit (\$319) or DMK7 7-piece Kit from Carvin (\$400) are the lowest cost drum kit solutions.

Bass: (Use the Q Kick out of the Samson kit = \$0) or (Use the D44 out of the DMK7 kit = \$0) or add the AKG D112 (\$200) for bass guitar if you want to record bass guitar and kick drum simultaneously. Or you can always record the bass guitar directly out the amp head, but may not give you the results you want. Are you planning on recording everything (drums, singers, bass, lead guitar) simultaneously or can you individually multitrack each instrument?

Question #37: It is my intention to film & record a live band on stage in a Liverpool theatre later this year. Past experience has led me to use SVHS video recorders for capturing sound but I have always had difficulty in capturing ambient and general front of stage sound. Are you able to give any pointers as to a good miking system and type of mike for capturing such a sound?

Answer #37: If the goal is to capture a live ambient performance in a really unique way, I'd try out the HRTF/binaural method that I mentioned in the book. (See page 72) You might want to experiment with it first to see if you like the effect, though. You can buy a "head" here with these guys (<http://www.sonicstudios.com/liteguy.htm>), but they want \$600 USD for it. If you are handy with materials, perhaps you can build your own. It would be great to suspend a binaural recording setup over the audience and have it pointed at the stage. You could capture some crowd noise and some very excellent directional audio cues with that setup. Just make sure no one starts using the head as a Piñata.

If you don't like that approach, you could get a pair of full bandwidth condenser mics and mount them back from the stage and above the audience. You could record them in an X-Y configuration to capture a stereo sound field as discussed in my book. For example, you could use a pair of the AKG C1000 (\$200 USD ea) or the Rode NT5 matched pair (\$300 USD pr). If you want to hang just 1 mic and get an X-Y recording out of it, try the Rode NT4 (\$450 USD). Those are all fairly low-cost solutions.

I recorded a concert once with a Sony ECM-DS70P stereo mic pair (now as low as \$50 USD) pinned to my shirt. I recorded the audio to a MiniDisc recorder in my pocket. I got amazingly good results from this setup, and I was just standing in the middle of the audience! You won't get Rolling Stones Mobile Truck performance, but perhaps you could try this approach with a wireless transmitter back to your recorder.

If money is no object, try something like the SoundField SPS422 mic (See <http://www.soundfieldusa.com/sps422.html>). You could record all four capsules so that the SoundField decoder can be used for steering the image in post.

When you set up the mic(s), try to strike a physical positioning mic balance so that the music from the stage is not buried under audience applause.

Question #38: How do I connect my Voice Processor to my mixer? The AVP (voice pro) has one main out and one line in. Where should I connect to the mixer?

Answer #38: Are you talking about the Antares AVP Vocal Producer? It depends on how/when you are using it and what equipment you are using it with.

If you are using it to record a new vocal track on your recorder and you have standalone/external mic preamps, run the mic into your mic preamp, then into your AVP then into the recorder channel. You don't even need the mixer at this stage, because it just adds more noise. (Note: don't listen to the AVP-processed sound in real time while you sing, as it may cause you to sing farther off key!)

If you don't have standalone/external mic preamps and are using the mic preamp in your mixer, then run the mic into your mixer, and hook the AVP into the INSERT of that mixer channel. The mic signal will then be going into the mixer mic preamp then back out to the AVP using the INSERT output, then back into the mixer channel using the INSERT input. Now you will want to run that mixer channel output (using the Main Output) to the recorder track you want to record on. If the track is already recorded and you want to process it afterwards, then run the audio recorder channel output into the mixer channel and use the AVP in the INSERT loop as described above. You can also run the audio recorder output channel directly into the AVP (since it handles line level signals) and then into the mixer line level input if you want.

If your mixer has no INSERT loop and you have no external/standalone mic preamps, then run the mic into the mixer to use its mic preamps, then run the mixer output (Main out) into the AVP input. The AVP output will then connect to audio recorder input channel. Hope that helps. If it doesn't, tell me specifically what equipment you have!

Question #39: I've been reading John's Sound Recording Advice for the home recording studio book and I'm trying to piece together a home studio. He advises the BBE 264 Sonic Maximizer, and the Toshiba 512W VHS recorder, both of which have been discontinued and are pretty difficult to find. I was wondering if you might be able to give some comparable devices that are still available.

Answer #39: The available hardware changes quickly, doesn't it? The lowest priced VHS Stereo Hi-Fi recorders I could find now (Feb. 2003) are:

JVC HR-A591U 4-Head Hi-Fi Stereo VCR (\$69.88) at www.jandr.com

SAMSUNG VR8260 HiFi Dual-Azimuth 4 Head VHS VCR (\$69.88) at www.jandr.com

Any of those should work to record audio as the master recorder. I would probably go with the JVC unit. (Or keep checking back at the J and R site to look for sales. You can get on their mailing list if you want- they send out sales flyers from time to time.)

It looks like the BBE 264Sonic Maximizer is now discontinued, although this place says they have one for \$39: http://www.gearbeat.com/show_products.asp?product_id=5343&offset=11

For other Sonic Maximizers, you can look around for some used units (here are the recommended used prices: <http://www.prepal.com/data/BBE.htm>). All of the BBE Sonic Maximizers use pretty much the same circuit. The more expensive ones are a little quieter, and they have balanced I/O connectors. Here are the lowest priced new ones I could find:

www.zzounds.com BBE 362 for \$99.95 (This is the one I have)

http://www.ab-cds.com/Queries/bbe_sonic_maximizer.asp BBE 362 for \$119.99

<http://www.samedaymusic.com/browseBBE;328> BBE 362 for \$100. They also have the 362NR (with a built in single-ended noise reduction system- great for removing tape hiss), but it is \$200.

<http://topdjgear.com/bbe-362.html> BBE 362 for \$99.95

I know Zzounds is a reputable dealer, so I would go with them.

Question #40: I'm interested in building a home studio. I have experimented in the past with digital and analog and my preference is the latter due to its warm and live sound. Currently I play in a reggae band and we have recorded at various studios around town (San Diego). Although the recordings sound great, I often find that they are too polished. I want to explore a more vintage sound, if you will, so our band can capture a more raw feeling in our recordings. Particularly, I would like the bass drum, bass guitar, and lower frequencies to come through clearly rather than muddy and distorted. I have found that 4 channel reel-to-reel recorders are ideal when recording bass and drums. Since I'm fairly new to the game would you suggest that I buy a reel to reel and begin here or go digital or both? I would like to explore all possibilities.

Answer #40: Well, you certainly can use a 4- or 8-track reel/reel to get a warmer sound than digital. The reason you hear this is because you can overdrive the tape into saturation (something you cannot do with a digital recorder). When you overdrive the tape into saturation, it tends to add tons of overtones, especially even harmonics. These tend to fatten up the sound, and this is pleasing to the human ear (as opposed to odd harmonics which are not pleasing). However, it also has some negative aspects associated with it, including tape hiss, dirty tape heads, demagnetizing the tape path, tape stretching or breaking, tape oxidation (drop outs), and distortion/noise build-up when dubbing tracks. I have an 8track reel/reel in my studio and I still use it occasionally, but I prefer my digital recorders for the lack of hiss, clarity and easier editing.

So, what can you do? You can use the analog recorders and suffer through their limitations. Or you can use the digital recorders and do some signal processing to try to get back to the good things associated with analog recording. Here are some things to try:

Use mics that have tubes in them.

Use a mic preamp that has tubes in the signal path.

Run your final mix through a line level preamp that has tubes in the signal path. Or perhaps just run the drums and bass through it as a submix to get some edge back into the low frequencies.

Select a preamp that will allow you to run the signal into "saturation", adding the critical even harmonics back into the mix.

Try using a BBE Sonic Maximizer to clean up the intelligibility of the low end.

Hope that helps! Good luck!

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