

A Focal Press Book



Audio Engineering Society Presents

MODERN RECORDING TECHNIQUES

A PRACTICAL GUIDE TO
MODERN MUSIC PRODUCTION

TENTH EDITION



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Modern Recording Techniques

Modern Recording Techniques is the bestselling, authoritative guide to sound and music recording. Whether you're just starting out or are looking to improve your skills, this book provides an in-depth guide to the art and technologies of music production and is a must-have reference for all audio bookshelves.

Using its familiar and accessible writing style, this new edition has been fully updated, presenting the latest production technologies and including detailed coverage of digital audio workstations (DAWs), networked audio, musical instrument digital interface (MIDI), signal processing and much more. *Modern Recording Techniques* is supported by a host of video tutorials, which provide additional listening and visual examples, making this text essential reading for students, instructors and professionals.

This updated tenth edition includes:

- Newly expanded “Art and Technology” chapters, providing more tips, tricks and insights for getting the best out of your recording, mixing, monitoring and mastering
- An expanded MIDI chapter to include MIDI 2.0
- More in-depth coverage of digital audio and the digital audio workstation
- Greater coverage of immersive audio, including Dolby Atmos Production

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Modern Recording Techniques

A Practical Guide to Modern Music
Production

Tenth Edition

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Acknowledgments

XXV



David Miles Huber is a 4× Grammy-nominated producer and musician in the electronic dance and surround-sound genres, whose music has sold over the million mark. His dance performance style is energized and balanced out by lush beats and live acoustic instruments that combine to create a “Zen-Meets-Tech Experience”. His latest music and collaborations can be heard at davidmiles-huber.com and davidmiles-huber.bandcamp.com.

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CHAPTER 1

Introduction

1

The world of modern music and sound production is multifaceted. It's an exciting world of creative individuals: musicians, engineers, producers, managers, manufacturers and businesspeople who are experts in such fields as music, acoustics, electronics, sales, production, broadcast media, multimedia, marketing, graphics, law and the day-to-day workings of the business of music. The combined efforts of these talented people work together to create a single end product: music that can be marketed to the masses. The process of turning a creative spark into a final product takes commitment, talent, a creative production team, a marketing strategy and, often, money. Throughout the history of recorded sound, the process of capturing music and transforming it into a marketable product has always been driven by changes in the art of music, production technology and cultural tastes.

In the past, the process of turning one's own music into a final product required the use of a commercial recording studio, which was (and still is) equipped with specialized equipment and a professionally skilled staff. With the introduction of the large-scale integrated (LSI) circuit, mass production and mass marketing (three of the most powerful forces in the Information Age), another option has arrived on the scene: the radical idea that musicians, engineers and/or producers can produce music in their own facility or home ... on their own time. Along with this concept comes the realization that almost anyone can afford, construct and learn to master their own personal audio production facility. In short, we're living in the midst of a techno-artistic revolution that puts more power, artistic control and knowledge directly into the hands of artists and creative individuals from all walks of life ... a fact that ensures that the industry will forever be a part of the creative life-force of *change*.

Those who are new to the world of modern digital audio and multitrack production, musical instrument digital interface (MIDI), mixing, remixing and the studio production environment should be aware that years of dedicated practice are often required to develop the skills that are needed to successfully master the art and application of these technologies. In short, it takes time to master the craft. A person new to the recording or project studio environment ([Figures 1.1](#)

and 1.2) might easily be overwhelmed by the amount and variety of equipment that's involved in the process; however, as you become familiar with the tools, toys and techniques of the recording process, a definite order to the studio's makeup will soon begin to emerge – with each piece of equipment and personal approach to production being designed to play a role in the overall scheme of making music and quality audio.

The goal of this book is to serve as a guide and reference tool to help you become familiar with the recording and production process. When used in conjunction with mentors, lots of hands-on experience, schooling, further reading, Web searching, soul searching and simple common sense, we hope this book will help introduce you to the equipment and day-to-day practices of the studio. Although it's taken the modern music studio over a hundred years to evolve to its current level of technological sophistication, we have moved into an important evolutionary phase in the business of music and its production: the digital age. Truly, this is an amazing time in production history, when we can choose between a vast array of powerful tools for fully realizing our creative and human potential in a cost-effective way. As always, patience and a nose-to-the-grindstone attitude are needed in order to learn how to use them effectively, but today's technology can free you up for the really important stuff: making music and audio productions. In my opinion, these are definitely the good ol' days!

FIGURE 1.1

The historic (but newly renovated) Capitol Records Recording Studios, Los Angeles, CA. (a) Studio A control room (courtesy of PMC Ltd., www.pmcspeakers.com). (b) Studio A (courtesy of Capitol Records, www.capitolrecords.com).



**FIGURE 1.2**

A couple of the many, many possible examples of a project studio (courtesy of Ableton AG, www.ableton.com).



TRY THIS: DIGGIN' DEEP INTO THE WEB

This book, by its very nature, is an overview of recording technology and production. It's a very in-depth look into the field, but there's absolutely no way that it can fully devote itself to all of the topics. However, we're lucky enough to have the Web at our disposal to help us dig deeper into a particular subject that we might not fully understand, or simply want to know more about. Giga-tons of sites can be found that are dedicated to even the

most off-beat people, places, toys and things ... and search engines can even help you find obscure information on how to fix a self-sealing stem-bolt on a 1905 sonic-driven nutcracker. As such, I strongly urge you to use the Web as an additional guide. For example, if there's a subject that you just don't get, look it up on www.wikipedia.org or simply Google it.

Of course, there's a wealth of info that can be found by searching the innumerable www.youtube.com

videos that relate to any number of hardware systems, software toys and production techniques. Further information relating to this book and the recording industry at large can also be found at www.modrec.com, as well as at youtube.com/modernrecordingtechniques. Digging deeper into the Web will certainly provide you with a different viewpoint

or another type of explanation, and having that “AH HA!” light bulb go off (as well as the “hokey pokey”) is definitely what it’s all about.

David Miles Huber (www.davidmilesheber.com)

Emiliano Caballero (www.emilianocaballero.com)

THE PROFESSIONAL STUDIO ENVIRONMENT

The commercial music studio is made up of one or more acoustic spaces that are specially designed and tuned for the purpose of capturing the best possible sound onto a recorded medium. In addition, these facilities are often structurally isolated in order to keep outside sounds from entering the room and being recorded (as well as to keep inside sounds from leaking out and disturbing the surrounding neighbors). In effect, the most important characteristics that go into the making and everyday workings of such a facility include:

- A professional staff
- Professional equipment
- Professional, yet comfortable, working environment
- Optimized acoustic and recording environment
- Optimized control room mixing environment

In this age of pro studios, project studios, digital audio workstations, groove tools and personal choices, it’s easy to understand how the “different strokes for different folks” adage equally applies to recording, as the artistic and technological process can be approached in a number of different ways. The cost-effective environment of the project studio has also brought music and audio production to a much wider audience, thus making the process much more personal. If we momentarily set aside the monumental process of creating music in its various styles and forms, the process of creating, producing and distributing a music project will generally occur in seven distinct steps:

- Preparation
- Recording
- Overdubbing
- Mixdown
- Mastering
- Product manufacturing
- Marketing and sales

The focus of this book, in its basic form, is to familiarize you with the tools, toys and techniques that go into the recording of audio ... as well as to introduce you to the seven steps that go into the making of audio for use in the various music and visual media that make up the artistry and business of audio. We urge you to take the time to read through each chapter, do additional dives into the various YouTube videos and Web resources on the many topics, talk among friends and share your insights ... and, of course, get yourself into the studio, basement, garage or corner of your bedroom and experiment with the tools of your trade. In short, take the time to learn your butts off, while hopefully having lots of fun along the way.

The Professional Recording Studio

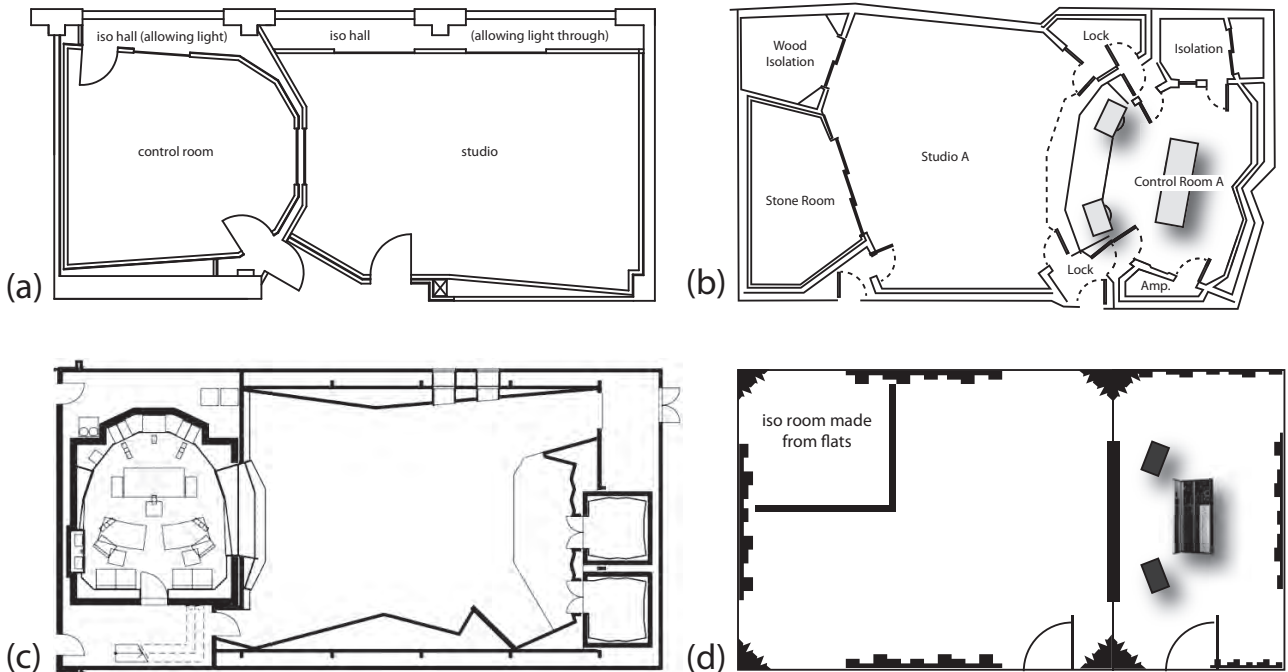
Professional recording studio spaces vary in size, shape and acoustic design (Figures 1.3 and 1.4) and usually reflect the personal taste of the owner or are designed to accommodate the music styles and production needs of clients, as shown by the following examples:

- A studio that records a wide variety of music (ranging from classical to rock) might have a large main room with smaller, isolated rooms off to the side for unusually loud or soft instruments, vocals, etc.
- A studio designed for orchestral film scoring might be larger than other studio types. Such a studio will often have high ceilings to accommodate the large sound buildups that are often generated by a large number of studio musicians.

FIGURE 1.3

Examples of a professional recording studio. (a) Berklee 160 Studio, Boston. (b) Trilogy Studios, San Francisco (courtesy of Walters-Storyk Design Group, www.wsdg.com).



**FIGURE 1.4**

Basic studio floor plans. (a) KMR Audio Germany, Berlin (courtesy of KMR Audio, www.kmraudio.de; studio design by Fritz Fey, www.studioplan.de). (b) Paisley Park's Studio A, Chanhassen, MN (courtesy of Paisley Park Studios). (c) Wisseloord Main Hall, Hilversum, Netherlands (courtesy of Wisseloord, www.wisseloord.nl, acoustics and design by Jochen Veith, jv-acoustics.com, www.jv-acoustics.de). (d) Simple, basic studio layout.

- A studio used to produce audio for video, film dialogue, vocals and mix-down might consist of only a single, small recording space located off the control room for overdub purposes.

In fact, there is no secret formula for determining the perfect studio design. Each studio design (Figure 1.4) has its own sonic character, layout, feel and decor that are based on the personal tastes of its owners, the designer (if one was involved) and the going studio rates (based on the studio's return on investment and the supporting market conditions).

During the 1970s, studios were generally small. Because of the new development of (and over-reliance on) artificial reverb and delay devices, they tended to be acoustically "dead" in that the absorptive materials tended to suck the life right out of the room. The basic concept was to eliminate as much of the original acoustic environment as possible and replace it with artificial ambience.

Fortunately, as tastes began to change and music-makers grew tired of relying entirely upon artificial ambience, rooms (both large and smaller) began to revert back to the idea of basing their acoustics upon a combination of absorption and natural acoustic reflections. This use of balanced acoustics has revived the art of capturing the room's original acoustic ambience along with the actual sound pickup. In fact, through improved studio design techniques, we have learned how to achieve the benefits of both earlier and modern-day

recording eras by building a room that provides a reasonable-to-maximum amount of isolation within the room (thereby reducing unwanted leakage from an instrument to other mics in the room) while encouraging higher-frequency reflections that can help give life and ambience to the overall sound. This natural balance of absorption and reflection is used to “liven up” the sound of an instrument or ensemble when they are recorded at a distance, a technique that has become popular when recording live rock drums, string sections, electric guitars, choirs, etc. Using close mic techniques, it’s also possible to use one or more iso-booths or smaller rooms as a tool, should greater isolation be needed.

In short, it is this combination of the use of acoustic treatment, proper mic techniques and a personal insight into the instruments and artists within a room (combined with a sense of experimentation, experience and personal preferences) that can bring out the best in a recording facility.

In certain situations, a studio might not have a large recording space at all but simply a small or mid-sized iso-room for recording overdubs (this is often the case in facilities that are used in audio-for-visual post-production and/or music remixing). Project studios, mix rooms and newer “concept” studios might not have a separate recording space at all, opting to create an environment whereby the artists can record directly within the mixing/production space itself.

The Control Room

A recording studio’s *control room* (Figures 1.5–1.7) serves a number of purposes in the recording process. Ideally, the control room is acoustically isolated from the sounds that are produced in the studio as well as from the surrounding, outer areas. It is optimized to act as a critical listening environment that uses carefully placed and balanced monitor speakers. This room also houses the majority of the studio’s recording, control and effects-related equipment. At the heart of the control room is the recording console and/or digital audio workstation (DAW).

FIGURE 1.5

There are a lot more project control rooms than pro ones (courtesy of www.emiliano-caballero.com).





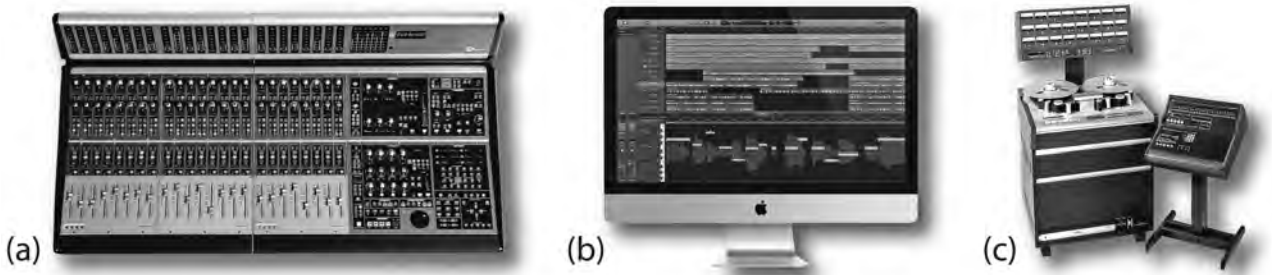
FIGURE 1.6
Morten Lindberg's 2L mix room (courtesy of 2L, www.2l.no).

The *recording console* (also referred to as the *board* or *desk*, as seen in [Figure 1.8a](#)) can be thought of as an artist's palette for the artists, producer and/or recording engineer. The console allows the engineer to combine, control and distribute the input and output signals of most, if not all, of the devices found in the control room. The console's basic function is to allow any combination of mixing (variable control over relative amplitude and signal blending between channels), spatial positioning (left/right or surround-sound control over front, center, rear and sub), routing (the ability to send any input signal from a source to a destination) and switching for the multitude of audio input/output signals that are commonly encountered in an audio production facility ... not to mention the fact that a console will also need to work in conjunction with a recording device. A DAW, as seen in [Figure 1.8b](#)), is a multi-channel media monster (audio, MIDI and video) that can work in conjunction with an outboard recording console or mixer, or it can work entirely on its own. DAWs are increasingly common fixtures within most control rooms, allowing us to work in an "in-the-box" stand-alone fashion.

FIGURE 1.7
Synchron Stage control room A, Vienna (courtesy of Walters-Storyk Design Group, www.wsdg.com).

The analog tape machine (24, 16, 8, 4 and 2 tracks, as seen in [Figure 1.8c](#)) is another way to capture sounds in the studio, using a way of working that's quite different (both functionally and sonically) than its digital counterpart.



**FIGURE 1.8**

The heart(s) of the recording studio. (a) The recording console. (b) The digital audio workstation (DAW). (c) The analog tape recorder.

Tape machines might be located toward the rear of a control room, while a DAW might be located at the functional center of the workspace (if the DAW serves as the room's main recording/mixing device) or at the side of the console. Because of the added noise and heat generated by recorders, computers, power supplies, amplifiers and other devices, it's becoming more common for equipment to be housed in an isolated machine room that has a window and door adjoining the control room for easy access and visibility. In either case, DAW controller surfaces (which are used for computer-based remote control and mixing functions) and auto-locator devices (which are used for locating tape and media position cue points) are often situated in the control room near the engineer for easy access to all recording, mixing and transport functions. Effects devices (used to electronically alter and/or augment the character of a sound) and other signal processors are also placed nearby for easy accessibility (frequently being designed into an effects island or bay that's often located directly behind the console).

As with recording studio designs, every control room will usually have its own unique sound, feel, comfort factor and studio booking rate. Commercial control rooms often vary in design and amenities – from a room that's basic in form and function to one that is lavishly outfitted with the best toys. Again, the style and layout are a matter of personal choice; however, as you'll see throughout this book, there are numerous guidelines that can help you make the most of a recording space. It's really important to keep in mind that although the layout and equipment will always be important, it's the people (the staff, musicians and you) who will almost always play the most prominent role in capturing the feel of a performance and the heart of your clients.

THE PROJECT STUDIO

With the advent of affordable, high-quality digital audio workstations, plug-ins, controllers and speakers, it's a foregone conclusion that the vast majority of music and audio recording/production systems are being built and designed for personal use. The rise of the *project studio* (Figures 1.9–1.11) has brought about monumental changes in the business of music and professional audio, in

**FIGURE 1.9**

Happiness is recording your own band in the basement (courtesy of Yamaha Corporation of America; www.yamaha.com).

a way that has affected and altered almost every facet of the audio production community.

One of the greatest benefits of a project or portable production system centers on the idea that an artist can choose from a wide range of tools and toys to get the particular sounds that he or she likes on their own schedule, in their own way and without hiring out a pro studio. This technology is often extremely powerful, as the components combine to create a vast palette of sounds and handle a wide range of task-specific functions. Such systems often include a DAW computer for recording, MIDI sequencing, mixing and just about anything that relates to modern audio production, soft-/hardware electronic instruments, soft-/hardware effects devices, as well as speaker and/or headphone monitoring.

FIGURE 1.10

DMH's project studio when he's in Berlin circa 2020 (courtesy of DMH, www.davidmilesHuber.com).

Systems like these are constantly being installed in the homes of almost all working and aspiring musicians, audio enthusiasts and DJs. Their sizes range from a corner in an artist's bedroom to a larger system that has been installed in a dedicated project studio. All of these system types can be designed to handle a wide range of tasks and have the important advantage of letting the artist produce his



**FIGURE 1.11**

The rustic look also works (courtesy of Steinberg Media Technologies GmbH, a division of Yamaha Corporation, www.steinberg.net).

or her music in a comfortable, cost-effective, at-home environment whenever the creative mood hits. Such production luxuries, which would have literally cost a fortune 30 years ago, are now within the reach of almost all working and aspiring musicians. This revolution has been carried out under the motto “You don’t have to have a million-dollar studio to make good music”. Truly, the modern-day project and portable studio systems offer such a degree of cost-effective power and audio fidelity that they can often match the production quality of a professional recording facility – all you need to supply is knowledge, care, dedication, patience and artistry.

Making the Project Studio Pay for Itself

Beyond the obvious advantage of being able to record when, where and how you want to in your own project studio, there are several additional benefits to working in a personal environment. Here are ways that a project studio can help subsidize itself, at any number of levels:

- Setting your own schedule and saving money while you’re at it! An obvious advantage of a project studio revolves around the idea that you can create your own music on your own schedule. Part of the expense of using a professional studio comes from having to be practiced and ready to roll on a specific date or range of dates. Having your own project studio frees you up to lay down practice tracks and/or record when the mood hits, without having to worry about punching the studio’s time clock.
- For those who are in the business of music, media production or the related arts business, the equipment, building and utility payments can be written off as a tax-deductible expense. Do some research and talk with a tax advisor; there are definitely advantages to writing off both personal and business studio deductions from your income tax.

- An individual artist or group might consider pre-producing a project in their own studio, allowing the time and expense billings to be a business tax deduction.
- The same artists might consider recording part or all of their production at their own project studio. The money saved (and deducted) could be later spent on a producer, better mixdown facility, professional freelance engineer, legal issues (such as copyright and contracts) ... and let's not forget marketing.
- The "signed artist/superstar approach" refers to the mega-artist who, instead of blowing their advance royalties on lavish parties in a professional studio (a sure way never to see any money from your hard work), will spend the bucks on building their own professional-grade project studio. After the project has been recorded, the artist will still have a tax-deductible facility that can be operated as a business enterprise. Then, when the next project comes along, the artist will still have a personal facility where they can record, while the saved advance bucks on the new project can be put in the bank.
- The name of the game for all of the above approaches is all about being wise and financially responsible.

THE PORTABLE STUDIO

Of course, as laptops have grown in power, it has become a simple matter to load them with your favorite DAW software and audio interface, grab your favorite mics and headphones, put the entire system in your backpack and hit the road running. These systems (Figure 1.12) have actually gotten so powerful that they equal and can sometimes surpass large, tower-based studio systems, allowing you to record, edit, mix and produce on the go or in the studio without any compromises whatsoever. In the bedroom, on the beach or at a remote seaside island under battery or solar power – there are literally no limits to what these ever-growing production systems can do.

FIGURE 1.12

A portable studio can be set up just about anywhere (courtesy of Universal Audio, www.uaudio.com © 2023 Universal Audio, Inc. All rights reserved. Used with permission).





To take these ever-shrinking analogies to the n th degree, newer handheld recording systems can actually fit in your pocket, allowing you to sample and record sounds with professional results, using either their internal high-quality mics or, in some cases, external professional mics under phantom power. Truly, it is a small world after all (Figure 1.13)!

FIGURE 1.13
A portable handheld recorder can go with you anywhere to sample or capture the moment.

The iRevolution

In recent years, another studio revolution has taken place – the iOS revolution. In fact, some of the greatest changes in audio production today are coming about as a direct result of the introduction of devices like the iPad and other iOS devices. Of course, the strengths of these systems are that they are extremely portable, wireless and offer an ever-increasing amount of processing power. A huge by-product of all this is overall cost-effectiveness. As an example, years ago, a remote controller device for a DAW would set you back \$1,200 or so ... now, it's a simple matter of getting out your pad and downloading a controller app from the “store”, and you'll have as many (or more) functions as its “wired” hardware counterpart at a ridiculously low cost, or even for free (Figure 1.14).

As new apps (applications) come onto the market on a daily basis, the iOS revolution continues to make its mark on all forms of media production. Within the fields of music and audio production, a pad can be used for such applications as:

- Audio recording and mixing
- DAW and live mixing
- Electronic instruments
- Systems controllers
- Compositional tools

Obviously, as these devices become more powerful, they can be used for any number of on-the-go purposes that previously required a larger computer or laptop ... it is truly a technological revolution in the making.

**FIGURE 1.14**

A pad (to the right) can be used as a wireless control surface for a DAW in a way that simulates the functions of a larger controller at a meager fraction of the cost.

The Retro Revolution

A revolution that has been making itself increasingly felt over the last decade at all levels of studio production is the desire for all things retro (Figures 1.15 and 1.16). Perhaps it's a need to revert back to our steampunk past, or just a nostalgia for simpler days, but retro is definitely in. So, what is retro? It's a desire to put older devices and techniques back into practice in our current productions, or to have new things that are designed in the style and function of yesteryear in our studios. Either way, it's often very cool to make use of these new, older toys in order to give our productions a fresh sound.

As with any art form, there is only one rule: there are none! Trends and what is "cool" come and go, but if you look into your heart and follow what's true to you, that sense of expression and feeling will be appreciated and felt by others.

A perfect example of this is the 2022 Grammy winner for Producer of the Year, Jack Antonoff. As he had started out with indie and underground bands and sounds, people in mainstream music didn't pay attention to his music until his unique way of imagining music and organic sounds started to become popular.

To us, the mainstream acceptance of all things retro goes above and beyond the reverence and interest in just older equipment – it has finally begun to further connect us with our use and interest in past techniques. This includes:

FIGURE 1.15

Joe Tritschler knows how to live the retro life (photo credit: Chris Bell, 2013).





- The use of distance techniques when placing microphones
- The use of analog tape machines (or their modeled plug-in counterparts) to add an indefinable punch to our mixes
- The willingness to use older equipment to add a different sonic character to our sound
- The willingness to place a set of speakers in the studio and mic them so as to add “room sound” to a mix
- Placing a speaker/mic combination in the bathroom down the hall to get “that sound”
- Recording the guitar track in a huge gym down the street with your laptop to get a larger-than-life acoustic sound

FIGURE 1.16

London Bridge Studio Neve 8048 console (courtesy of London Bridge Studio, Seattle, WA, www.london-bridgestudio.com).

In short, I think retro is helping us to accept that all things don't always have to be new in order to be exciting and relevant. It can be a piece of equipment, it can be a mic technique, it can be expensive or it can cost nothing to use tools you already have at your disposal. All you need is a sense of adventure and a willingness to experiment.

THE CHANGING FACES OF THE MUSIC STUDIO BUSINESS

As we've noted, the role of the professional recording studio has begun to change as a result of upsurges in project studios, audio for video and/or film, multimedia and the Internet. These market forces have made it necessary for certain facilities to rethink their operational business strategies. Sometimes, this means that a studio will not be able to adapt to the changing times; however, for those who are able to react and diversify in the new digital age, new possibilities can be met with success, as is illustrated by the following examples:

- Personal production and home project studios have greatly reduced the need for an artist or producer to have constant and costly access to

a professional facility. As a result, many pro studios now cater to artists and project studio owners who might have an occasional need for a larger space or better-equipped recording facility (e.g., for recording big drum sounds, string overdubs or an orchestral session). In addition, after an important project has been completed in a private studio, a professional facility might be needed to mix the production down into its final form. Most business-savvy studios are only too happy to capitalize on these new and constantly changing market opportunities.

- Upsurges in the need for audio for video, game and film post-production have created new markets that allow professional recording studios to provide services to the local, national and international broadcast and visual production communities. Creative studios often enter into lasting relationships with audio-for-visual and broadcast production markets, so as to thrive in the tough business of music, when music production alone might not provide enough income to keep a studio afloat.
- Studios are also taking advantage of Internet audio distribution techniques by offering Web development, distribution and other audio-for-Web services as an added incentive to their clients.
- A number of studios are also jumping directly into the business of music by offering advisory, business, networking and management services to artists and bands, sometimes signing the artists and funding tours in exchange for a piece of the business pie.
- A studio with several rooms might offer one of the rooms to an established engineer/mixer, offering it up as “Joe’s Mix Room” in exchange for a roster of clients that comes with the territory of having “Joe” on board.

These and other aggressive marketing strategies (many of which may be unique to a particular area) are being widely adopted by commercial music and recording facilities to meet the changing market demands of new and changing media. No longer can a studio afford to place all of its eggs in one media basket. Tapping into changes in market forces and meeting them with new solutions are important for making it (or simply keeping afloat) in the business of modern music production and distribution. Make no mistake about it, starting, staffing and maintaining a production facility, as well as getting the clients’ music heard, is serious work that requires dedication, stamina, innovation, guts and a definite dose of craziness.

OK, now for the hard part. Let’s take a moment to say that all-important word again: business. With the onset of more creative changes, opportunities and options, the only thing that stays constant is change, right? For example, there has been a steady onslaught of technological advances in audio production (such as new software, portable recording and controller options that come with new generations of computer, laptop and pad technologies). However, beyond that, in reality, many (if not most) of the technical aspects of music and audio production have stayed the same. What *have* drastically changed are the business

aspects of the industry – most notably in how music is distributed, marketed and consumed by the buying public.

We certainly don't have to remind you about how the traditional label distribution models have all changed in the wake of the download and streaming era. Over the last decade, the game has been continuously evolving in a way that keeps even the most seasoned industry professionals on their toes ... is this necessarily a bad thing? I'm not convinced it is. Innovation and ingenuity have always been part of the creative process ... it's what keeps things new and exciting. However, innovation doesn't always come easily and is often at a price. Recording studios are constantly being challenged to ride the wave of innovation – some make it, some are simply unable to adapt to the new world of the personal studio, the Internet and changing business models. In short, the reality is that the professional studio business is a tough one that requires that the studio make itself and its expertise relevant and marketable in the changing world of music and media production.

LIVE/ON-LOCATION RECORDING: A DIFFERENT ANIMAL

Unlike the traditional multitrack recording environment, where overdubs are often used to build up a song over time, *live/on-location recordings* are created on the spot, in real time, often during a single on-stage or in-the-studio performance event, sometimes with little or no studio post-production other than mixdown. A live recording might be very simple, possibly being recorded using only a few mics that are mixed directly to two or more tracks. Or, a more elaborate gig might call for a full-fledged multitrack setup, requiring the use of a temporary control room or fully equipped mobile recording van or truck (Figure 1.17). A more involved setup will obviously require a great deal of preparation and expertise, including a knowledge of sound reinforcement combined with the live recording techniques that are necessary to capture instruments in a manner that provides enough isolation between the tracks so as to yield control over the individual instruments during the mixdown phase.

FIGURE 1.17
Studio Metronome's live recording audio truck, Brookline, NH (courtesy of Metronome Media Group, www.studiometronome.com, Photo by Bennett Chandler).



Although the equipment and system setups will be familiar to any studio engineer, live recording differs from its more controlled studio counterpart in that it happens in a world where the motto of the day is “you only get one chance”. When you’re recording an event where the artist is spilling his or her guts to hundreds or tens of thousands of fans, it’s critical for everything to run smoothly. Live recording usually requires a unique degree of preparedness, redundancy, system setup skills, patience and, above all, experience. It’s all about capturing the sound and feel of the moment, the first time – and for a brave few, that’s a very exciting thing.

AUDIO FOR VIDEO AND FILM

In this day and age, it’s simply impossible to overlook the importance that quality audio plays in the production of film and video. With the introduction of complex surround playback formats, high-budget music scores and special effects production, audio-for-film has long been an established and specialized industry that has a dramatic effect on the movie-goer’s experience. Most definitely, audio-for film is an art form that has touched and helped shape our world culture (Figures 1.18 and 1.19).

Prior to the advent of the DVD, Blu-ray and home theater surround sound, broadcast audio and the home theater experience were almost an afterthought in a TV tube’s eye. However, with the introduction of these new technologies, audio has matured to being a highly respected part of video and visual media production. With the common use of immersive sound in the creation of movie soundtracks, along with the emerging popularity of Dolby Atmos in home and computer entertainment systems, the public has come to expect high levels of audio quality from their entertainment experience.

In modern-day production, MIDI, hard-disk recording, timecode and synchronization, automated mixdown and advanced effects have become everyday components of the audio-for-visual environment, requiring that professionals be highly specialized and skilled in order to meet the demanding schedules and production complexities.

FIGURE 1.18
Skywalker Sound main control room (courtesy of Skywalker Sound, a division of Lucasfilm Ltd., www.skysound.com).





AUDIO FOR GAMES

Most of the robot-zappin', daredevil-flyin', Hufflepuff-boppin' addicts who are reading this book are very aware that one of the largest and most lucrative areas of media audio production is the field of scoring, designing and producing audio for computer games – Zaaaaaaappppppppp! Like most subcategories within audio production, this field of expertise has its own set of technical and scheduling rigors and requirements that center as much around spreadsheets and databases as they do around audio equipment. With the tens of thousands of voice and music cues that are commonly required to make a game into a fully interactive experience, an entirely different skillset is often required of a gaming sound technician.

In addition, a rather interesting connection between orchestral recording and game audio has been steadily on the upsurge. Just as film makes use of heavy orchestral scoring for dramatic effect, game audio has also begun to score using big-budget and big-name orchestras to create a bigger-than-life storyline.

THE DJ

The days when DJs would bring their records to a gig and spin are pretty much gone (except for those who still prefer the retro, hands-on way of working). Now, on-stage systems are commonly made up of laptops, controllers, visual gear and other toys that have just as much in common with a project studio as they do with the theater or performance stage. In short, it's not just a pair of turntables anymore. From a performance perspective, the modern-day DJ can range from being someone who plays other people's music to one who creates and composes their own productions and then combines these sounds with the works of others.

A new development within the DJ community revolves around the use and distribution of stems (individual groupings of instruments that can combine together to make up a recording). Much in the same way that instruments, vocals, etc. can be grouped together and isolated in a session, it's possible for "stems" to be recorded to isolated tracks in a way that allows them to be individually remixed and/or isolated in ways that can create a whole new outlook

FIGURE 1.19

Auditorium, Galaxy Studios, Mol, Belgium (courtesy of Galaxy Studios, www.galaxy.be).

on the track. Additionally, the use of stems in a DJ setting allows these various sub-grouped stems from various songs to be combined, mixed and mutilated in ways that can create a whole new song or composition. The rule here is: be inventive and have fun!

THE TIMES, THEY'VE ALREADY CHANGED: MULTIMEDIA AND THE WEB

With the integration of text, graphics, MIDI, digital audio and digitized video into almost every facet of the personal computer and mobile environment, the field of *multimedia* audio has become a fast-growing, established industry that represents an important and lucrative source of income for both creative individuals and production facilities alike. Of course, the use of audio-for-the-Web can take any number of forms:

- A record label might decide to offer a new release in a streaming-only format, requiring that the project be mastered in a way that best suits the medium.
- An online language dictionary might require that all of the translations be recorded so they can be easily pronounced and heard in high quality.
- An online download site might offer any number of music loops that can be downloaded and made into a personal remix that can be shared over the Web.
- A music sample library might make use of a major recording facility to record instruments for a sampler plug-in.
- The list is absolutely endless!

For decades, the industry has been crying foul over the breakup of the traditional record industry as we know it. In the early days of the Web, a new kid on the block came onto the scene ... the MP3. This "ripping" and playback codec made it possible for entire song libraries to be compressed (data-wise), uploaded, downloaded and streamed with relative ease. Such a simple beastie then progressed into a social animal that would itself bring an entire industry to its virtual knees. With media sharing came the eventual revolution of the social network – allowing people to connect with each other in totally new ways never before thought possible. With the sharing of information came the sharing and new networks for distributing music and visual media, allowing DMH to be currently listening to a melodic Ukrainian rapper on his phone (called a "Handy" in Deutschland) while walking on the Oberbaum Brücke in Berlin. It's a brave, new world after all, and we're all part of that big change!

POWER TO THE PEOPLE!

On a more personal and human front, with all of these amazing tools that are at our disposal, it totally makes sense that artists, producers and aspiring recording professionals will create art using the toys, tools and techniques that

are affordable and understandable. However, technology isn't enough to create great art – a personal sense of drive, passion and ingenuity is also required. One more ingredient is also necessary to finish off this artistic “mix”, namely, a personal and never-ending search for knowledge to improve your craft. This all-important ingredient can be gained by:

- Reading about the equipment choices that are available to you on the Web or in the ever-dwindling number of trade magazines that are available
- Visiting and talking with others of like (and dissimilar) minds about their equipment, techniques and personal working styles (conventions, industry organizations and social networks can be a really effective learning and networking tool)
- Enrolling in a recording course that best fits your needs, working style and budget
- Researching the type of equipment and room layout that best fits your needs and budget before you make any purchases and, if possible, getting your hands on equipment before you make any final purchases (i.e., checking them out at your favorite music store)
- Experience and time – always the best teacher

The more you take the time to familiarize yourself with the options and possibilities that are available to you, the less likely you are to be unhappy about how you've spent your hard-earned bucks after the fact. It is also important to point out that *having* the right equipment for the job isn't enough – it's also important to *take the time* to learn how to use your tools to their fullest potential. Whenever possible, read the manual and get your feet wet by taking the various settings, functions and options for a test spin long before you're under the time and emotional constraints of being in a session.

Whatever Works for You

As you begin to research the various types of recording and supporting systems that can be put to use in a project studio, you'll find that a wide variety of options are available. There are indeed hundreds, if not thousands, of choices for recording media, hardware types, software systems, speakers, effects devices – the list goes on. This should instinctually tell us that no one tool is right for the job. As with everything in art (even the business of an art), there are many personal choices that can be combined into a working system that's right for you. Whether you

- Work with a DAW or tape-based system
- Choose to use analog or digital effects equipment (or both)
- Are a Mac or PC kind of person (pretty much a nonissue these days)
- Use this type of software or that,

it all comes down to the bottom line of how does it sound? Does the music move you? How does it move the audience? How can it be sold? In truth, no

prospective buyer will turn down a song because it wasn't recorded on such-and-such a machine, at such-and-such sample rate, using speakers made by so-and-so – it's the feel, baby. It's the emotion in the art that always seals the deal in the end.

THE PEOPLE WHO MAKE IT ALL HAPPEN

“One of the most satisfying things about being in the professional audio (and music) industry is the sense that you are part of a community.”

Frank Wells, editor, Pro Sound News

When you get right down to the important stuff, the recording field is built around pools of talented individuals and service industries that work together toward a common goal: performing, producing, selling and enjoying music. As such, it's the people in the recording industry who make the business of music happen. Recording studios and other businesses in the industry aren't only known for the equipment that they have, but are more often judged by the quality, knowledge, vision and combined personalities of their staff. The following sections describe but a few of the ways in which a person can be involved in this multifaceted industry. In reality, the types and descriptions of a job in this techno-artistic industry are limited only by the imagination. New ways of expressing a passion for music production and sales are being created every day, and if you see a new opportunity, the best way to make it happen is to roll up your sleeves and “just do it”.

The Artist

The strength of a recorded performance begins and ends with the artist. All of the technology in the world is of little use without the existence of the central ingredients of human creativity, emotion and individual technique. Just as the overall sonic quality of a recording is no better than its weakest link, it's the performer's job to see that music's main ingredient, its inner soul, is laid out for all to experience and hear. After all is said and done, a carefully planned and well-produced recording project is simply a gilded framework for the music's original drive, intention and emotion.

Studio Musicians and Arrangers

A project will often require additional musicians to add extra spice and depth to the artist's recorded performance. For example:

- An entire group of selected studio musicians might be called on to provide the best possible musical support for a high-profile artist or vocalist.

- A project might require musical ensembles (such as a choir, string section or background vocals) for a particular part or to give a piece a fuller sound.
- If a large ensemble is required, it might be necessary to call in a professional music contractor to coordinate all of the musicians and make the financial arrangements. The project might also require a music arranger, who can notate and possibly conduct the various musical parts.
- A member of a group might not be available or be up to the overall musical standards that are required by a project. In such situations, it's not uncommon for a replacement studio musician to be called in to fit the bill.

In situations like these, a project that's been recorded in a private studio might benefit from the expertise of a professional studio that has a larger recording room, an analog multitrack for that certain sound and/or an engineer who knows how to better deal with a complicated production scenario.

The Producer

Beyond the scheduling and budgetary aspects of coordinating a recording project, it's the job of a producer to help the artist and record company create the best possible recorded performance and final product that reflects the artist's vision. A producer can be hired for a project to fulfill a number of specific duties or might be given full, creative rein to help with any and all parts of the creative and business side of the process to get the project out to the buying public. More likely, however, a producer will act collaboratively with an artist or group to guide them through the recording process to get the best possible final product. This type of producer might:

- Help the artist (and/or record label) create the best possible recorded performance and final product that reflects the artist's vision. This will often include a large dose of musical input, creative insight and mastery of the recording process
- Assist in the selection of songs
- Help to focus the artistic goals and performance in a way that best conveys the music to the targeted audience
- Help to translate that performance into a final, salable product (with the technical and artistic help of an engineer and mastering engineer)

It's interesting to note that because engineers spend much of their working time with musicians and industry professionals with the intention of making their clients sound good, it's not uncommon for an engineer to take on the role of producer or co-producer (by default or by mutual agreement). Conversely, as producers and artists alike become increasingly knowledgeable about recording technology, it's increasingly common to find them on the other side of the glass, sitting behind the controls of a console.

Additionally, a producer might also be chosen for his or her ability to understand the process of selling a final recorded project from a business perspective to a label, to a film licensing entity or to the buying public. This type of producer

can help the artist gain insights into the world of business, business law, budgeting and sales, always an important ingredient in the process.

Of course, in certain circumstances, a project producer might be chosen for his or her reputation alone and/or for giving a certain cachet to a project that can help put a personal “brand” on the project, thereby adding to the project’s stature and hopefully helping to grab the public’s attention.

One final thing is for certain: the artist and/or label should take time to study what type of outside producer is needed (if any) and then agree upon his or her creative and financial role in the project *before* entering into the creative process.

The Engineer

The role of an engineer can best be described as an interpreter between technology and art. He or she must be able to express the artist’s music and the producer’s concepts and intent through the medium of recording technology. In this world, both the music and the recording process itself are totally subjective and artistic in nature and rely on the tastes, experiences and feelings of those involved. During a recording session, one or more engineers can be used on a project to:

- Conceptualize the best technological approach for capturing a performance or music experience
- Translate the needs and desires of the artists and producer into a technological approach that best captures the music
- Document the process for other engineers or future production use
- Place the musicians in the desired studio positions
- Choose and place the microphones or pickup connections
- Set levels and balances on the recording console or DAW mixing interface
- Capture the performance (onto hard disk or tape) in the best possible way
- Overdub additional musical parts into the session that might be needed at a later time
- Mix the project into a final master recording in any number of media formats (mono, stereo and immersive)
- Help in meeting the needs for archiving and/or storing the project
- Last, but not least, be helpful, understanding and supportive in a way that can put those who are in a stressful situation at ease

In short, engineers use their talent and artful knowledge of recording media technology to convey the best possible finished sound for the intended media, the client and the buying public.

Assistant Engineer

Many studios often train future engineers (or build up a low-wage staff) by allowing them to work as assistants or interns who can offer help to staff and visiting freelance engineers. The assistant engineer might do microphone and

headphone setups, run DAW or tape machine operations, carry out system patching, help with session documentation, do session breakdowns and (in certain cases) perform rough mixes and balance settings for the engineer on the console. With the proliferation of freelance engineers (engineers who are not employed by the studio but are retained by the artist, producer or record company to work on a particular project), the role of the assistant engineer has become even more important. It's often his or her role to guide freelance engineers through the technical aspects and quirks that are peculiar to the studio, and to generally babysit the technical and physical aspects of the place.

Traditionally, being an assistant has been a no- or low-wage job that can expose a “newbie” to a wide range of experiences and situations. With hard work and luck, many assistants have worked their way into the hot seat whenever an engineer quits or is unexpectedly ill. As in life, there are no guarantees in this position – you just never know what surprises are waiting around the next corner for those who rise to the occasion.

Maintenance Engineer

The maintenance engineer's job is to see that the equipment in the studio is maintained in top condition and regularly aligned and repaired when necessary. Of course, with the proliferation of project studios, cheaper mass-produced equipment, shrinking project budgets and smaller staff, most studios will not have a maintenance engineer on staff. Larger organizations (those with more than one studio) might employ a full-time staff maintenance engineer, whereas outside freelance maintenance engineers and technical service companies are often called in to service smaller commercial studios in both major and non-major markets.

Mastering Engineer

Often, a final master recording will need to be tweaked in terms of level, equalization (EQ) and dynamics so as to present the final “master” recording in the best possible sonic and marketable light. If the project calls for it, this job will fall to a mastering engineer, whose job it is to listen to and process the recording in a specialized, fine-tuned monitoring environment. Of course, mastering is a techno-artistic field in its own right. Beauty is definitely in the ear of the beholding client, and one mastering engineer might easily have a completely different approach to the sound and overall feel to a project than the next dude or dudette. However, make no mistake about it – the mastering of a project can have a profound impact on the final sound of a project, and the task of finding the right mastering engineer for the job should never be taken lightly. Further info on the subject can be found in Chapter 20.

Studio Management

Running a business in the field of music and audio production requires the special talents of businesspeople who are knowledgeable about the inner workings

of promotion, the music studio, the music business and, above all, the people. It requires constant attention to quirky details that would probably be totally foreign to someone outside “the biz”. Studio management tasks include:

- *Management:* The studio manager (who might or might not be the owner) is responsible for managerial and marketing decisions for all of the inner workings of the facility and its business.
- *Bookings:* This staff person keeps track of most of the details relating to studio booking, usage and billing.
- *Competent administration staff:* These folks keep everyone happy and running as smoothly as possible.

Note, however, that some or all of these functions often vary from studio to studio. These and other equally important staff members are necessary in order to successfully operate a commercial production facility on a day-to-day basis.

Music Law

It’s never good for an artist, band or production facility to underestimate the importance of a music lawyer. When entering into important business relationships, it’s always a good idea to have a professional ally who can help you, your band or your company navigate the potentially treacherous waters of a poorly or vaguely written contract. Such a professional can serve a wide range of purposes, ranging from the primary duties of looking after their clients’ interests and ensuring that they don’t sign their careers away by entering into a life of indentured, nonprofit servitude, all the way to introducing an artist to the best possible music label or distribution network.

Music lawyers, like many in this business, can be involved in the working of a business or career in many ways; hence, various fee scales are used. For example, a new artist might meet up with a friend who knows about a bright, young, freshly graduated music lawyer who has just passed the bar exam. By developing a relationship early on, there are any number of potential opportunities for building trust and making special deals that are beneficial to both parties, etc. On the other hand, a more established lawyer could help solicit and shop a song, band or artist more effectively within a major music, TV or film market. As with most facets of the biz, answers to these questions are often situational and require intuition, careful reference checking and the building of trust over time. Again, it’s important to remember that a good music lawyer can be extremely important (at the right moment) and is the unsung hero of many successful careers.

Women and Minorities in the Industry

Ever since its inception, males have dominated the recording industry. I remember many sessions in which the only women on the scene were female artists, secretaries or studio groupies in short dresses. Fortunately, over the years,



women have begun to play a much more prominent role, both in front of and behind the glass, and in every facet of studio production and the business of music (Figure 1.20). Fortunately, in recent decades, most of the resistance to including new and fresh blood based on gender, race or sexual orientation into the business has greatly reduced. In the end, the most important thing that you can do to make it in “the biz” is to be sincere, work hard, play nice and simply be yourself.

Behind the Scenes

In addition to the positions listed earlier, there are scores of other professionals who serve as a backbone for keeping the business of music alive and functioning. Without the many different facets that contribute to the making of the music business, the biz would be very, very different. A small sampling of the additional professional fields that help make it happen includes:

- Artist management
- Artist booking agents
- A&R (artist and repertoire)
- Equipment design
- Equipment manufacturing
- Music and print publishing
- Distribution
- Web development
- Graphic arts and layout
- Audio company marketing
- Studio management

FIGURE 1.20

Women's Audio Mission, an organization formed to assist women in the industry (courtesy of the Women's Audio Mission, www.womensaudiomission.org).

No matter who you are, where you're from or what your race, gender, sexual or planetary orientation is, remember this universal truth: If your heart's in it and you're willing to work hard enough, you'll make it (whatever you perceive “it” to be). Don't let them tell you (or tell yourself) otherwise.

- Live sound
- Live sound tour management
- Acoustics
- Audio instruction
- Club management
- Sound system installation for nightclubs, airports, homes, etc.
- ... and a whole lot more!

This incomplete listing serves as a reminder that the business of making music is full of diverse possibilities and extends far beyond the notion that in order to make it in the biz, you'll have to sell your soul or be someone you're not. In short, there are many paths that can be taken in this techno-artistic business. Once you've found the one that best suits your own personal style, you can then begin the lifelong task of gaining knowledge and experience and pulling together an interactive network with those who are currently working in the field.

It's also important to realize that finding the career niche that's right for you might not happen overnight. You might try your hand at one aspect of production, only to find that your passion lies totally in another field. When and if this happens, don't beat yourself up. Finding the right career

path that best fits your life might not be easy ... but it's super important. As the saying goes, "Wherever you may be, there you are!" Finding the path that's best for you is a lifelong ongoing quest; the general idea is to work hard, learn and enjoy the ride.

CAREER DEVELOPMENT

It's a sure bet that those who are interested in getting into the business of audio will quickly find out that it can be a tough nut to crack. For every person who makes it, a large number won't. In short, there are a lot of people who are waiting in line to get into what is perceived by many to be a glamorous biz. So, how do you get to the front of the line? Well, folks, here are the primary keys:

- Self-Motivation
- Networking

Self-Motivation

The business of art (the techno-art of recording and music being no exception) is one that's generally reserved for self-starters and self-motivated people. Even if you get a degree from XYZ college or recording school, there's absolutely no guarantee that your dream studio will be knocking at your door with an offer in hand (in fact, they most certainly won't). It takes a large dose of perseverance, talent and personality to make it.

This may sound strange, but one of the best ways to get into the biz is to simply jump in and start. In fact, you might try this little trick ... find a stick (or one of

those Scottish swords, if you happen to have one hanging around) and get down on one knee, then “knight” yourself on the shoulder with the figurative “sword” and say: “I am now a _____ !” (Fill in the blank with whatever you want to be – engineer, artist, producer ... whatever) and then say “arise Sir or Dame _____ ... you are now a _____!” Simply become it ... right there on the spot! Now, make up a business card, start a business and begin contacting artists to work with (or make the first step toward becoming the creative person you want to be). All you have to do is BELIEVE IN YOURSELF, work hard and follow the Golden Rule.

In fact, there are many ways to get to the top of your own personal mountain. For example, you could get a diploma from a school of education or from the school of hard knocks (it usually ends up being from a bit of both), but the goals and the paths are up to you.

Networking: “Showing Up Is Huge”

The other half of the success equation rests with your ability to network well with other people. As the venerable expression says, “It’s not [only] WHAT you know, it’s WHO you know”.

Maybe you have an uncle or a friend in the business, or a friend who has an uncle

– you just never know where help or

that initial break might come from

next. This idea of getting to know

someone who knows someone else

is what makes the business and pro-

duction world go around. So, don’t

be afraid to put your best face forward

and start meeting people. If you want to

work at XYZ Studios, hang out without being

in the way. You never know, the engineer might need

some help or might know someone who can help get you into the proverbial

door. The longer you stick with it, the more people you’ll meet ... and eventu-

ally, you’ll have a bigger and stronger network than you ever thought could be

possible.

A friend of mine recently added a phrase to this proverb: “but you have to be ready!” If you’re at the right place, at the right time and you’re not ready to step up to the plate, then it’s all been for naught.

ANCIENT PROVERB

Being “in the right place at the right time” means being in the wrong (or right) place at the wrong time a thousand times! In short, “Showing up is HUGE”!

So, What Are Some Good Ways to Get Started?

- Join an industry association such as The Recording Academy (Grammys), Grammy U (for students), Audio Engineering Society (AES), etc.

- Attend conventions and industry business functions (both nationally and in your area).
- Visit a favorite studio and get to know them (and make it easy for them to get to know you).
- Online social networking.

Of course, I've been assuming that you want to get into the production side of the recording business. But for those who just want to learn the tools and toys of recording technology from an artist's standpoint, these networking tools apply even more to those who want and need to get their names out to the music-consuming public. For business professionals, networking is essential – for the artist, it's the driving force of your life.

So, when do you start this grand adventure? When do you start building your career? The obvious answer is *RIGHT NOW*. If you're in school, you have already started the process. If you're just hanging out with like-minded biz folks and/or joined a local or national organization, that, too, is an equally strong start. Whatever you do, don't wait until you graduate or until some magic date in the future, because putting it off will just put you that much further behind.

In addition to all this, make yourself visible. Try not to be afraid when sending out a link to your site (which should include your resume, music/mix examples, etc.) when asking for a job or any type of position. The worst thing they can do is say "No." You might also keep in mind that "No" could actually mean "No, not right now". You might actually ask if this is the case. If so, they might take your persistence into account before saying "No" two or three times. By picking a market and particular area, blanketing that area with resume/press kits and knocking on doors, you just never know what might happen. I know it's not easy, but if you fail, simply pick yourself up (again), reevaluate your strategies, and start pounding the streets (again). Just remember the self-motivation rule: "failing at something isn't a bad thing – not trying is!"

Here are a few additional networking and job placement tips to get you started:

- Make a Facebook or personal Web page (WordPress is an easy, free and powerful way to get started).
- Send out lots of resumes, or better yet, make an online bio/resume link on your page.
- Choose a mentor who you can rely on and talk to (sometimes they fall out of the sky, sometimes you have to develop the relationship over time).
- Pick the areas you want to live in (if that's a key factor).
- Pick the companies in that area and target them.
- Contact studios or companies in this area that might be looking for interns.
- Visit these places, just to hang out and see what they are like.
- Use your school counselors for intern placement.
- Always remember to follow up at least once, usually more.

To summarize ... by now it should be painfully obvious that getting into music production, audio production and all things recording takes hard work, perseverance, blood, sweat, tears and laughter. For every person who builds a personal career in audio production, a large number won't make it. There are a lot of people waiting in line to get into what is perceived by many to be a glamorous biz. So, how do you get to the front of the line? Well, folks, just as the best way to get to Carnegie Hall is to practice – here are some key skills that are practically requirements:

- A ton of self-motivation
- Good networking and communication skills
- A good, healthy attitude
- An ever-present willingness to learn
- The realization that “showing up is always huge!”

The business of art (the techno-arts of recording and music production being no exception) is one that's generally reserved for self-starters. Even if you get a degree from XYZ College or recording school, there's absolutely no guarantee that anyone will be knocking on your door asking you to work for them. More often than not, it takes a large dose of perseverance, talent, personality and luck to make it.

There are many ways to get to the top of your own personal mountain. You could get a diploma from a school of education or from the school of hard knocks (it usually ends up being from both), but the goals and the paths are up to you. As a mentor of mine always said, “Failure isn't a bad thing – not trying is!”

Another huge part of the success equation lies in your ability to network with other people. As the venerable expression says, “It's not [only] what you know – it's who you know”. Maybe you have an uncle or a friend in the business, or a friend who has an uncle – you just never know where help might come from next. This idea of getting to know someone, who knows someone else, who knows someone else, is what makes the business world go around. Don't be afraid to put your best face forward and start meeting people. If you want to play gigs around your region (or beyond), get to know a promoter or venue manager and hang out without being too much in the way. You never know – the music maven down the street might know someone who can help get your feet in the proverbial door. The longer you stick with it, the more people you'll meet, thereby making a bigger and stronger network than you thought would be possible.

As a close buddy of mine always says, “Showing up is huge!” It's the wise person who realizes that being in the right place at the right time means being at the wrong place hundreds and hundreds of times. You just never know when lightning is going to strike – just try to be prepared and stand under the right tree when it does.

Here are some more practical and immediate tips for musicians and producers:

- Build a personal and/or band website: making a great social network presence and/or creating your own personal site helps to keep the world informed of your gigs, projects, bio and general goings-on.

- Build a relationship with a music lawyer: many music lawyers are open to building relations that can be kicked into gear at a future time. Take the time to find a solicitor who is right for you. Does he or she understand your personal music style? If you don't have the bucks, is this person willing to work with you and your budget as your career grows?
- The same questions might be asked of a potential manager. This symbiotic relationship should be built with care, honesty and safeguards (which is just one of the many reasons you want to know a music lawyer).
- Copyright your music: always protect your music by registering it with the Library of Congress. It's easy and inexpensive and can give you peace of mind about knowing that the artistic property that you're sending out into the world is protected. Go to www.copyright.gov for more information (www.copyright.gov/forms). Additional organizations also exist that can help you get paid.
- On a personal note as a musician, I've come to realize that making music is about the journey – not necessarily the goal of being a star, or being the big man/woman on campus. It's about building friendships, collaborations, having good and bad times at gigs – and, of course, it's all about making music.

A Word on Professionalism

Before we close this beginning chapter, there's one more subject that we'd like to touch on – perhaps the most important one of all: professional demeanor. Without a doubt, the life and job of a typical engineer, producer or musician isn't always an easy one. It often involves long hours and extended concentration with people who, more often than not, are new acquaintances. In short, it can be a high-pressure job. On the flip side, it's one that's often full of new experiences, with demands that change on almost a daily basis, and often connects you with exciting people who feel passionately about their art and chosen profession.

It's been my observation (and that of many I've known) that the best qualities that can be exhibited by anyone in "the biz" are:

- Having an innate willingness to experiment
- Being open to new ideas (flexibility)
- Having a good sense of humor
- Having an even temperament (this often translates as "patience and understanding")
- Being open to communicating with others
- Being able to convey and understand the basic nuances of people from all walks of life and with many different temperaments

The best advice we can possibly give is to be open, be patient and above all, BE YOURSELF. Also, be extra patient with yourself. If you don't know something ...

ask. If you make a mistake (trust me, you will; we all do), admit it and don't be hard on yourself. It's all part of the process of learning and gaining experience.

This last piece of advice might not be as popular as the others, but it might come in handy someday: it's important to be open to the fact that there are many, many aspects to music and sound production, and you may find that your career calling might be better served in another branch of the biz (other than the one that you've been studying or striving for). That's totally OK! Change is an important part of any creative process – that and taxes are the only constants you can count on!

IN CONCLUSION

Obviously, these tips are just part of an ever-changing list. The process of producing, recording and mixing in any type of studio environment is an ongoing, lifelong pursuit. Just when you think you've gotten it down, the technology or the nature of the project changes under your feet – hopefully, you'll be the better for it and will be open to learning a new process or piece of gear or software tech.

Far more than just the technology, the process of coming up with your own production style and applying these tools, toys and techniques in your own way is what makes us artists – whether you're in front of the proverbial glass or behind it. Over time, your own list of studio tips and tricks will grow. Take the time to write them down and pass them on to others, and be open to the advice of your friends and colleagues. Use the trade mags, conventions and the Web to lead you to new ideas. This way, you're opening yourself up to new insights on using the tools of your profession and to finding new ways of doing stuff. Learning is an ongoing process – try to have lots of fun along the way!



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CHAPTER 2

Sound and Hearing

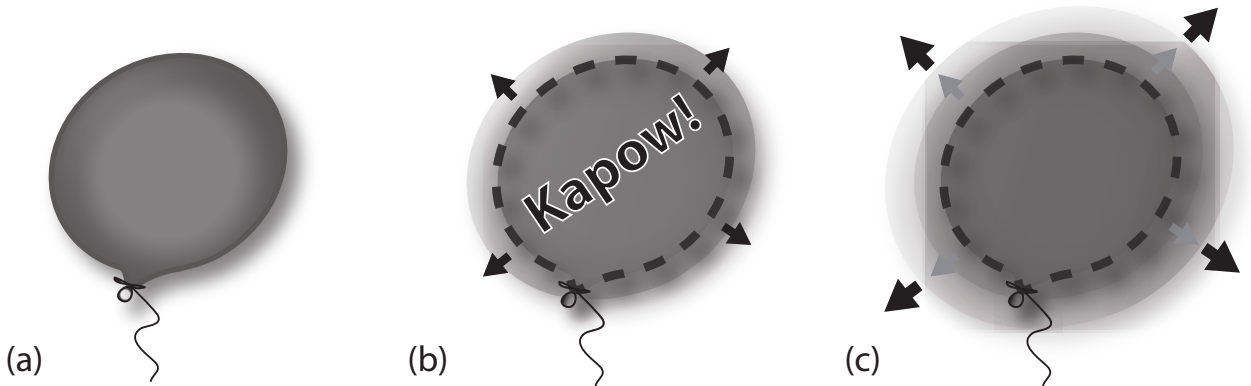
When we make a recording, in effect, we're actually capturing and storing sound into a memory media so that an original event or generated signal can be re-created at a later date. If we start with the idea that *sound* is actually a concept that corresponds to the brain's perception and interpretation of a physical auditory stimulus, the study of sound can be divided into four areas:

- The basics of sound
- The characteristics of the ear
- How the ear is stimulated by sound
- The psychoacoustics of hearing

THE BASICS OF SOUND

Sound arrives at the ear in the form of periodic variations in atmospheric pressure called *sound-pressure waves*. This is the same atmospheric pressure that's measured by the weather service, although the changes in pressure heard by the ear are simply too small in magnitude and fluctuate too rapidly to be observed on a barometer. An analogy of how sound waves travel in air can be demonstrated by bursting a balloon. Before we stick it with a pin, the molecular motion of the room's atmosphere is at a normal resting pressure. The pressure inside the blown-up balloon is much higher, though, and the molecules are compressed much more tightly together (Figure 2.1a), like people packed into a crowded subway car. When the balloon is popped – KAPOW! (Figure 2.1b) – the tightly compressed area under high pressure begins to exert an outward force on its molecular neighbors in an effort to move toward areas of lower pressure. When the neighboring set of molecules have been compressed, they will then exert an outward force on the next set of lower-pressured neighbors in a continuing ongoing outward motion (Figure 2.1c), which travels until the pressure stabilizes and the molecules have used up all their energy in the form of heat.

Likewise, as a vibrating mass (such as a guitar string, a person's vocal chords or a loudspeaker) moves outward from its normal resting state, it squeezes air

**FIGURE 2.1**

Wave movement in air as it moves away from its point of origin. (a) An intact balloon contains pressurized air. (b) When the balloon is popped, the compressed molecules exert a force on its outer neighbors in an effort to move to areas of lower pressure. (c) This exerted force continues outwards to the next set of molecules in an effort to move to areas of lower pressure.

molecules into a compressed area, away from the sound source. This causes the area being acted on to have a greater than normal atmospheric pressure, a process called *compression* (Figure 2.2a). As the vibrating mass moves inward from its maximum movement, an area with a lower than normal atmospheric pressure will be created, in a process called *rarefaction* (Figure 2.2b). As the vibrating body cycles through its inward and outward motions, areas of higher and lower compression states are then cyclically generated. These areas of high and low pressure will cause the oscillating wave to move outward from the sound source in the same way that the compressed wave moved outward from the burst balloon. It's interesting (and important) to note that the molecules themselves don't move through air at the velocity of sound – only the sound wave itself moves through the atmosphere in the form of high-pressure compression waves that continue to push against areas of lower pressure (in an outward direction). This outward pressure motion is known as *wave propagation*, which is the building block of sound.

Waveform Characteristics

A *waveform* is the graphic representation of a sound-pressure level or voltage level as it moves through a medium over time. In short, a waveform lets us see and explain the actual phenomenon of wave propagation in our physical environment and will generally have the following fundamental characteristics:

- Amplitude
- Frequency
- Velocity
- Wavelength
- Phase
- Harmonic content
- Envelope