

AUDIO ENGINEERING SOCIETY PRESENTS ...



# MODERN RECORDING TECHNIQUES

DAVID MILES HUBER



9<sup>TH</sup> EDITION

A Focal Press Book



# 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 for a step-up in the industry, *Modern Recording Techniques* provides an in-depth read on the art and technologies of music production. It's a must-have reference for all audio bookshelves. Using its familiar and accessible writing style, this ninth edition has been fully updated, presenting the latest production technologies and includes an in-depth coverage of the DAW, networked audio, MIDI, signal processing and much more.

A robust companion website features video tutorials, web-links, an online glossary, flashcards, and a link to the author's blog. Instructor resources include a test bank and an instructor's manual.

The ninth edition includes:

- Updated tips, tricks and insights for getting the best out of your studio
- An introduction to the Apple iOS in music production
- Introductions to new technologies and important retro studio techniques
- The latest advancements in DAW systems, signal processing, mixing and mastering

**David Miles Huber** is a 4-time Grammy-nominated producer and musician who works in the electronic music and surround sound genres. He is widely acclaimed in the recording industry as a consultant, author and guest lecturer on the subject of digital audio and recording technology.



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Several months before Prince's death, I took the cover shot for this book at London Bridge Studio in Seattle. The black theme combined with the retro look of their vintage Neve 8048 console intrigued me, and I immediately envisioned making MRT9 "The Purple Rain Edition," complete with purple highlights. After losing him and so many other great artists in 2016, it seemed that it would be a natural tribute to those who used, currently use and will use the art of modern recording technology to its fullest. I hope you enjoy and learn from it.

All the best!

DMH



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David Miles Huber  
[www.davidmileshuber.com](http://www.davidmileshuber.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 business-people 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 assures 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, further reading, Web searching, soul

### 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.pmc-speakers.com](http://www.pmc-speakers.com)) (b) Studio A. (Courtesy of Capitol Records, [www.capitolrecords.com](http://www.capitolrecords.com))



(a)



(b)

### FIGURE 1.2

One of the many, many possible examples of a project studio. (Courtesy of Bernd Scholl Musikproduktionen, [www.moonbooter.de](http://www.moonbooter.de), © foto by moonbooter.de)



searching and simple common sense, I 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 an 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!



### 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 one, 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](http://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](http://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](http://www.modrec.com). 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.davidmileshuber.com](http://www.davidmileshuber.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

### The Professional Recording Studio

Professional recording studio spaces vary in size, shape and acoustic design (Figures 1.3 through 1.5) 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.
- A studio used to produce audio for video, film dialogue, vocals and mixdown might consist of only a single, small recording space located off the control room for overdub purposes.

**FIGURE 1.3**

Alicia Keys' Oven Studios, New York. (Courtesy of Walters-Storyk Design Group, [www.wsdg.com](http://www.wsdg.com))



**FIGURE 1.4**

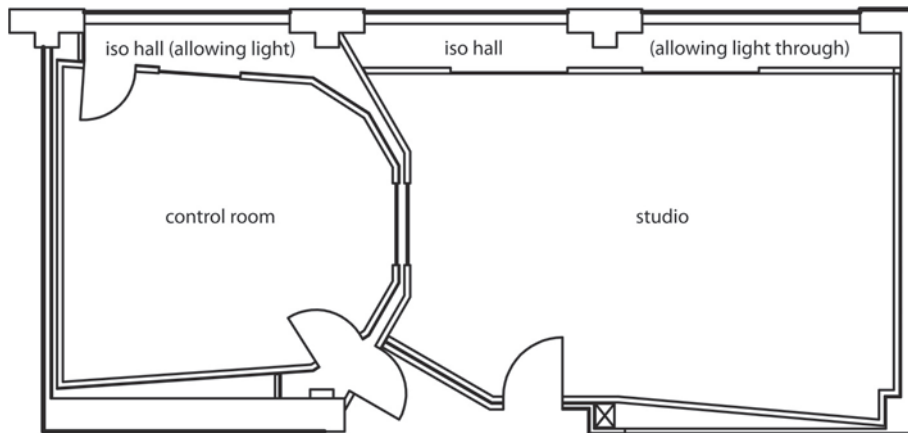
Trilogy Studios, San Francisco. (Courtesy of Walters-Storyk Design Group, [www.wsdg.com](http://www.wsdg.com))



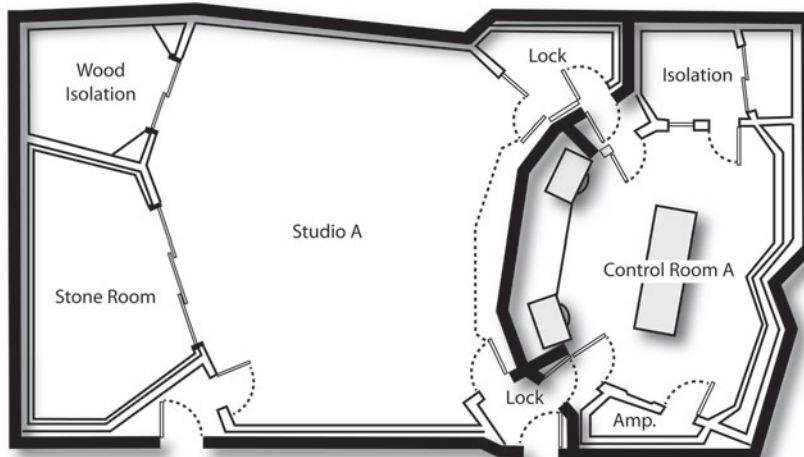


**FIGURE 1.5**  
Main hall at Galaxy Hall,  
Galaxy Studios, Mol,  
Belgium. (Courtesy of  
Galaxy Studios,  
[www.galaxy.be](http://www.galaxy.be))

In fact, there is no secret formula for determining the perfect studio design. Each studio design (Figures 1.6 and 1.7) 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).



**FIGURE 1.6**  
Basic floor plan for KMR  
Audio Germany, Berlin.  
(Courtesy of KMR Audio,  
[www.kmraudio.de](http://www.kmraudio.de); studio  
design by Fritz Fey,  
[www.studioplan.de](http://www.studioplan.de))



**FIGURE 1.7**  
Floor plan of Paisley Park's  
Studio A, Chanhassen, MN.  
(Courtesy of Paisley Park  
Studios)



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 have 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 1.8 through 1.10) 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.



**FIGURE 1.8**  
In the middle of a session.  
(Courtesy of Kris Gorsky,  
Gdansk, Poland)



**FIGURE 1.9**  
Boston Symphony Hall  
control room. (Courtesy of  
Walters-Storyk Design  
Group, [www.wsdg.com](http://www.wsdg.com))



**FIGURE 1.10**  
Synchron Stage control  
room A, Vienna. (Courtesy of  
Walters-Storyk Design  
Group, [www.wsdg.com](http://www.wsdg.com))

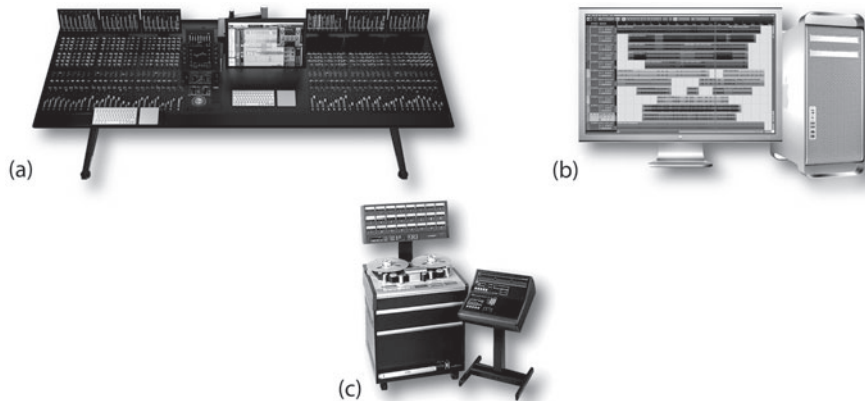
The *recording console* (also referred to as the *board* or *desk*, as seen in [Figure 1.11a](#)) can be thought of as an artist's palette for the artists, producer and/or recording engineer. The console allows the engineer to combine, control and distribute the input and output signals of most, if not all, of the devices found in the control room. The console's basic function is to allow for 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 digital audio workstation (DAW, as seen in [Figure 1.11b](#)) 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.

The analog tape machine (24, 16, 8, 4 and 2 tracks, as seen in [Figure 1.11c](#)) 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 1.11

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 side of the console or at the functional center (if the DAW serves as the room’s main recording/mixing device). 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 (often 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) that will almost always play the most prominent role in capturing the feel of a performance and the heart of your clients.

## 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 1.12 and 1.13). 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.



**FIGURE 1.12**

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



**FIGURE 1.13**

Welcome to 1979's control room. (Courtesy of Welcome to 1979, Nashville, TN, [www.welcometo1979.com](http://www.welcometo1979.com))

To me, 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:

- 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