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*"Often we can help, when no one else can."*

The Unofficial NGH Recording FAQ  
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As part of my hypnotism practice I do a lot of recording. Therefore, I get questions from colleagues about equipment and software. This FAQ is intended to answer a lot of those questions.

If you are curious, go to my website and click over to the Photo Gallery. You can see a photo of my recording equipment there. But now, let's get started.

### Choose Your Media

The first thing you need to decide when you get into recording sessions is what media you want to record onto. These days the answer will almost certainly be compact disc. Even your clients who will want to transfer the recording to a digital player will find that a CD is the easiest way to do that.

Where there are still people out there who use audiotape cassettes, the reality is that audiotape is a dying technology. While you can still buy the equipment, and a lot of people still have players at home that will use them, it is getting harder and harder to buy blank tapes and that will only get worse. Also, as the read/write head of the tape recorder is in physical contact with the audiotape media, audiotapes break, stretch and wear out. A CD will last 100 years.

When you go shopping for CDs you will discover a world of abbreviations: CD-R, CD-RW, CD-R Music. Here is what they mean:

-CD-R stands for Compact Disc Read. They are blank CDs that you can record onto using a process called "burning." When you are finished recording, you will "finalize" the recording or "close" the disc. This means that the CD burner burns a Table of Contents onto the CD that standard CD players can read. Without the Table of Contents a CD-R cannot be played on a standard CD player, although specialized players can still

use it.

-CD-RW stands for Compact Disc Read and Write. These are CDs made of a special media that can be used, erased and reused. However, CD-RW discs are notoriously fragile and there is no reason to use them for recording, as most home CD players cannot play them.

-CD-R Music stands for Compact Disc Read Music. These are CDs that are identical to CD-R discs except they have a special track that indicates that a donation has been made to an international fund that compensates the music industry for possible copyright damages due to people making copies of copyrighted music. The idea was that CD players would be sold that would only play CDs someone had recorded if this track was present. However, this idea never really caught on. Unless you own hardware that requires the use of CD-R Music blank discs, there is no reason to pay the extra cost that goes with this media.

In the days of ancient antiquity when CDs were first developed they were actually thin disks of metal covered by clear plastic. Indentations in the metal encoded the binary data of the digital recording. Production CDs for music are still recorded this way. However, CD-R media is structurally different. Under the clear plastic is a chemical film that changes its reflective properties when hit by a laser. The change in reflection duplicates the effect of the indentations in factory-created recordings. All modern CD players can play a CD-R disc that has been finalized as if it were a factory-created recording. However, some of the oldest equipment cannot. So if a client can't play a CD-R, the client needs to buy some modern equipment.

### Get A Microphone

No matter how you plan to make your recordings, you need a good microphone. This is not a place to conserve. Pay for a good microphone and your recordings will love you. Buy a cheapie microphone and your precious recordings will suffer. You can get a microphone for as little as \$20, or for as much as \$2000. As you will just be recording voice, not high-end music you will not need that highest end microphones, but remember that you get what you pay for.

Here is what you need to consider when looking at a microphone:

First, what sort of cable does it use? If you are going to be plugging this microphone into the sound card of your computer you need one that has a jack that fits. Typically, this will be a 1/8-inch stereo plug and the cheapest microphones have them. Most microphones come with 1/4-inch plugs and the best come with balanced XLR plugs that only attach to a mixer. Be sure you know what you need.

By the way, it's always a good idea to keep your cable runs as short as possible. Extra cable length can act as an aerial and pick up hum sounds from nearby electrical equipment, or even radio broadcasts. If there is only three feet between the recorder and the microphone, buy yourself a three foot cable—not a twenty foot cord that you have to coil up.

While you can get adapters that will adapt any microphone to any plug, doing a lot of that is usually a bad idea. The adapters are not perfect and you can lose sound quality. The one exception is that if you are going to use the option described below to do all your recording on your personal computer, it is possible to get special interfaces that bridge between higher end microphones and the computer that connect using USB or Fire Wire ports.

Second, do you want a dynamic or condenser microphone? Dynamic microphones use a standard magnet inside of them. They do not require any internal power to use. Condenser microphones use electromagnets which means they need power going into them in order to work. Some condenser microphones have a place for a battery to supply this and provided a battery is in place they will work with any system that they can plug into. Some condenser microphones require “phantom power.” That means they must be plugged into a mixing console that has a special circuit that sends power to the microphone. That's fine, provided you plan to buy a mixer and that mixer can supply phantom power (the cheaper ones do not).

Generally speaking, the cheaper microphones are dynamic and the more expensive ones are condenser. But there's a problem in the mid-range. A mid-range dynamic microphone will often be more forgiving than a mid-range condenser. The latter will pick up every little click and crackle while the former will often suppress background noise. If you are buying in the mid-range this choice is something of a gamble.

Third, do you want an omnidirectional or unidirectional microphone? Omnidirectional microphones pick up all sound in a 360-degree circle while a unidirectional microphone is intended to pick up the sounds directly in front of the microphone. Almost without exception hypnotists will want to use a unidirectional microphone.

Fourth, do you want a large or small diaphragm microphone? The diaphragm is the flexible part of the microphone that moves inside a magnetic field to create the data the microphone picks up. Small diaphragm microphones are shaped like sticks while large diaphragm microphones (like the sort you see on the desk of a TV show host) are shaped like cucumbers. Large diaphragm microphones pick up a fuller range of sound than small diaphragm microphones and are ideal for recording voice. They are also way more expensive.

Finally, you may need a microphone amplifier. Different microphones output different levels of voltage. Some will give you more than enough volume just as they are; some need to have their output amplified. It depends on the design of the microphone. Better mixing consoles have built-in preamplifiers to do this for any microphone plugged into them, others do not and you need to add a separate microphone amplifier. Also, some expensive microphones are “tube” microphones that have vacuum tubes in them instead of printed circuits. Many people believe these give a “warmer” sound. All tube microphones require an amplifier, often over and above the preamplifier in a good mixer.

### Personal Computer v. Dedicated Hardware

The next decision you will have to make is whether or not you will make your CD recordings using your personal computer or if you want to buy dedicated hardware for this purpose. It depends on what you want to achieve.

### The All-Computer Option

If you are simply going to make recordings that you will later distribute, you can do everything you need to do with a good personal computer that has a CD-R burner drive (almost all personal computers have this) and appropriate software.

Basically, you plug a microphone into the microphone jack of your computer's soundcard, plug a set of headphones into the headphone jack and you're in business. You will record onto the computer's hard disk and then burn the CD using the CD-R drive in the computer. Higher end systems can plug the microphone and even other sound sources into an interface box that connects to the computer using a USB or Fire Wire port.

In the Microsoft Windows world I recommend you look at “Adobe Audition” as the software, although there are other programs. If you run on a Macintosh, check out Apple's own “Audio Logic” software, although there are other programs available.

Be aware that recording programs are memory and resource hogs. You will have the best experience if your computer is fast with plenty of RAM and plenty of space on the hard drive. Underpowered computers will still work, but things will be slow and recordings could end up with skips and silences that you later have to edit out, created by the time gaps where the computer needed to store and retrieve data from the hard disk.

All of the recording programs will let you record live sound as some sort of a digital file. Most will let you then view the recording as a graph-like tracing and edit it. The better programs will either let you remove all background noise or allow you to run a specialized program within them that will do that (for example, Apple's Audio Logic will

let you add Bias Software's "SoundSoap") Most of these programs will also let you separately record music, and then mix your edited voice track with the music and create a final product that will sound like it came from a professional recording studio.

### Dedicated Hardware

Using your personal computer is a wonderful way to make recordings for later distribution. However, if you want to make a recording in real time at a session that you can give to your client, using your personal computer to do this is about as graceful as hopping on one foot. The computer will be slow. You have to wait for digital profiles to update, removing noise from a recording can take five or ten minutes (far longer on a slower machine) and computers can crash taking the recording with them into the ether.

If you want to do real-time recording, do yourself a favor and get yourself some dedicated hardware.

### The Portable Studio

Most hypnotists who want to go this route will probably do fine with an all-in-one portable studio. These are console like gadgets about the size of an old IBM Selectric Typewriter. They have inputs for higher quality microphones (they use balanced or XLR connectors). You can run a CD player or digital music into them to create your background music, and when you've got things recorded just right, most of them have a CD burner built right in.

Many of the portable studios will also do multitrack recording on an internal hard disk or other media that will let you do multiple takes of a recording and select only the best parts for use. Therefore, you can turn out classy production-quality recordings on a unit like this, just like you can on a personal computer.

Stop by a local pro audio shop, like Guitar Center or Musician's Friend, wander into the electronic room and ask the salesperson to show you what they have in stock by way of a portable studio. They will have several different makes and will run a price range that is similar to a personal computer. A low-end portable studio will cost about as much as a low end personal computer and a high-end unit will cost about as much as a high end personal computer.

However, if you really have a busy practice and do a lot of recording, you probably need more horsepower than even the highest end portable studio can provide. If so, you need to go the separate component route. Also, if you depend on a portable studio and it breaks down, you're out of business until it comes back from repair. If you use separate components, you just swap out the defective part and you're back in business.

## Separate Components

Basically, “separate components” means that you have freestanding units (often fitting into some sort of rack) connected to each other by cables. The components will have many of the same features as those on the portable studio, but will be larger, more powerful and flexible. What you will need at a minimum will be:

1. The Mixer –This is a console that lets you take different parts of a composition (for example, voice, music, and nature sounds) and mix them together into a pleasing final product. Good mixers also have jacks for sending and receiving information from your personal computer, tweaking the sound, adding in effects such as reverb or noise gates and so on. Good mixers also can send the final sound elsewhere multiple times. For example, my mixer can output the final sound to five different places simultaneously: to a set of speakers in my office, to headphones, to my computer if I want to record it there, and to a CD burner and a cassette tape recorder for those clients who still want an audio tape.
2. One or more microphones as described above. If you want your client to be able to talk back to you during the session, there has to be a second microphone over by the client to pick up his or her voice.
3. One or more other sound sources. You will need something to play the background music into the mixer so you can mix it with your voice. This can be a tape or CD player, a digital music player or even your computer. Whatever it is, it plugs into the mixer using an appropriate cable. If you plan on mixing in nature sounds (like surf or bird song) you will need to plug in some sort of a player to play them. If you plan on mixing in pre-recorded sections, you will need to plug that player in too.

Each sound source will be either monaural or stereo. A monaural sound source (like a microphone) will take up one channel of your mixer. A stereo sound source will take up two channels (one for the left track and one for the right). So when you shop for a mixer and the salesperson wants to know how many “tracks” you want, he or she is asking you about how many things you plan on plugging into the mixer. A mixer can get filled up fast and more capacity is better than too little.

4. A headphone amplifier. As you will have a microphone in front of you it’s dangerous to try to play the sound for the client to hear over speakers (unless the client is in a separate “relaxation room” or an “environmental chair” with its own low-volume internal speakers). Putting speakers and an open microphone in the same room invites feedback sound. Therefore, the client and you will probably want to listen to the sound over headphones.

While you can usually plug two sets of headphones into a “Y” adapter and plug the adapter into the headphone jack on the mixer there are problems with doing this. First, you can’t separately control the volume in each headphone (unless the headphone has a volume control) and each time you split a signal using a “Y” adapter you lose some sound quality. Therefore, the best thing to do is to use a headphone amplifier which plugs into the mixer and will let you branch four or five headphones off it with no loss in sound quality. High-end headphones require an amplifier.

5. Headphones. You will probably need at least two sets (one for you and one for your client), but if you work with a group you may need more. Be aware that different headphones require different levels of voltage to run. If you have two different brands of headphones plugged into the same sound source using a “Y” adapter, the sound in one can be much louder than in the other (which is another reason to use a headphone amplifier).

Headphones come in different configurations. Some are “open back” (also called “studio monitor”) which allow you to hear other things in the room than the sound. Others are “closed back” which try to muffle environmental noise. Some headphones are lightweight, some press upon the ear (and can be uncomfortable to wear for a long time), while others cup the ear completely. What you like is a matter of personal preference.

Recently, “noise canceling” headphones have begun to appear. These headphones have an internal computer linked to a microphone on the outside of the headphone shell. This computer listens to the background noise, and if it hears any noise it creates a sound inside the headphones at 180 degrees to it. This tends to cancel the background sound out. The more expensive noise canceling headphones work very well but tend to be fragile. They also require an internal battery to work so you will need to keep a supply of batteries around.

6. The Target Recorder. If you plan to give the client a recording of the session you need to have something attached to one of the main output feeds from the mixer to make the recording on. This can be a free standing CD burner, an audiocassette recorder, or even your computer running recording software.

And remember that all of these components will have to be connected using cables.

### Some Final Tips

I realize all of this is a bit overwhelming at the high end. But if you are reading this you are probably a beginner and will not want to start off at the high end. Let yourself grow

into your equipment and don't hesitate to upgrade as your needs change. Here are some final things to keep in mind:

Whatever you decide to do, be sure you have enough electrical power to do it. There is nothing worse than blowing a fuse in the middle of a recording. You may need to have an electrician install a special circuit for your recording equipment. Also don't forget to buy surge protectors for all your expensive equipment.

If you decide to buy separate recording components realize there is no end to the amount of money you can spend. Be careful of just trusting what a salesperson says. If a component is on sale for a seriously reduced price, there may be a reason for that. Search the web for reviews.

It is much cheaper to buy consumer grade equipment from places like Radio Shack. I did this myself once. Such equipment is much less expensive than studio grade components. However, you get what you pay for. Consumer grade electronics will wear out sooner and will be less capable. Studio grade equipment was designed for what you want to do and it was built to run six days a week, ten hours each day.

If you can afford it, consider getting a compressor for your recording equipment. This is a component that takes the sound and lowers the highs and raises the lows. It prevents the hissing "S" sounds, the popping "P" sounds and the clicking "K" sounds than too often spoil recordings. Most recording software has compression built in, but if you are recording through hardware you need to add a component, usually to your mixer.

If you are doing recording by hardware, and if you can afford it, consider getting a noise gate as well. A noise gate lets you set a threshold level of sound for your microphone. If a sound is below that threshold, only silence comes through the microphone. If the sound is above the threshold, it can be heard. If you work a microphone closely, or if you wear a headset microphone, a noise gate is essential. Otherwise the client will hear a sucking sound every time your lips open and might conclude he or she has Cthulhu as a hypnotist. All high-end mixers support noise gates.

I hope you find this FAQ helpful and I welcome comments to improve it.