MARK SCHULMAN PRESENTS...

A DAY IN THE RECORDING STUDIO

A DO-IT-YOURSELF GUIDE TO RECORDING GREAT DRUM TRACKS FOR DRUMMERS AND ALL MUSICIANS

DrumGalaxy

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This DVD was filmed in May 2009 at my studio, West Triad located in Venice, California. I share this studio with two very talented gentlemen and dear friends, Julian Coryell and Erich Gobel. I have spent most of my life recording music of all types and styles in garages, bedrooms and living rooms in addition to some of the finest studios on the planet. The days of having an expensive studio and engineer to record drums are virtually gone. The new trend is to be able to record drum tracks yourself. I believe that you need this ability in today's changing music industry.

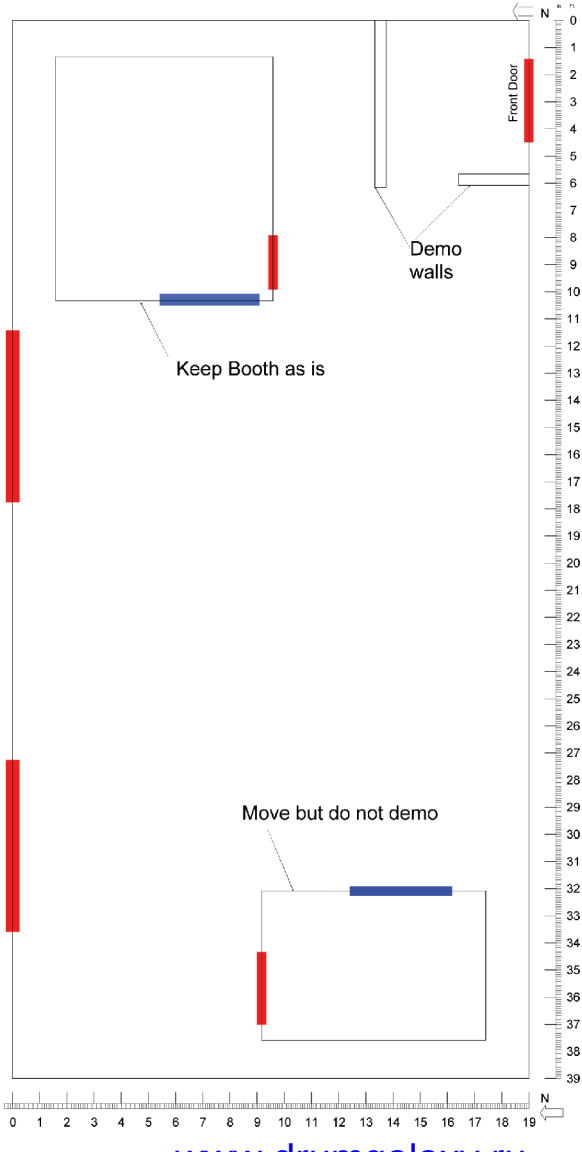
I have been teaching drum recording seminars for the last four years, showing drummers and other musicians how simple, fun, and gratifying recording really can be! I've decided to make a DVD and give you the best information I've learned and utilized over the past 25 years, and show you what is possible.

Our recording space in Venice started out as an 800 square foot loft with no soundproofing, isolation or treatment at all. The only thing that I had built with my friend Roger (well, Roger did most of the work) a few years ago was an 8' x 8' drum booth. The booth is built with 2x4s, industrial insulation and covered with plywood, soundboard and carpet. Roger raised the floor using 2X8 studs, more insulation, plywood, rubber padding and professionally laid carpet. The rest of the room (above two garages) had a plywood floor covered with peeling paint and not an ounce of insulation!

In 2008, what started out as a desire to simply keep sound from penetrating through the floor, doors, and windows, developed into a full-blown effort to create a commercial recording space. My partners and I spent far less money than we anticipated, considering the quality of recording space we now have. At the time of this writing, we are planning on doing some additional sound proofing in our control room. Because of these changes, we have successfully created a studio space that is nearly completely soundproof except for minimal leakage through the roof. We made no changes to the roof except adding another pane of glass on the bottom of each skylight.

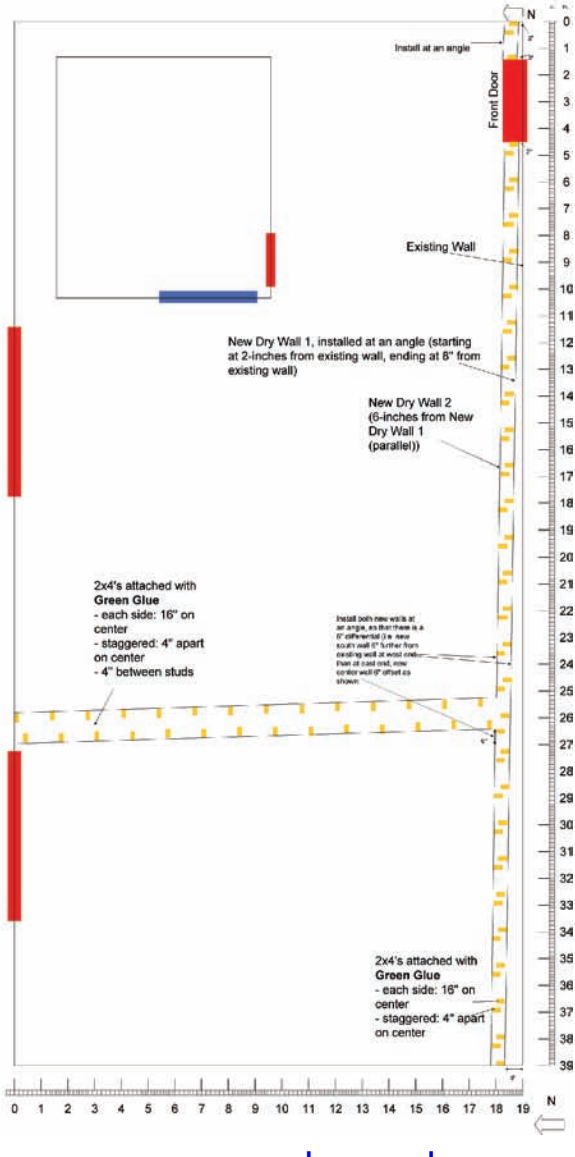
Julian and his girlfriend Jennifer drew up the plans. Because she is an engineer and he has already built 3 studios before, Erich and I left it up to the pros! They came up with the technical plans for what was needed, and the contractors did the majority of the construction. Check out the following plans to see how we did. If you are inspired to convert any part of your space into a soundproof recording room, use this as a reference. I strongly recommend you do some research on the web and talk to a contractor.

Existing Layout



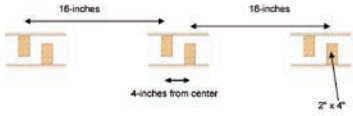
Vernon Studio Construction June 2008

New Layout



Additional Specs and Details

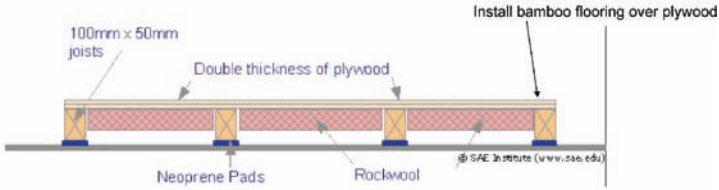
Walls



Place studs 16-inches on center for each wall, 4-inches between each staggered stud

Use **Green Glue** rather than nail or screws to attach 2x4 to plywood and joists

Floors



FLOATING TIMBER FLOOR

Specificatoins:

100mm x 50mm = 4 inch x 2 inch

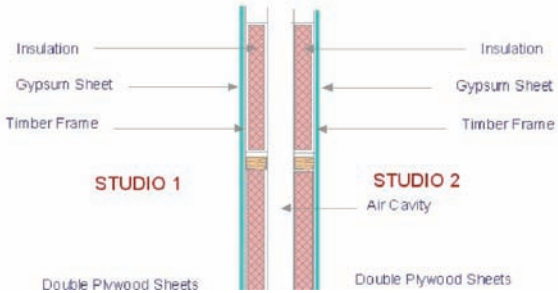
Each Plywood = 5/8-inch (total of 1 1/4 inches of plywood)

Joists placed 16 inches apart on center

Neoprene pads cut to fit under joists

Use **Green Glue** rather than nail or screws to attach plywood, joists, an neoprene

Floating Wall



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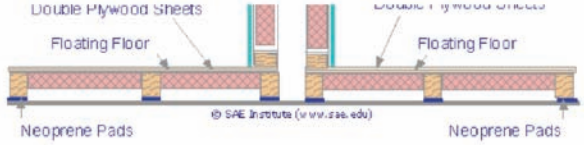


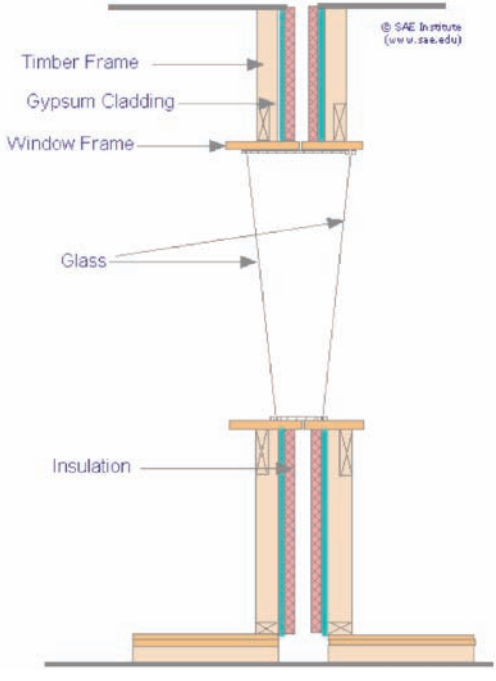
Double Wall with Floating Floor

In the drawing above I've shown a single gypsum (pale blue) layer but adding to the layer can dramatically increase the transmission loss. The options are

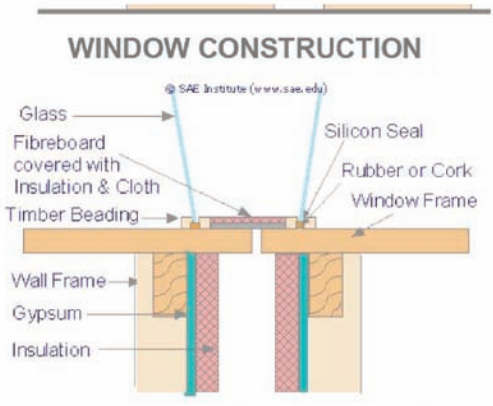
- **Adding another layer of gypsum which is glued (not nailed) to the first sheet and should be a different thickness than the first sheet. i.e. 16mm (5/8") and 12mm (1/2")**
- **sandwiching a layer of fibreboard between the two sheets.**

This really works well, a double wall with a triple layer as described above on a floating floor will create a room that will allow you to set up a band and not hear it outside the room! Just remember that all the sound is now trapped inside the room and heavy acoustic treatment is required to control it all.

Windows



Additional Specs and Details



WINDOW CONSTRUCTION DETAIL

DOORS

WINDOWS AND DOORS

Windows and doors require special construction because no matter how much you seal your walls if the windows and doors aren't built correctly your isolation will be ruined. The main thing with windows is that they must have the following features:

- **Different Glass Thickness. It is essential that the two sheets of glass be different in thickness. I recommend that you put the thicker of the two panes on the control room side. The thicker the glass obviously the better the sound isolation plus the thicker glass has a lower resonate frequency. Unfortunately thick glass is expensive. I would suggest you try 8mm and 10mm glass. (5/16", 3/8"). Any thinner and you are going to start getting resonate frequencies from the glass and inadequate sound isolation.**
- **Angles. The two sheets of glass must be at an angle to each other else the two sheets will interact in a resonate sympathy and the sound reduction properties will be reduced. You can angle the glass as in the following drawing but don't forget that the glass can also be angled in the horizontal plane as well as the vertical plane.**
- **Silica Beads. Because the windows are sealed the cavity created is a different temperature and humidity than your rooms which are probably air conditioned. It is therefore possible for the glass to steam up as in your car but not quite as dramatically. It is therefore recommended that you purchase some silica beads**

(like you get in a little sachet when you purchase a quality camera or the like) and put them in the cavity between the glass.

- **Insulation. The cavity between the glass is like any space and will have a reverberant field so you must line around the cavity with insulation. The easiest way to do this is to cut sheets of fibreboard to the shapes and then glue thin fibreglass to it. Then you can wrap cloth around it for aesthetics and glue it into place. It is also a good idea to drill 25mm - 50mm (1" - 2") holes in the fibreboard in which you can put the silica beads.**

Doors

You can use two types of doors in a studio. Solid core doors or glass doors. Obviously if you wish to use glass doors the glass, like in the windows above, must be of a reasonable thickness to stop resonance. I'd suggest a minimum thickness of 8mm (5/16") yet obviously the thicker the better. Glass doors are good because they increase the communication factor which is important in a studio but if you are to use a two door sound lock you must have the doors at an angle to each other or you will get standing waves between them that will reduce isolation.

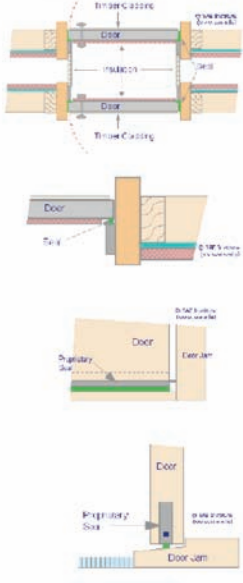
Additional Specs and Details

them that will reduce isolation.

Hinged Doors

- **Seals. As with windows once again correct sealing of doors is the main determinant that effects the sound isolation. Doors must be sealed all round and it is advisable to purchase proper commercially made door seals. There are a number of different manufacturers of door seals and I suggest you contact your local supplier. The most important seal is the one at the bottom of the door as it is the hardest seal to make. Some commercial manufacturers make a seal that has a spring loading so that when the door is closed a lever is compressed that causes a rubber seal to be forced downwards on to the door jam. When the door is opened the seal is lifted again.**
- **Thickness. It is recommended that you purchase solid core doors. If you wish to isolate you can clad the room side with extra timber that gives a nice finish and increases the effective sound isolation.**
- **Insulation. Like the window the two doors create a resonate cavity when closed so it is advisable to line**

the cavity and the doors with some insulation and cover with cloth.



SEALING DOORS

You can purchase proprietary door seals that fit into the base of the door. The unit has a sprung button that when the door is closed forces a rubber seal down onto the door jam. When the door is opened the spring releases the seal.

Drums

There are some things that my tech, Mark and I recommend that you do to check to see that your drums are recording-ready. First, take off the drums heads, stripping the drum down to the shell. Check the bearing edges of each drum to make sure that they are consistent. Use very fine sand paper to smooth edges if necessary. Check all of the screws inside each drum to make sure that they are all completely tight. This can prevent rattles and the holes in the drum from getting enlarged over time.

Make sure that drum is 'in round'. A drum is a resonating cylinder, which means that it needs to resonate consistently to have a rocking', consistent tone or pitch. If the drum is not extremely round, it can be difficult to tune and to get a consistent tone and pitch. Check the roundness of the drum by measuring it with a measuring tape at consistent intervals around the drum. If is it within a 32nd of an inch (less than one millimeter) then you should be able to tune the drum evenly.

When you put the head on the drum, start with the bottom head. Finger-tighten the rods in the hoop evenly. Remember that the more evenly-tensioned the head is (translation, the rods are evenly tightened), the better it will resonate. To start tuning the drum with the key, press your thumb in middle of head; you must keep the pressure consistent. Tune the drum in a star pattern to get the wrinkles out of head. This gets the head as even as possible before listening to the pitches. Tap the edges near each rod and try to make the pitches sound the same. You can lightly put your finger in the center of the drumhead to listen and fine tune at the edges.

Generally, single ply heads can be tuned higher because you can create more tension on the head. Single ply heads also have longer decay times therefore the drum tones linger on longer. This can be considered more of an open or jazz sound. Thicker and double-ply heads have shorter decay times so the drum resonance dies out faster and is less open sounding. Thicker heads make the drums a bit easier to control in the studio. These heads can also be tuned to lower pitches because the heads resonate with less slack (looseness).

We use mounting systems for the drums so the drums can resonate better without the shell being directly contacted by the mount. This also creates fewer holes in the drum, which can enable it to resonate better. Remember that when you put on the top head with a mounting system, put on the suspension mount before the hoop and rods.

Finger-tighten and perform the same tuning process for the top head once you have tuned the bottom head. We always start by matching the pitch of the top head to the bottom head. You can experiment and change the tuning between the heads. The top head can determine the feel of the drum using the bottom

head for pitch. Sometimes you may want the top head tighter so you have more rebound, bounce and stick control. You can then experiment with the bottom head, bringing the pitch up or down until the drum sounds good to you. The tuning of the other drums can also influence your tuning range for one drum. If you like your toms to be tuned low, we suggest that you start with the lowest tom so you don't tune the higher toms too low by the time you get to the low tom! The interval of tuning between the toms can be determined by how many toms you have and your preference.

With the snare drum it is just the opposite. The top head determines the pitch of the drum and the bottom head determines the sensitivity of the snares. We usually prefer the snare to be sensitive so I can always perform with subtle rolls or grace notes regardless of the pitch of the drum. Therefore, we usually have the bottom snare head tight, which makes it very sensitive. Even if you have the top snare head tuned way down for a fat (or is that 'phat) snare tone, you can still maintain musical sensitivity!

Sometimes you get 'sympathetic vibration' between the snare drum and the toms. This means that the snare buzzes because it is close in pitch (or sometimes a harmonic overtone) to one or more of the other drums. A quick way to reduce this is to detune one or more lugs on the bottom of the snare head that are closest to the snares.

You can tune the kick drum (bass drum) using different approaches while applying all of the same techniques for assessing the drum and putting on the heads. You can also apply the concept of using the batter (beater side) head for feel and the front head for tuning variations. The main difference with this is that I usually tune down the batter head very low so there is less response or bounce so I can keep the beater in the head without it buzzing or gurgling.

As with the other drums, you can use different types of heads, but the kick drum heads usually have extra characteristics of muffling to deaden the head for rock/pop playing. You can also experiment to taste with varying amounts of muffling inside the drum to deaden the sound even further. I have used many different approaches depending upon the sound that I want. When I was a kid, I used a double-headed drum with ripped up newspaper inside the drum. More recently I may use a double-headed drum with a six-inch hole and minimal muffling up against the batter side only. For more deadening I may use more muffling and use it to muffle both heads. I may enlarge the hole to get the mic more inside the drum closer to the batter head. For the most extreme muffling, I may take off the front head completely and use a nice fluffy pillow up against the batter head with a heavy brick or mic stand bottom to weigh down the pillow and keep it in place against the head.

Digital Recording and Equipment

Since my descriptions on the DVD are quite un-technical, I decided to give some additional information to supplement my presentation. I will explain this as briefly as I can. I promise!

I call the entire routing of the recording process the signal path because it is literally the path of the drum sound through all the various bits into the computer. In the first phase of the recording process, the analog signal, is the signal coming in from the microphone, which is then transmitted to an analog to digital converter (ADC) through a microphone pre-amplifier or, as we say in the business, a 'mic-pre'. The ADC converts this signal to a series of binary numbers. The quantity of numbers produced per second is called the sample rate. You can select the sample rate in your audio program depending on how accurate you want the numbers to convert the analog signal. The higher the sample rate, the more accurate the conversion and theoretically the better the sound. Then, a bundle of wires transmit these numbers into either a sound card that may be installed in your computer or an audio interface - which is what we use.

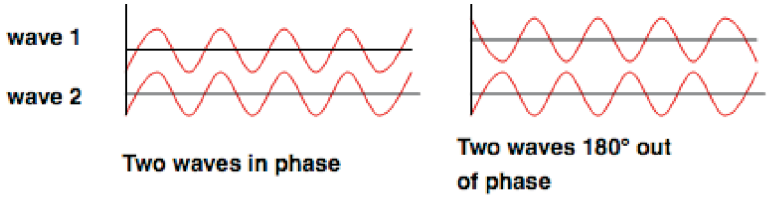
When recording drums you need the ability to record multiple microphones simultaneously, so you need to use an interface that is capable of doing this. The audio interface or sound card, very simply stated, determines where the numbers will go inside the computer. The computer then stores this information storage onto recording media such as a hard drive or optical drive.

When we record the drums or anything else, we are recording a sequence of numbers- the digital information. We can then manipulate these numbers through the use of signal processors such as compressors and equalizers. The sequence of numbers is then transmitted back from storage through the signal processors into a digital to analog converter (DAC). This converts the numbers back to an analog signal, which is amplified and transmitted to the monitors (speakers) so we can hear our rockin' drum tracks!

The quality of the mic-pre helps determine the quality of the sound coming in through the microphone. A mic-pre usually has some variation on how the signal from the mic can be enhanced or changed. The 'Input' of the mic-pre controls the level of signal coming from the mic, kind of like a volume control. The 'Pad' on the mic-pre simply reduces the strength of the signal coming in if the signal is still too high with the input knob turned all the way down. The '48V' switch activates the 'Phantom Power'. (This sounds scary and exciting doesn't it?) This means that condenser microphones require an extra power source to transmit signal. Phantom power is that power source and needs to be turned on when a condenser mic is plugged in.

The 'ø' button refers to 'Phase Reversal'. In my very simple layman's terms, a

sound wave has a peak and a valley. When two different mics are picking up the same sound source from different distances, the sound sources may reach the microphone at a different point in the waveform. If we are listening to many microphones at the same time and the wave forms are at different points, the sounds phase'.



By experimenting with switching the phase button on and off, you can change the phase relationship of the different mics. When the two sources are out of phase, the sound is thin. In the rare case that two sounds are completely out of phase (180°), they can completely cancel each other out like the picture above. One instance when I would usually reverse the phase is when I have two mics on one drum, one mic above and one below as I usually do when recording a snare drum.

Compression is a process that reduces the dynamic range of an audio signal. A compressor is the device used to apply compression. In simple terms, a compressor is an automatic volume control. Loud sounds over a certain threshold are reduced in level while quiet sounds remain untreated. Compression reduces the level of the loud sounds, but not the quiet sounds; thus, the level can be raised to a point where the quiet sounds are more audible without the loud sounds being too loud.

Threshold is the level above which the signal is reduced. It is commonly set in dB (decibels, or units of volume), where a lower threshold (e.g. -60 dB) means a larger portion of the signal will be treated (compared to a higher threshold of -5 dB).

The Ratio determines the input/output ratio for signals above the threshold. For example, a 4:1 ratio means that a signal overshooting the threshold by 4 dB will leave the compressor 1 dB above the threshold. The highest ratio of ∞:1 is commonly achieved using a ratio of 60:1, and effectively denotes that any signal above the threshold will be brought down to the threshold level (unless some attack is in force). My brain hurts already!

A compressor might provide a degree of control over how quickly it acts. The 'attack phase' is the period when the compressor is increasing gain reduction to reach the level that is determined by the ratio. The 'release phase' is the period when the compressor is decreasing gain reduction to the level determined by

the ratio, or, to zero, once the level has fallen below the threshold. The length of each period is determined by the rate of change and the required change gain reduction. For more intuitive operation, a compressor's attack and release controls are labeled as a unit of time (often milliseconds).

OK, I know this reads complex… but it actually sounds fantastic. When you use high levels of compression, the sound actually sounds very fat and thick. The trade off is that the sound also gets less punchy, and more spread out sounding. If the attack time is set to a fast setting, the compressor 'squashes' the sound more quickly… listen to it to see what it does. A slower attack time makes the sound more gradually compressed like more of a pumping sound. The fast release time means that the sound actually decays more quickly, while a long release time actually gives the impression of the sound lasting longer.

Experiment with the room mic (s) because you can actually control the apparent size of the room by changing the attack and release times. I love this! Here's a big trick I use with compression: I love the sound of compression on the snare drum and bass drums because it makes them sound fat and round but I still need the attack of the unaffected signal. So I may copy the top mic snare drum track and the kick drum track and use the compressor on the copied track with but leave the original track without compression. This way I get the best of both sounds!

Equalization (or EQ) is the process of using digital algorithms for the purpose of altering the frequency response of the input signal or recorded signal. Simply stated, the frequencies are like the bass, midrange and treble knobs on your stereo but you can independently control any frequency.

There are many kinds of EQ and fortunately the EQ that comes with most audio programs is called a parametric equalizer.

With parametric EQ you have complete control of all the bass, midrange and high frequencies. You can choose any frequency (Hz) to boost or cut (turn up or down) by adjusting the level (Gain). You can choose how many other frequencies surrounding your center frequency are affected through adjusting the bandwidth (Q). My demonstration in the video shows parametric equalization quite usefully.

Microphones

A microphone is a device that changes sound into an electrical signal. Inside the microphone are transducers. The sensitive transducer element of a microphone is called its diaphragm, element or capsule. The two most common types of mics are dynamic and condenser mics. A dynamic mic uses a simple, rugged diaphragm/coil. It handles extreme volume levels without distortion. A condenser mic utilizes a lightweight, sensitive diaphragm that precisely and smoothly captures sound nuances. Condenser mics require an external phantom power supply (48V) or sometimes a battery. My personal guideline is the farther the distance from the drum or cymbal, the bigger the diaphragm. I also use a larger diaphragm mic for a bigger drum.

Here are some very basic distinctions between dynamic and condenser mics:

Dynamic mics are generally less expensive, Tolerate rough handling, are excellent over a wide variety of frequency ranges, do not require an external power source and are good for live and recording applications. I use dynamic mics on the snare drum top (Shure Beta 56, 57), bass drum (Shure Beta 52) and sometimes on the toms (Shure Beta 56.57).

Condenser mics are generally more expensive, require more careful handling, are very sensitive, smooth and natural sounding up to very high frequency ranges, require phantom power or a battery, are recommended for more controlled environments and are used more often in recording and less frequently in live applications. I use condenser mics on the cymbals (Shure KSM 32,34), high hats (Shure KSM 137), toms (Shure Beta 98, KSM 32), for the under side snare mic (Shure SM 91) and for room mics (Shure VP88).

There are three basic types of mic pick-up patterns omnidirectional, unidirectional and figure-eight. An omnidirectional mic picks up from all sides of the mic equally as shown in this drawing:

Omnidirectional

Since it can't be aimed to isolate one area, one would rarely use this mic to individually mic a drum. It can be a good choice as a room mic for drum recording.

The most common type of unidirectional microphone is called a cardioid because the pickup pattern is heart-shaped.

Cardioid

Supercardioid Hypercardioid

These mics effectively isolate sound for one drum. If you want to have more control to keep other drums from leaking into, say the snare drum mic, you would use a cardiod mic. Most commercial cardiod mics utilize the supercardiod pattern but there are some specialized, very isolating mics that utilize the hypercardiod pattern. Some mics have a control that can change the pick-up pattern from omni to super to hyper cardiod.

The "figure-eight" or bidirectional microphone pattern just refers to a microphone element that has symmetric pickup lobes to the front and rear. This would rarely be used in drum miking. I usually use this pattern when recording two vocalists on one mic on either side of the mic.

There are other controls that many mics utilize. A mic may enable you to cut the lower frequencies with a roll-off switch. This actually changes the frequency response of the mic. You would use this to cut out unwanted low rumble when miking, say the cymbals overhead. You can also cut the input level (like the pad switch on a mic-pre) usually by 10, 15 or 25 dB (decibels) to make the mic less sensitive to loud volumes.

The following information on drum miking techniques is courtesy of Shure Incorporated:

GENERAL RULES

Microphone technique is largely a matter of personal taste — whatever method sounds right for the particular instrument, musician, and song is right. There is no one ideal microphone to use on any particular instrument. There is also no one ideal way to place a microphone. Place the microphone to get the sound you want. However, the desired sound can often be achieved more quickly and consistently by understanding basic microphone characteristics, sound-radiation properties of musical instruments, and acoustic fundamentals.

Here are some suggestions to follow when miking musical instruments for sound reinforcement.

- Try to get the sound source (instrument, voice, or amplifier) to sound good acoustically ("live") before miking it.
- Use a microphone with a frequency response that is limited to the frequency range of the instrument, if possible, or filter out frequencies below the lowest fundamental frequency of the instrument.
- To determine a good starting microphone position, try closing one ear with your finger. Listen to the sound source with the other ear and move around until you find a spot that sounds good. Put the microphone there. However, this may not be practical (or healthy) for extremely close placement near loud sources.
- The closer a microphone is to a sound source, the louder the sound source is compared to reverberation and ambient noise. Also, the **Potential Acoustic Gain** is increased — that is, the system can produce more level before feedback occurs. Each time the distance between the microphone and sound source is halved, the sound pressure level at the microphone (and hence the system) will increase by 6 dB. **(Inverse Square Law)**

- Place the microphone only as close as necessary. Too close a placement can color the sound source's tone quality (timbre), by picking up only one part of the instrument. Be aware of **Proximity Effect** with unidirectional microphones and use bass rolloff if necessary.

- Use as few microphones as are necessary to get a good sound. To do that, you can often pick up two or more sound sources with one microphone. Remember: every time the number of microphones doubles, the **Potential Acoustic Gain** of the sound system decreases by 3 dB. This means that the volume level of the system must be turned down for every extra mic added in order to prevent feedback. In addition, the amount of noise picked up increases as does the likelihood of interference effects such as comb-filtering.

- When multiple microphones are used, the distance between microphones should be at least three times the distance from each microphone to its intended sound source. This will help eliminate phase cancellation. For example, if two microphones are each placed one foot from their sound sources, the distance between the microphones should be at least three feet. **(3 to 1 Rule)**

- To reduce feedback and pickup of unwanted sounds:

  1) place microphone as close as practical to desired sound source

  2) place microphone as far as practical from unwanted sound sources such as loudspeakers and other instruments

  3) aim unidirectional microphone toward desired sound source (on-axis)

  4) aim unidirectional microphone away from undesired sound source (180 degrees off-axis for cardioid, 126 degrees off-axis for supercardioid)

  5) use minimum number of microphones

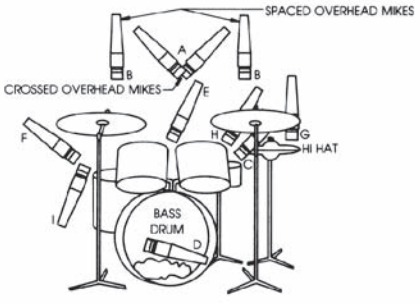
- If the sound from your loudspeakers is distorted even though you did not exceed a normal mixer level, the microphone signal may be overloading your mixer's input. To correct this situation, use an in-line attenuator (such as the Shure A15AS), or use the input attenuator on your mixer to reduce the signal level from the microphone.

Microphone Techniques for DRUMS

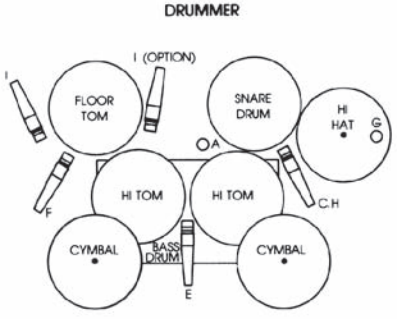
Seasoned sound engineers have developed favorite microphone techniques through years of experience. If you lack this experience, the suggestions listed on the following pages should help you find a good starting point. These suggestions are not the only possibilities; other microphones and positions may work as well or better for your intended application. Remember — Experiment and Listen!

MICROPHONE POSITIONS

In most sound reinforcement systems, the drum set is miked with each drum having its own mic. Using microphones with tight polar patterns on toms helps to isolate the sound from each drum. It is possible to share one mic with two toms, but then, a microphone with a wider polar pattern should be used. The snare requires a mic that can handle very high SPL, so a dynamic mic is usually chosen. To avoid picking up the hi-hat in the snare mic, aim the null of the snare mic towards the hi-hat. The brilliance and high frequencies of cymbals are picked up best by a flat response condenser mic.



Front View



Top View

Microphone Placement	Tonal Balance	Comments
1 Overhead-Cymbals:		
One microphone over center of drum set, about 1 foot above drummer's head (Position A); or use two spaced or crossed microphones for stereo (Positions A or B).	Natural; sounds like drummer hears set	Picks up ambience and leakage. For cymbal pickup only, roll off low frequencies. Boost at 10,000 Hz for added sizzle. To reduce excessive cymbal ringing, apply masking tape in radial strips from bell to rim.
2 Snare drum:		
Just above top head at edge of drum, aiming at top head. Coming in from front of set on boom (Position C); or miniature microphone mounted directly on drum.	Full, smooth	Tape gauze pad or handkerchief on top head to tighten sound. Boost at 5,000 Hz for attack, if necessary.

Microphone Placement	Tonal Balance	Comments
3 Bass drum (kick drum):		
Placing a pad of paper towels where the beater hits the drum will lessen boominess. If you get rattling or buzzing problems with the drum, put masking tape across the drum head to damp out these nuisances. Placing the mic off center will pick up more overtones.		
Remove front head if necessary. Mount microphone on boom arm inside drum a few inches from beater head, about 1/3 of way in from edge of head (Position D); or place surface-mount microphone inside drum, on damping material, with microphone element facing beater head.	Full, good impact	Put pillow or blanket on bottom of drum against beater head to tighten beat. Use wooden beater, or loosen head, or boost around 2,500 Hz for more impact and punch.
4 Tom-toms:		
One microphone between every two tom-toms, close to top heads (Position E); or one microphone just above each tom-tom rim, aiming at top head (Position F); or one microphone inside each tom-tom with bottom head removed; or miniature microphone mounted directly on drum.	Full, good impact	Inside drum gives best isolation. Boost at 5,000 Hz for attack, if necessary.

Microphone Placement	Tonal Balance	Comments
5 Hi-hat:		
Aim microphone down towards the cymbals, a few inches over edge away from drummer (Position G). Or angle snare drum microphone slightly toward hi-hat to pick up both snare and hi-hat.	Natural, bright	Place microphone or adjust cymbal height so that puff of air from closing hi-hat cymbals misses mike. Roll off bass to reduce low-frequency leakage. To reduce hi-hat leakage into snare-drum microphone, use small cymbals vertically spaced 1/2" apart.
6 Snare, hi-hat and hi-tom:		
Place single microphone a few inches from snare drum edge, next to hi-tom, just above top head of tom. Microphone comes in from front of the set on a boom (Position H).	Natural	In combination with Placements 3 and 7, provides good pickup with minimum number of microphones. Tight sound with little leakage.
7 Cymbals, floor tom and hi-tom:		
Using single microphone, place its grille just above floor tom, aiming up toward cymbals and one of hi-toms (Position I).	Natural	In combination with Placements 3 and 6, provides good pickup with minimum number of microphones. Tight sound with little leakage.

One microphone: Use Placement 1. Placement 6 may work if the drummer limits playing to one side of the drum set.

Two microphones: Placements 1 and 3; or 3 and 6.

Three microphones: Placements 1, 2, and 3; or 3, 6, and 7.

Four microphones: Placements 1, 2, 3, and 4.

Five microphones: Placements 1, 2, 3, 4, and 5.

More microphones: Increase number of tom-tom microphones as needed. Use a small microphone mixer to submix multiple drum microphones into one channel.

Microphone Placement	Tonal Balance	Comments
Timbales, congas, bongos:		
One microphone aiming down between pair of drums, just above top heads.	Natural	Provides full sound with good attack.
Tambourine:		
One microphone placed 6 to 12 inches from instrument.	Natural	Experiment with distance and angles if sound is too bright.
Steel Drums:		
Tenor, Second Pan, Guitar One microphone placed 4 inches above each pan.	Bright, with plenty of attack	Allow clearance for movement of pan.
Microphone placed underneath pan.	Natural	Decent if used for tenor or second pans. Too boomy with lower voiced pans.
Cello, Bass One microphone placed 4 - 6 inches above each pan.	Natural	Can double up pans to a single microphone.
Xylophone, marimba, vibraphone:		
Two microphones aiming down toward instrument, about 1 1/2 feet above it, spaced 2 feet apart, or angled 135° apart with grilles touching.	Bright, with lots of attack	Pan two microphones to left and right for stereo.
Glockenspiel:		
One microphone placed 4 - 6 inches above bars.		For less attack, use rubber mallets instead of metal mallets. Plastic mallets will give a medium attack.

The Studio and Getting Sounds

At West Triad Studio, we bring the signal from the mics into the control room by plugging them into a panel on the wall in the studio that has mic inputs. This is wired into our patch-bay in the rack in the control room. Erich and Julian spent many hours with strippers and hot irons (wow…that's wire strippers, people!) attaching all the connections in the patch-bay while I was on the road with P!NK; I owe them a drink... or maybe12! The patch-bay is simply configured to give us patch points to be able to plug any mic into any mic-pre into any compressor or EQ and then assign these to any track going through our audio card into the computer. In days of old, this is how the phone operators connected people to each other before electronic switchers and digital communication!

As you see in the DVD, our mic-pres are labeled because we record drums so frequently. The input levels on the mic-pres are pre-adjusted but I always check the input levels every time I record because they usually need tweaking based on how hard I may be hitting that day or the scope of the music I am playing. The signal from the mics gets routed into the ADC (see above for more description), into the audio interface and then into the computer. I use the program, Cubase 5 by Steinberg to record and mix all my music in the studio. My partners also use the very popular Protools program.

In Cubase 5, the input section shows the levels of the mics coming in. I usually set these to 0 (unity gain) and adjust the input levels on the mic-pres so the levels are peaking (at their loudest) just above the 0 line. I keep them right below the red to avoid distortion. The output section only reflects the level at which we listen and does not effect the input (recording) level.

When I'm checking the sounds, I may solo one mic at a time for more critical listening. Remember though that the total drum sound is what matters so I always pay the most attention to the complete drum sound. As you see in the DVD, I will get anyone available to help me get drum sounds as I usually record the drums myself without an engineer. I like having my wife, Lisa in the studio because what she lacks in technique, she makes up for in beauty, sense of humor and a wonderful scent! She is for hire as a session drummer, so email me and I'll put you in contact with her!

Anyway, I got sidetracked… When I record the drums, I record just the signal coming in directly from the mics. Many engineers use EQ and sometimes compression on the signal to shape the sound exactly the way they like it before they record it. I have done that too, but I think that whoever mixes the final project has greater choices with an unaffected signal- a blank canvas, if you will.

With someone else playing the drums, I usually start with soloing (listening by itself) the kick drum mic, and then I bring in the second kick to hear how they

sound together. I may check the phase between the two mics (see above) to make sure that they sound good together. I may experiment with the placement of the kick mic, bringing it closer or farther away from the head for more attack or more tone. As you see in the video, the second mic I use is called a 'sub-kick' that is basically a six inch speaker used in reverse as a mic to pick up only low-end frequencies.

(You can do a similar thing with a more traditional mic, preferably a large diaphragm condenser mic placed a few feet in front of the kick. Some engineers with whom I have worked have used a packing blanket to build a 'tunnel' over the kick drum extending beyond the second mic to trap the sound and the low end (bass frequencies) inside the tunnel. This tunnel isolates the sound of the kick drum from the other drums and keeps the rest of the kit from 'leaking' into the second kick drum mic.)

I then listen to just to the top snare drum mic followed by the bottom snare drum mic. I usually put the bottom snare drum mic out of phase, and I always check it. I switch the phase ('ø') switch on and off to check it while I'm listening to see if the snare drum sound gets thinner when both mics are mixed in. I can also reverse the phase in the playback stage in the output section on the bottom snare drum track later on, but I prefer it correct in the recording process. Remember that I want the input levels as high as they can be without distorting the signal.

I usually check the hi-hat next. I keep the hi-hat level a bit lower than many engineers because I think hit-hat comes through the overhead mics plenty. Next, I check the toms individually to make sure that the mics are placed in the right position. Sometimes, the mics need to be moved farther away from the heads because if they are too close, they pick up a lot of attack and not enough tone. This can be especially true for the floor tom mic. I always check the toms together to makes sure that they sound even in level and consistent in tone.

I check the overheads next to make sure that they are balanced from right to left and even-sounding between the cymbals and the drums. I also may check the phase to see if anything sounds weird. Weird is obviously a matter of opinion so my suggestion is just listen as you flip the phase switch in and out to see what you like. Many engineers start with the overheads to get an overall kit balance. I may do this if the sound I desire is more open and less thick, as with a jazz recording. As mentioned above and in the DVD, there are different techniques to mic the overheads; I say experiment!

My last and perhaps favorite process is checking the room mic(s). I use one stereo condenser mic but most other people use two mono condenser mics. There are so many variations in room miking that have to do with room size, composition, resonance, preference, phase etc. I say just set them up and listen to see if you like what you hear. Even if you do, move them around and

see what happens. Remember that there are no rules, and if there are, break them!

Charting

I want to remind you that it is important to listen to a song at least once before charting. Listen for basic style, form, groove and any unusual elements to which you may want to pay attention. Remember that the goal is to keep your place in the chart and put your energy into the MUSIC rather than having to concentrate so much on the chart.

When a producer or artist hires me to play a drum track, I have them email me an mp3 of the track. If they already have drums or have programmed drums, I have them email me a version of the track with their drumming ideas and one without the drums/programming. I ask them to provide me with the tempo as well as a metronome count in so I can sync up the track with my metronome in my audio program, where I'll create a new file (Cubase 5 by Steinberg) and I drag both mp3s into the program. My program converts them into a .wav or .aif file depending on which file I have assigned Cubase to record in the Preferences folder. I usually use .wav files because they are both MAC and PC friendly files. While the files are importing, I love to drink coffee!

I make sure that my tempo in my program is set to the same tempo as the client's tracks. If the tempo is below 85, I may double the speed so the metronome is playing 8th notes rather than 1/4 notes. This usually feels more comfortable. If the producer or artist has sent me a track with drum ideas and one without drum ideas, I make the same adjustments to both tracks. I suggest muting one of the tracks so you are only listening to one, but still making adjustments to both tracks by selecting them both if you move them. I put on my metronome to make sure that my metronome is playing at the same time as the tracks. If the tracks (particularly the metronome count at the beginning of the tracks) are not quite in sync with my metronome, I turn off the SNAP feature, which enables me to slide the tracks to any position (without them lining up with any particular note value) so I can get them to line up to the smallest increment I need. I always play one of the tracks and listen to make sure that the track is lined up as perfectly as my ear can detect. I keep my metronome (we'll call it the 'click track') ON while I record. If the track is not lined up with my click track, my ear goes with the click track and I may play ahead or behind the track by listening to the click. Of course I want to lock with the track so it is critical that the click and the client's tracks line up.

When I am recording the drums by myself, I need to have enough time to run into the studio from my control room. There are remote controls that you can have next to the drums to avoid this process but I'm just a bit old school; what can I say!? Because of this, I choose to move the tracks forward to give me more time to get to the drums. I put the SNAP feature back on which allows me

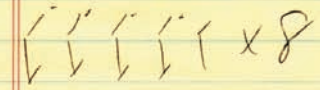
to slide the tracks in even increments of notes or bars. I set the increment level (also known as quantize) to BAR so it moves the tracks by the bar. I usually give myself 4-8 extra bars at the front of the song depending on the tempo of the song and how fast I can run that day!

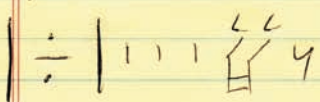
I will also listen for what drum sound I think may be the most appropriate, particularly the snare drum pitch and quality- more ringing or more muffled. If I'm thinking of an open ringing snare drum tone, I may choose to actually tune the snare drum to the track, using the root, 3rd (major or minor- depending on the key of the song) or 5th. I may also try different kick drums or change the kick drum muffling.

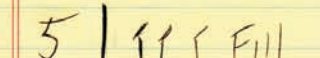
Tempo = 82.5

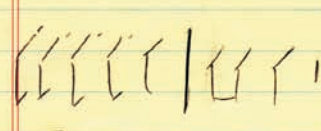
One Night Forever

~~A B C~~

A 

B 

B2 5 

C 

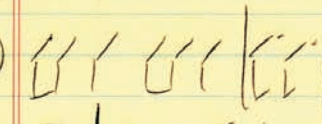
A 8

B 2

B2 6

C 4

BR 4 Double time

Solo 

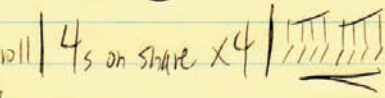
B2 3 

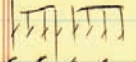
CH

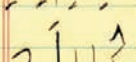
Tempo = 136

Summer Rain

(I): Intro, (A) (B) (C) (BR) (Kick)

(I) Full buzz roll | 4s on snare x4 |  | ÷1

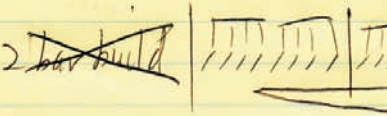
(A)  x8

(A2) 7 | 

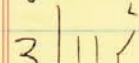
(B) x4 (add more Kicks)

(C) 6 3 2 bar build

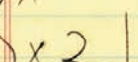
(A) 8

(Kick) x2 | 2 ~~bar build~~ |  x2

(A) 6

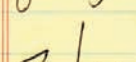
(BR) 3 |  | 3 | Fill

(BR2) A x3 | Fill

(Kick) x2 | 

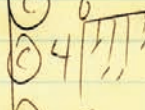
(B) x4

(C) 6 5 | 2 bar build

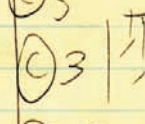
(A2) 7 | 

(B) 4

(C) 6

(C) 4 

(C) 5

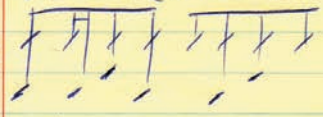
(C) 3  Fill

(C) 2 ||

by Jared Engelmier

Jane

(I) Tacet (Don't Play!) x 6

(I²) 

(A) 4

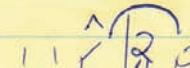
(B) 4

(CH) 8

(I²) 4

(A) 4

(B) 4

(CH) 7 | ||| 

(Solo) 8

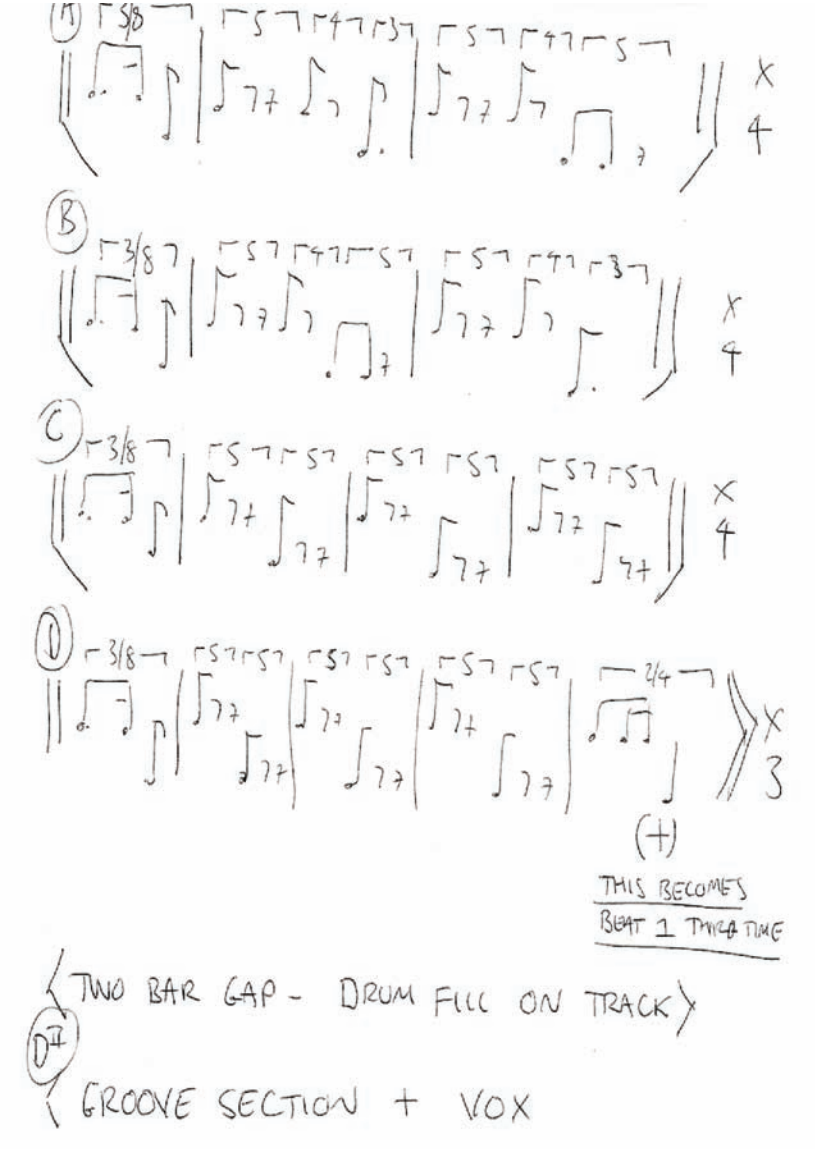
(CH) > mp (quieter!) ~~x~~ 3 | ||

(CH) 8

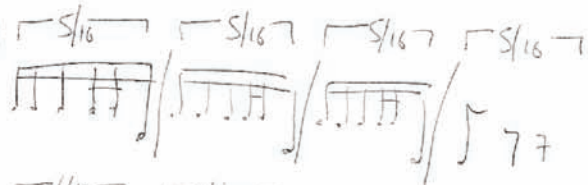
(CH) Double time x 2 | 2 regular

(I²) 1 | || Fill | 𝅝 ||

Lock It Pete!

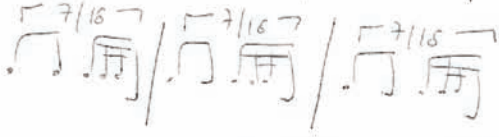


(E) 5/16 5/16 5/16 5/16 (2)



6/16 6/16 6/16 5/16

7/16 7/16 7/16



(E II) GROOVE SECTION FOR DRUM SOLO

(F) QUESTION AND ANSWER =

VOCAL PERCUSSION 4 BARS
DRUM SET SOLO 4 BARS
} X 4

RETURN TO HEAD (A)4 (B)4 (C)4 (D)3

1 BAR GAP

(E)1 TO END.

A Day in the Recording Studio

Director:	Sam Gracey
Editor:	Chris Barnett
Audio Mixing:	Mark Schulman
Booklet Layout:	JW Wallace

Produced by Mark Schulman and Sam Gracey
A Maybe Films Production

Featuring:
Mark Bennett
Erich Gobel
Lisa Skarell-Schulman
Sam Gracey's voice

Mark wishes to extend the utmost gratitude and love to his friends at:
Gretsch
Gibraltar
Toca
Sabian
Vic Firth
Shure
Remo
Steinberg
Native Instruments
Roland
Jetty Jewels
Rey Aquino Designs
West Triad Studios

Special Thanks:
Dr. Jim Samuels, Jared Engelmier, Michael Voss, Pete Lockett, Julian Coryell, John Flannery, Jeff Wallace, Roger King Jr., Bill Moore, Terry Miller, Stephen Stern, Mark Grossman, HD Camera Rentals, Casablanca in Venice

Music:
One Night Forever
Produced/Engineered by Mark Schulman
Written by Jared Engelmier
Performed by Jared Engelmier
Guitar / Bass by John 'Flan' Flannery (recorded at Flantrax)
Cello / Violin by Stevie Blacke (recorded by Stevie Blacke)
Drums by Mark Schulman

Summer Rain
Produced/Engineered by Michael Voss
Written by Holggy Begg
Performed by Beggar's Bride
Musicians: Molly Duncan, Fritz Schneider, Michael Voss, Holggy Begg, and Mark Schulman
From the album: Rockin' the Pumpkin

Jane the Stripper
Produced/Engineered by Mark Schulman
Written by Jared Engelmier
Performed by Jared Engelmier
Guitar / Bass by John 'Flan' Flannery (recorded at Flantrax)
More Guitar by Jared Engelmier
Guitar Solo by Julian Coryell
Drums by Mark Schulman

Lock It Pete!
Produced/Engineered by Pete Lockett and Mark Schulman
Written by Pete Lockett
Percussion / Konnakol / Sound Design by Pete Lockett
Drums by Mark Schulman

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MARK IN THE STUDIO

MARK ON THE ROAD

Go ahead and watch A Day in the Recording Studio. Mark Schulman shows you how to play and record state-of-the-art drum tracks in this two-hour DVD.

Imagine yourself setting up your own recording studio in your home, garage or as a professional business to record yourself or your drummer playing top class drum tracks. You can accomplish this after watching Mark's DVD- guaranteed!

As a world-class drummer, professional engineer, producer and studio owner Mark is constantly staying on top of his game with a career of studio work, worldwide tours and TV appearances with P!NK, Billy Idol, Sheryl Crow, Cher, Stevie Nicks, Foreigner, Richard Marx, Velvet Revolver and other great artists.

"I'm proud to present this DVD. We taped it in my studio in Venice, CA. I guarantee that whether you are a beginner, professional, drummer, guitar player, engineer or parent of a musician, this DVD will change your life!

"The DVD simply and humorously shows you the complete spectrum of recording drums in the studio: preparation of the equipment, tuning, microphone technique, digital recording, my own quick system of charting songs, creating drum parts, performance, editing, effects, studio construction and some darn great video footage! Oh, and there are some cool performances by yours truly...

"Nearly every studio drummer in Los Angeles records his/her own drum tracks in bedrooms, garages and home studios. The days of having an expensive studio and engineer to record drums are virtually gone. The new trend is to record drums yourself. I believe that you need this information in today's changing music industry. This DVD shows you how to do it and reduces your fear of getting started by giving you simple, entertaining and inspiring information. You can start recording right away and have the best time creating top class drum tracks!"

Mark Schulman