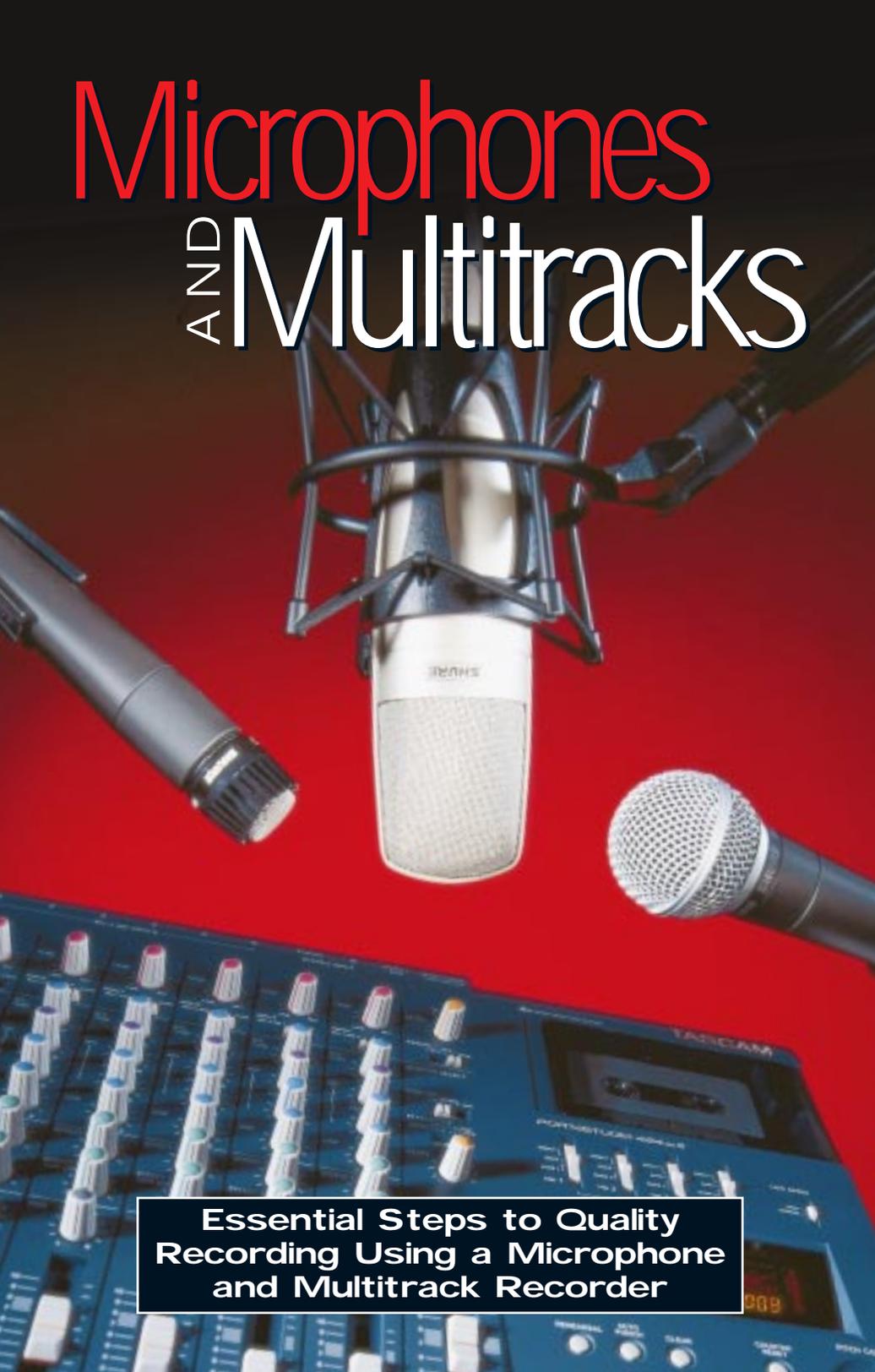


Microphones AND Multitracks

A collage of audio recording equipment against a red background. At the top center is a silver Shure condenser microphone mounted in a black shock mount. To its left is a grey handheld microphone. To its right is a silver dynamic microphone. At the bottom is a blue Tascam multitrack recorder with numerous knobs and buttons.

**Essential Steps to Quality
Recording Using a Microphone
and Multitrack Recorder**



TABLE OF CONTENTS

MICROPHONES AND MULTITRACKS

ESSENTIAL STEPS TO QUALITY RECORDING USING A MICROPHONE AND MULTITRACK RECORDER

BY JON CHAPPELL

INTRODUCTION:..... 3

**CHAPTER 1: A DYNAMIC DUO:
WHY MICS AND MULTITRACKS
WORK WELL TOGETHER** 4

Understanding the standard recording paradigm of a microphone and a multitrack recorder.

**CHAPTER 2: STRATEGIES FOR
ACHIEVING AN OPTIMAL SIGNAL** 7

Mic choice and positioning, level setting, and signal routing.

**CHAPTER 3: MULTIPLE MICS,
MULTIPLE TRACKS** 14

The challenges of multi-mic recording and multiple track management.

**CHAPTER 4: SPECIAL APPLICATIONS
AND TECHNIQUES** 16

Specific recording applications utilizing classic setups.

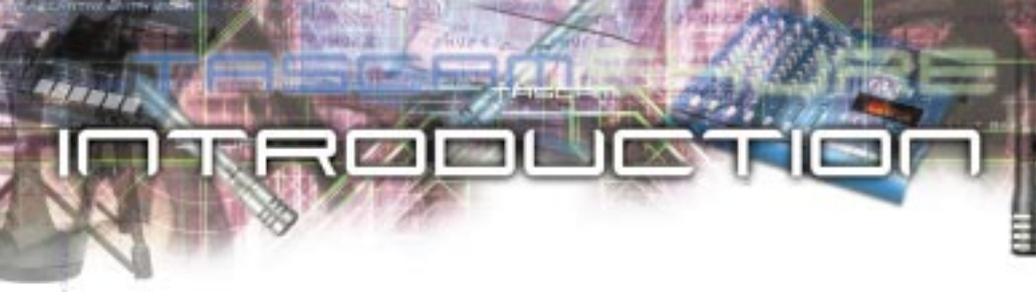
CHAPTER 5: TRICKS AND TIPS 19

Some techniques the pros use to maximize their sound.

LAST NOTE: WHERE TO GO FROM HERE 21

APPENDIX A: SHURE MICROPHONES 22

APPENDIX B: TASCAM PORTASTUDIOS 23



TASCAM INTRODUCTION

Maybe you're an instrumentalist wanting to put down backing tracks to solo over. Or perhaps you're a songwriter looking to flesh out some basic arrangements. Or you could be the member of an ensemble who's looking to record your group with greater flexibility than is offered by a 2-track recorder.

Well, if so, welcome to *Microphones and Multitracks*, a quick-start guide that will not only have you making music with your SHURE microphone and TASCAM Portastudio, but doing it in about the time it takes you to skim through this booklet and press the Record button on your deck. We'll show you how to get optimum results using some specific models of SHURE mics and TASCAM Portastudios. Though we'll refer to models by SHURE and TASCAM for the purposes of this guide, these techniques apply to all mics and recorders of similar specs and configurations. Some of the mic characteristics may vary from manufacturer to manufacturer, and some multitrack operations may be handled differently, depending on the model, but the principles presented here can be applied across any recording medium.



A DYNAMIC DUO: WHY MICS AND MULTITRACKS WORK WELL TOGETHER

A TIMELESS PARADIGM

Whether you're recording your cousin on the couch or Robert Plant at the Record Plant, the lessons you learn when using a microphone and a multitrack will carry you through your entire recording education. Through the years, the mic locker may grow and your mixer channels may span more turf, but you'll still use the skills you learned from day one — the very first time you stuck a mic in front of a trembling vocalist (which may even have been you).

Even the best engineers in the world start a recording session by placing a solitary mic in front of an instrument (usually it's a kick drum), and they listen, listen, listen. Great recording is not so much about acquiring and mastering great technology, it's about great music and having ears good enough to bend whatever existing technology is at hand to conform to the sonic picture in your head.

This section tells you how to hook up a microphone of any model to a Portastudio. We'll spare you the suspense, though, right from the start — essentially, it's idiot-proof; you can't

hurt yourself, the mic, or the mixer no matter how you hook it up.

UNIVERSAL JOINTS

The great thing about microphones is that, no matter which one you buy, you probably won't have to worry about it being incompatible with your mixer. Most microphones are designed to

**UNDERSTANDING
THE STANDARD
RECORDING
PARADIGM OF A
MICROPHONE AND A
MULTITRACK
RECORDER.**

plug into most mixers, from inexpensive boards to the top-of-the-line studio consoles. Electrically speaking, any dynamic mic can go into any mic

input of any mixer. You might have to use an adapter or transformer, though, depending on the jack configuration of the mixer. Condenser mics require a special power supply (explained later in the chapter).

If you start with any quality *dynamic* mic, such as the SM57, SM58, or their Beta equivalents, and get the matching cable, you'll notice that the mixer end, or *plug*, has three pins. This is known as an XLR connector. If your mixer has the corresponding three-hole *jack*, you're in business. (The TASCAM 414mkII and 424mkIII both include XLR jacks.) Just plug the mic into the jack



FIGURE 1: A transformer looks like an adapter that converts your three-pin XLR cable to a 1/4-inch jack, but there's some electrical conversion going on, too.

(it can only go in one way), and you're all set.

If, however, you look at your mixer's back panel and you see only a single-hole 1/4-inch jack, like those commonly found on guitar amps (and on the Porta02MKII Ministudio and 788 Digital Portastudio — which includes two transformers in the box), you'll need a special kind of adapter called a *line transformer*.

The transformer converts your three-pin mic cable to a 1/4-inch one, so that you can stick your mic right into the 1/4-inch jack on the back panel. There's also some

electrical converting going on inside the transformer itself, but it's a very basic conversion (see fig. 1). And the transformer is inexpensive.

In models known as *condenser* mics, such as the SHURE SM81, BG4.1, and KSM32, you'll need to have an external power supply or preamp to get your mic "powered up" before going into the mixer input. An outboard phantom power supply costs as little as \$60, and once you plug your condenser into one of



FIGURE 2: Dynamic microphones: Beta 52, Beta 56, SM58, SM57 and Beta 57A. Condenser microphones: KSM32, BG 4.1 and SM81.

these, you then take either a 1/4-inch or three-pin output and plug into the mixer the same way as you would a dynamic.

Some mics, like the SM81, have a battery compartment inside the mic shaft that allows you to insert a AA battery, so it can receive power from either the battery or an external source. The KSM32, SM81, and many other models can receive power only from an external source.

INTRODUCING THE PLAYERS

For the purposes of this guide, we'll focus our discussion on specific SHURE

microphones and TASCAM Portastudios. But the principles presented here apply to any microphone and multitrack recorder, so keep this booklet handy as you navigate your way through the recording jungle. Fig. 2 shows the SHURE microphone models referred to in this guide.

The TASCAM Portastudio line includes four units, starting with the budget-priced Porta02mkII Ministudio, and continuing on through the 414mkII Portastudio, the 424mkIII Portastudio, and the high-end digitally based 788 Digital Portastudio. Fig. 3 shows the Tascam Portastudio line.



FIGURE 3: The Porta02 features two input strips for four channels, and four tracks; the 414mkII has four tracks, four channels, four channels, two-band EQ, and aux sends for effects processing; the 424mkIII has six channel strips, one stereo input, and four tracks with a logic-controlled transport; the 788 Digital Portastudio has eight channels, eight tracks, built-in digital effects, and 24-bit AD/DA converters.

STRATEGIES FOR ACHIEVING AN OPTIMAL SIGNAL

It sounds deceptively simple, but the first thing you must ask yourself is, “What kind of sound am I recording?” The answer should start, obviously enough, with the instrument or vocal part at hand, whether that’s an acoustic guitar, a singer, or a drum kit. But you should also consider what environment you want to place the sound in. Should it be up-close and intimate, or ambient and from a distance? Will the sound be loud and obvious, or soft and subtle?

Keep in mind that any single source can take on a variety of personalities, and each may very well require a different mic, a different mixer channel setup, and a different approach to recording. For example, an acoustic guitar can be miked with either a dynamic mic, like the SM57 or Beta 57A, for a meaty rock-rhythm sound, or a condenser, such as the SM81 or KSM32, to capture the more crisp and delicate qualities of a fingerpicking passage. It all depends on the instrument, the musical application, and even the player himself.

SELECTING A MIC: PATTERNS AND THEIR APPLICATIONS

Mics are grouped according to their pickup patterns and transducer types.

Let’s look first at pickup patterns.

A mic that listens to sound equally from all sides is called an *omnidirectional* mic. This is great for picking up the room sound to provide natural ambience. Omni mics are also very good vocal ensemble mics.

Typically, omni mics are used in rooms where there is no other activity — like a tape recorder operator — so their use for home recordists is somewhat limited.

A directional mic listens to sound only in a specific direction. There are many types of directional mic patterns, but the most common is *cardioid*, so named because its sensitivity field is shaped somewhat like a heart. A cardioid mic picks up sound best when the source projects directly in line with — or on axis to — its pickup. A cardioid mic will de-emphasize sound coming off axis, and reject sound coming from the rear of the capsule. A *supercardioid* mic has a tighter, or narrower, pickup pattern, which is useful for close clusters of instruments performing together, where bleed can be a problem. In these situations, bleed is dramatically reduced and isolation is improved with a supercardioid mic because of its increased off-axis rejection. Most of the mics in the SHURE Beta series feature a

MIC CHOICE AND POSITIONING, LEVEL SETTING, AND SIGNAL ROUTING.

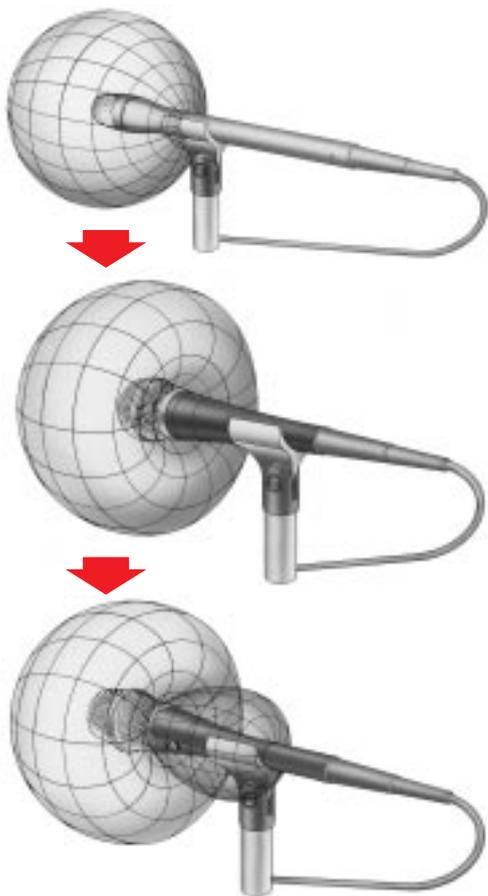


FIGURE 4: An omnidirectional mic (top) picks up sound equally from all sides; a cardioid favors sound directly in front of its capsule and rejects sound from the rear; a supercardioid has a tighter response in front and some slight response in the rear.

supercardioid pickup pattern. Because of these properties, cardioids and supercardioids also make great stage microphones, but their other qualities are also useful for studio work — even when there's only one instrument in the room. All of the eight mics pictured in fig. 2 have either cardioid or supercardioid pickup patterns. Fig. 4 shows the pickup

patterns of an omnidirectional, cardioid, and supercardioid mic.

DYNAMIC VS. CONDENSER

The other principal difference among mic types is whether its transducer (the element for converting sound waves to electrical ones) is a dynamic or a condenser. A dynamic mic works sort of like a speaker in reverse: A coil of wire is mounted on a diaphragm, which sits inside a magnetic field. When the diaphragm moves — reacting to the sound that's hitting it — the fluctuations in the magnetic field that result create a current, which runs down the wire and into the board.

A dynamic is the most widely used and economical type of mic. Found on performing stages everywhere, it's also used extensively in the studio. The SM57 and SM58 are two of the most popular dynamic microphones used for vocals and instruments. Dynamic mics are rugged and can handle high SPLs (sound pressure levels), like those delivered by kick drums, snare drums, and the speakers of cranked-up guitar amplifiers. They don't pick

up a tremendous amount of high-end detail, but this can be good, as they tend to reject rattles in drum hardware and guitar-amp cabinets.

A condenser mic uses a different method for producing signals than a dynamic model, and requires a constant electrical charge in the pickup element. The mic draws this

power from an external source, such as a battery, a phantom power supply in a mixer, or an outboard mic preamp with built-in phantom power circuitry. Condenser mics are more sensitive than dynamics. This is usually a good thing in microphones (despite the quality of dynamics to reject rattles), as it yields better results in aspects such as high frequency detail and *transient response*. Transients are the initial attack noises of a note, and are quite short. Small diaphragms, like

those found in the SM81, have less mass and therefore require less energy to move. These diaphragms are very responsive to the small, high-energy frequencies produced by the plucked string of an acoustic guitar. For the same reason, small-diaphragm condensers work well as overhead cymbal mics. What small-diaphragm mics are less good at is capturing warmth, and responding to complex or pronounced low-end frequencies. For sounds with those qualities, you'd

FIGURE 5: SHURE MIC CHART

<p>VOCALS SM58 SM81 (with A81G Windscreens) Beta 87 KSM32</p> <p>ENSEMBLE VOCALS SM81 BG4.1 KSM32</p> <p>GUITAR AMP Beta 56 Beta 57A SM57</p> <p>BASS AMP Beta 52 Beta 57A Beta 56 SM57</p> <p>KICK DRUM Beta 52 Beta 57A SM57</p> <p>SNARE DRUM Beta 57A Beta 56 SM57</p> <p>TOMS Beta 57A</p>	<p>Beta 56 SM57</p> <p>OVERHEAD SM81 BG4.1 KSM32</p> <p>MALLETS SM81 BG4.1 Beta 57A KSM32</p> <p>STRINGS SM81 BG4.1 KSM32</p> <p>ACOUSTIC BASS Beta 52 SM81 BG4.1 KSM32</p> <p>BRASS Beta 56 Beta 57A SM57</p> <p>WOODWINDS SM81 BG4.1 KSM32</p>	<p>SAXOPHONE Beta 56 Beta 57A SM57</p> <p>ACOUSTIC GUITAR SM81 BG4.1 KSM32</p> <p>HARMONICA SM57 SM58 52ODX (Green Bullet)</p> <p>LESLIE CABINET Beta 57A Beta 56 SM57</p> <p>ORCHESTRA SM81 BG4.1 KSM32</p> <p>LIVE STEREO RECORDING SM81 (pair) BG4.1 (pair) KSM32 (pair)</p> <p>SAMPLING SM81 BG4.1 KSM32</p>
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FIGURE 6: SETTING LEVELS

Here are the steps to properly set the mixer's input level controls:

1. Get the mic in front of the performer and have him perform with the dynamics and feel of the actual music you're going to record.

2. Go to the individual channel's controls, which are arranged vertically, and bring up the volume fader to about 3/4 of the way, to the "0" dB (unity gain) point. This is the optimum setting for a volume fader, and many mixers such as the 414MKII and 424MKIII provide a shaded area on the faceplate to show that you're "in the zone." Do the same with the master fader, located all the way to the right of the channel faders. If your monitor system is set up correctly (headphones or speakers), you should hear audio.

3. If the overall level is too high or too low (that is, if the meters aren't registering or they're maxing out into the red zone constantly), adjust the trim control so that the signal peaks at the meters' 0 dB points. If the meters occasionally go a little higher than that, into the red, that's usually okay. Most mixers allow the signal to travel a little bit into the red before distortion occurs.

4. Go back to the mic position and adjust it to get the just right tonal quality. For example, if you're recording an acoustic guitar, try moving the mic so that it's in front of the bridge and then the fingerboard. Listen to the results over headphones as you try different positions, and then go back to the mixer channel to see if you need to make any gain adjustments.

The next step is to plug the mic into the appropriate channel input, which is usually input 1 for channel 1. On the 414mkII and 424mkIII, you can plug into an XLR jack. If you've got the Porta 02 or 788, break out your trusty line transformer.

Be certain you're passing audio from the mic to the mixer channel and to the output stage. If you don't pass audio to the proper output stage, you won't be able to hear your signal, record it, or both.

To ensure that you're getting a signal at all, look at the mixer channel and make sure your Input switch, at the top of the mixer channel, is set to Mic/Line. This tells the channel to look at the mic rather than a tape track (which you'd do

seek the aid of a larger diaphragm condenser, such as the KSM32.

Fig. 5 shows a chart of various SHURE mic models and some of their suggested uses. This chart should serve merely as a guide. You're encouraged to experiment with all types of mics on any sound to get a result that sounds good to your ear.

TO THE BOARD!

All right, let's say you've selected a mic and wrangled a musician into performing in front of it so that you can actually record some music. What now?

for mixing down).

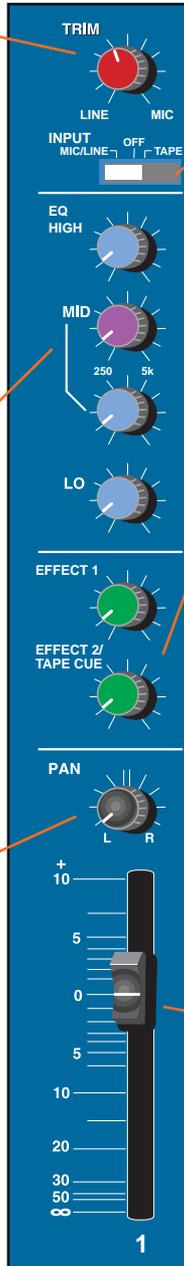
After it's clear you've got some kind of signal, you now need to *optimize* that signal, both from the perspective of the mic as well as the recorder. All that means is that you're providing the best possible signal level from the mic that the recorder needs to see. Ideally, the signal should be as loud as possible, but not too loud, so that it will allow for dynamic fluctuations on the part of the performer. The optimal signal is one that is loud enough to keep the noise floor down (a fixed, low-level of noise present in all

FIGURE 7: ANATOMY OF A MIXER CHANNEL

A. TRIM. This controls the gain level of the preamp. For keyboards and other line-level sources, you generally keep this control at or near the minimum (all the way left). For mics, you'll need to crank it further to the right. The trim knob acts as a normalizer on signals of different levels so that the faders can be used in their optimum positions.

C. EQ. EQ is short for equalization, or, more simply, tone control. The number of knobs and their function will vary, but a common arrangement is to have four controls: a high- and low-shelving EQ (typically voiced at 10 kHz and 100 Hz, respectively) and two midrange knobs that work in conjunction with each other. One selects the frequency, and the other proves a boost or cut at that frequency.

E. PAN. The pan (short for "panorama") control serves double duty: When tracking, or recording tracks, the pans work with the Record Function switches (on the 414mkII and 424mkIII) and direct the signal to the busses, which in turn go to tape tracks. When mixing, the pan control places the sound in the stereo field.

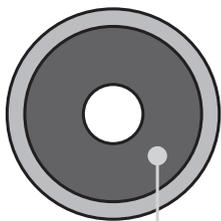


B. INPUT SELECT. Tells the mixer channel what to listen to. The "Mic/Line" setting tells the channel to pass the input source (mic, keyboard, guitar, etc.); "Off" means that no audio passes; "Tape" tells the mixer to listen to the recorded tape track assigned to that channel.

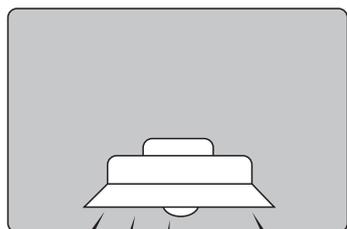
D. EFFECTS SENDS. If you've got some effects units at hand, like a digital reverb or digital delay, you can hook them up via the effects send and return jacks, and then control the intensity of the effect — per channel — via the individual effects send control. Using one unit for multiple channels is a great way to maximize a limited number of effects. For example, you could use one effects processor — say, a reverb set to a live room sound — and put a little on the vocal, a little more on the guitar, a lot on the snare drum, and none on the bass. On the 424mkIII, Effect 2 doubles as the Tape Cue (playback) control.

F. FADER. Most of your volume moves will be made here, after you've set the trim knob to the proper level (described above in "Setting Levels"). The trims, EQ, and effects sends are all pretty much "set and forget," and the faders are where 90 percent of your "board moves" take place.

SPEAKER FRONT VIEW



CLOSE MIC POSITION



AERIAL VIEW

FIGURE 8: A front and aerial view of a dynamic mic aimed at a guitar amp speaker. This off-axis approach is a classic, and was used by Eddie Van Halen, among others.

electronic gear, especially tape-based recorders), but not so loud that there's not a little *headroom* to accommodate periodic bursts of a really loud sound. In practical terms, it means setting up the mic and adjusting the mixer levels correctly. Fig. 6 presents the four steps.

OTHER CHANNEL STRIP CONTROLS

Once you have your levels set, you might want to make other adjustments to the sound, such as EQ or effects. Fig. 7 is the “anatomy of a mixer channel”

using a channel strip of the 424mkIII, which represents a fairly standard mixer-channel configuration.

ROUTING YOUR SIGNAL TO A TAPE TRACK

Though you might be able to hear your source through an input channel, there's no guarantee it's going to go to the proper tape track, unless you understand routing and busing. *Bus* is the term for a line that connects multiple points. For example, you can connect three mixer channels to a common tape track (which you would do when blending a sound), or connect one mixer channel to three tracks (which you might do for overdubbing — to keep from unplugging and re-plugging a microphone).

If this seems confusing, don't worry, it will become clear in time, and this is as complicated as it gets. TASCAM has made the routing and busing issue a whole lot clearer on the 424mkIII by including a function called *Direct* on its bus switches. By selecting *Direct*, a channel is automatically routed to its correspondingly numbered tape track. For example, placing track 3's bus switch to *Direct* means it will listen only to channel 3. Very handy.

TIP: *Channel* refers to the vertical strips on the mixer section that you feed instruments into. A *track* is the actual stripe of tape where information gets recorded. The Porta 02, Porta 414, and Porta 424mkIII each have four tracks. The 788 has eight tracks. In the Portastudio line — or any mixer-recorder combination — the number of channels doesn't necessarily correspond to the number of tracks a unit has.

AUDITION YOUR SOURCE

Once you understand routing — and you're certain that when you cue the

performer, the music will go to the right place — go back to making the fine, subtle adjustments in mic positioning that will yield the best results. A good trick to try is varying the on/off axis position, or attitude, of a mic toward its source. Sometimes the best results are when the mic is slightly off from the direct point of the signal. When recording a trumpet, this works well by aiming at the lip of the bell and not its center. And the classic way to mic a guitar cabinet is to put an SM57 one to three inches from the grille, at the edge of the center of the dust cap, at a 60-degree angle (see fig. 8).

In addition to tilting the axis, try varying the distance of the mic to the source. This is sometimes called “presence,” because the closer a source is to the mic, the more present it seems to the listener. (Presence also has meaning with regard to EQ: the upper mid-high frequencies, roughly 2–4 kHz.)

Position the mic and monitor the results through headphones, or, if you're

in another room, over speakers. If the recorder is in another room, or at least far away, it's really handy to have an assistant make subtle positioning changes. Don't make the talent (performer) do it: you want him to focus on delivering a consistent performance. Before you actually start recording and put the musician into “performer mode,” it helps to line up the input to the correct track where the music will ultimately reside so that you don't have to bounce later on.

RECORD AND PLAY BACK YOUR WORK

It's time to hit that Record button! The one way to make sure you've set up things correctly is to actually record something and play it back. If all your routing is correct, and you've adjusted the monitor levels (speakers or headphones), the only thing you have to do is rewind the tape, flip the Input switch from Mic/Line to Tape, press Play, and adjust the Tape Cue control to a comfortable playback level.





MULTIPLE MICS, MULTIPLE TRACKS

Recording one track is relatively simple, especially after you master the mechanics of mic setup, level setting, signal routing, and playback monitoring. Where things really get interesting is when you decide to record, play back, and mix multiple tracks.

Once you've set up one channel, the procedure is the same for all other

channels. In fact, you don't even need to change channels to record to different tracks if you don't want to. Through bussing, you can

use the same source on the same channel to feed, successively, tracks 2, 3, and 4 (or, if you're on a 788, tracks 2 through 8). There are several approaches to recording multiple tracks. Let's tackle some of the most common ones.

LAYERING AND BLENDING

Blending is where you take two mics and simultaneously record a single source, but from different positions. One of the most common scenarios for this approach is an electric guitar. One mic, typically a dynamic, like an SM57, is placed close to the guitar amp's grille cloth (one to three inches away), while another mic, usually a condenser mic, like a KSM32, is

placed several feet back. The two mics feed two different channels, each with independent EQ and levels, but are bussed to a single track.

If you had two different sources — for example, two guitarists playing similar riffs with one in the low register and the other playing an octave higher — this would be considered layering. In both

cases, two sources are used to comprise the sound for one track. What's interesting about layering and blending is that

because the channels are ganged to one track, changing the level on one channel or the other doesn't so much change the volume as it does the tonal character. There are endless experimental possibilities using this approach. You can create your own unique tonal colors this way. But it can also become quite addicting!

OVERDUBBING

Overdubbing is the process where a musician listens back to a previously recorded track and plays another part perfectly in sync with it (or as best he can!). There are several considerations when overdubbing. First and foremost: protect your previously recorded tracks. TASCAM facilitates this

THE CHALLENGES OF MULTI-MIC RECORDING AND MULTIPLE TRACK MANAGEMENT.

procedure by adding a Safe setting on its Record Function switches. Use it.

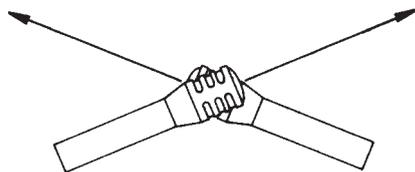
After taking the necessary track-protecting precautions, try to achieve a working balance of the tape cue level and the live instrument level. This isn't as easy as it sounds, because, while you can turn up the tape track (via the Cue controls), you must try to keep the record levels of the live track consistent. It's tempting to turn down the live track in your headphones to get it to blend with the backing tracks, but don't do it! You'll throw off the delicate balance of signal-to-noise that you so carefully sought in setting your initial levels. Also, there are several places in the signal path to adjust levels, and you have to be sure you're affecting only the monitoring (listening) portion and not the recording one (the one that goes to tape).

Maybe you want to record yourself singing harmony. Or playing three different acoustic guitar parts. For this procedure, you'll use the same source and simply overdub by recording onto successive tracks.

ENSEMBLE RECORDING

This is sort of the flip side of overdubbing. Ensemble recording means you record the way nature intended — all together and at the same time. You record to multiple tracks using bussing, but you do it simultaneously. While this makes things easier from a musician's standpoint, it sometimes poses challenges from the recordist's perspective.

One problem is where to put all these people. If you have them all next to each other in the same room, but on three different mics going to three different channels, which go to three different tracks, you risk bleed. This is when one mic picks up the sound from another, unintended source. The result is that you



The stereo miking x-y pattern.

can't turn up mic 1 without also turning up the bleed from the singer on mic 2. And it may very well be that that's the precise reason you're turning up mic 1 — to get the timid singer there to match lungs with the *basso profundo* on mic 2. You could separate the singers, but then they lose the ability to act as a unit — where they listen to each other for cues, tuning, etc. In that case, you might consider a different mic — one with a tighter pickup pattern. If you like your SM58, you might consider switching to a Beta 58A, which has many of the same qualities, but a tighter, supercardioid pickup pattern. For stereo recording, consider going with a pair of identical-model mics, such as two BG4.1's. Place them in an XY pattern (where the capsules crisscross each other at about a 135-degree angle) and position them in front of the source.

TRACK BOUNCING

Once you have your ensemble recorded to different tracks, you might want to *bounce* the tracks all to one open track. Bouncing is taking several pre-recorded tracks and mixing them down to one (or two, if you're running in stereo). Bouncing allows you to reclaim those individual tracks — by erasing and re-recording over them. The one caveat is that once you bounce and start recording over the original tracks, you're stuck with your bounced track mix. So make sure to audition it over several systems before you start to re-record. You must always leave an open track, so plan carefully.

SPECIAL APPLICATIONS AND TECHNIQUES

It's one thing to stumble through the recording process and discover all the things to do and not to do all by yourself. But why not take a couple of short-cuts and benefit from the collective wisdom of people that have been there, done that, and lived to tell the tale?

There are many classic approaches to miking and recording all sorts of standard

arrangements of instruments. It doesn't mean you have to follow them to the letter, but knowing what the traditional approach is certainly makes for a good jumping-off point.

Let's examine some specific recording applications utilizing classic setups.

RECORDING GUITARS

Acoustic guitars. If you're trying to lay down a thumping rock rhythm on acoustic guitar, try using a dynamic, like the Beta 57A. It has a little more high-end sizzle than an SM57, but it features a great midrange "honk" that higher-quality condensers don't seem to favor. For a classic two-mic setup, take a small-diaphragm condenser, like an SM81, and point it toward the 12th fret,

about 12 inches away. Then take a larger-diaphragm condenser, like the KSM32, and place that about six inches from the bridge. Run the mics to separate channels and blend to taste.

Electric guitars. Like vocals and their acoustic counterparts, electric guitars can be greatly enhanced by recording

them in an ambient space, like a bathroom, garage, or long hallway. One trick is to close-mic the cabinet with a dynamic mic, and then take a condenser and place it several feet back, or even way back at the end of a

hall for a cathedral-like ambience. In this case, the ambient mic takes on a much smaller role than, say, the two-mic method for an acoustic. Blend the ambient mic subtly. Fig. 9 shows how the two mics should be placed, relative to the guitar amp.

MIKING A DRUM KIT

Mic choice and setup. There is no one correct way to mic a drum kit. Some people like to set up two mics in front of the drummer in a nice, live room, about six feet high and ten feet back, and just

NOW IT'S TIME TO TAKE A LOOK AT SOME SPECIFIC RECORDING APPLICATIONS UTILIZING CLASSIC MIKING SETUPS FOR INSTRUMENTS SUCH AS GUITARS AND DRUMS.

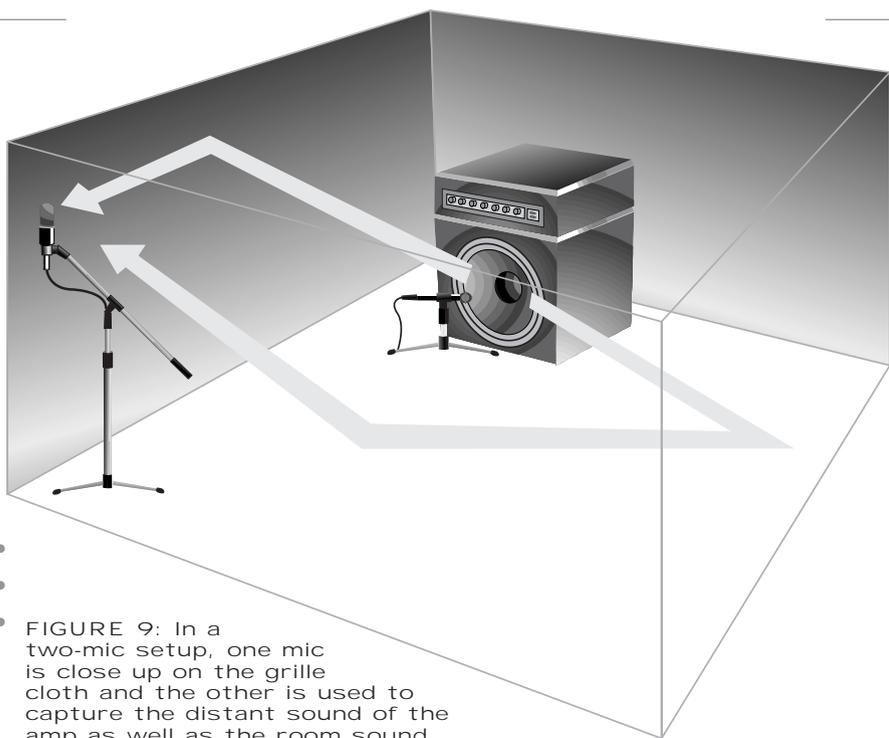


FIGURE 9: In a two-mic setup, one mic is close up on the grille cloth and the other is used to capture the distant sound of the amp as well as the room sound.

let the drummer wail. Others mic every drum, send them all to separate channels, and then hunker down for a marathon mixing session. But most strike a balance somewhere in the middle. That usually involves separate dynamic mics for the kick and snare, a condenser mic for the hi-hat, and two large-diaphragm condensers for the overhead mics, which pick up the toms and the cymbals. Alternatively, you can use a pair of closed-mic dynamics on the toms, if you like. Fig. 10 shows how the “well appointed” drum kit looks, with the mic configuration discussed above.

Panning assignments. On a drum kit miked with the above setup, set the pan controls this way for a stereo spread on mixdown (not for tracking): kick 12:00, snare 12:00, toms high to low in an 11:00–1:00 spread, hi-hat 2:00, and

overheads 10:00 and 2:00. (see Fig. 10a).

USING EFFECTS SENDS EFFECTIVELY

For a true stereo sound, you must record a source with two mics and send each signal to a separate track. But that burns tracks in a hurry, so a great way to create a faux-stereo effect on single-track-recorded instruments is to put just the effects in stereo. Use a stereo effects unit, but feed it one input from either a channel (one instrument) or the entire mix. Then return two outputs — the left and right from the effects processor — and patch them back into the main stereo bus. That way the reverb, delay, or chorus will shimmer with a subtle stereo effect, even if your instruments are all panned up the center. This is also a great way to ensure mono compatibility.

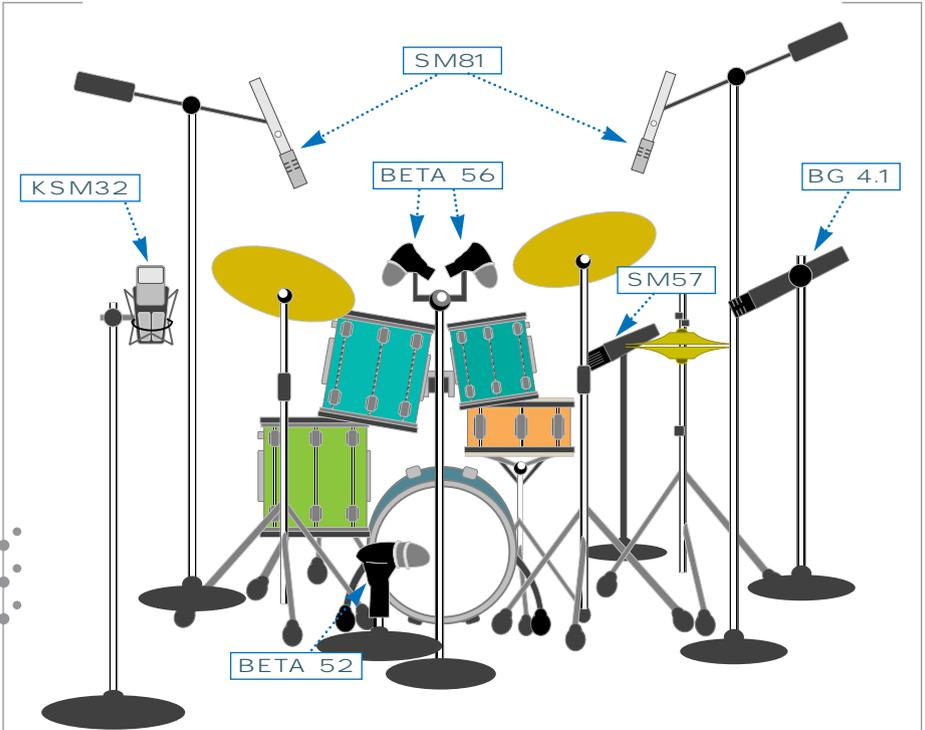
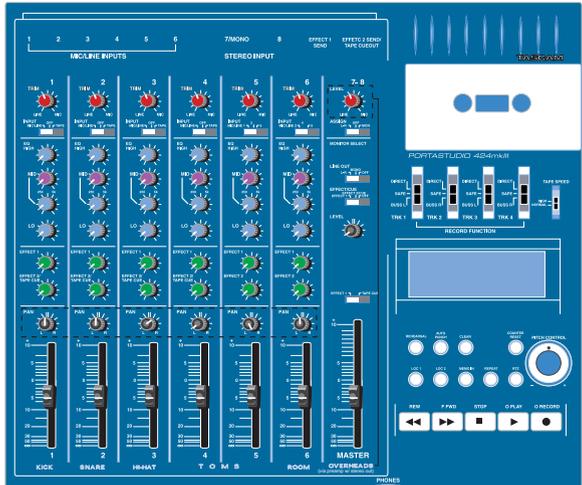


FIGURE 10: A classic miking approach for a drum kit is two condensers for the overheads, one on the hihat, two dynamics on the toms, and one mic each for the snare and kick. A large-diaphragm condenser for a room mic is optional.

FIGURE 10a: Note the pan assignments on the rotary knobs just above the faders. The 414mkII will take eight inputs even though it only has six faders. Inputs 7 and 8 are on a single stereo jack and are controlled by a rotary level knob.



TRICKS AND TIPS

You've done all the homework and followed the rules, right? So now it's time for some fun. Here is some weird science, recording-wise, that actually works.

PUSH THE METERS — YOU'RE USING TAPE!

In this digital world, distortion when recording is verboten. But not so in analog-land.

Pushing the tape means that you distort just enough to compress the

tape, but not enough to make your preamps clip in an ugly way. There's a narrow window in there where that happens, but if you find it, you'll be sitting pretty in the sweet zone.

MIC THE STRINGS OF YOUR ELECTRIC GUITAR

If you want to get some acoustic snap from your electric — but don't have a split pickup configuration with a piezo and magnetic — here's how you can achieve the same effect. Isolate the guitarist from the amp in a quiet room and have him monitor over headphones. Close mic the strings of the electric guitar with a small-diaphragm condenser, like the SM81 or BG4.1, at a distance of only a few inches. You have

to be sure there's no other noise, like studio monitors or even loud breathing, because you'll have to run the mic pretty hot. Run the miked signal to its own track and then mix it judiciously with the principal electric sound. You'd be surprised how this effect — anemic on its own — adds a whole new dimension to a guitar sound.

SOME TECHNIQUES THE PROS USE TO MAXIMIZE THEIR SOUND.

10 TRACKS WITH 4 TRACKS AND ONLY 1 BOUNCE

Bouncing tracks

is great, but the rule of thumb is that you really don't want to have more than one generation for any part, especially on cassette-based machines. But by performing a live track along with the ones you're bouncing, you can get ten tracks onto a 4-track in just seven steps, and with no track subjected to more than one generation. See fig. 11 for the road map.

GHOST VERB

Here's a neat trick that's subtle enough to turn the heads of the attentive, but won't distract from the musical impact of the principal signal. Start by recording, on any instrument, a melodic line onto one track. Then double the line, via overdubbing, by listening to the original

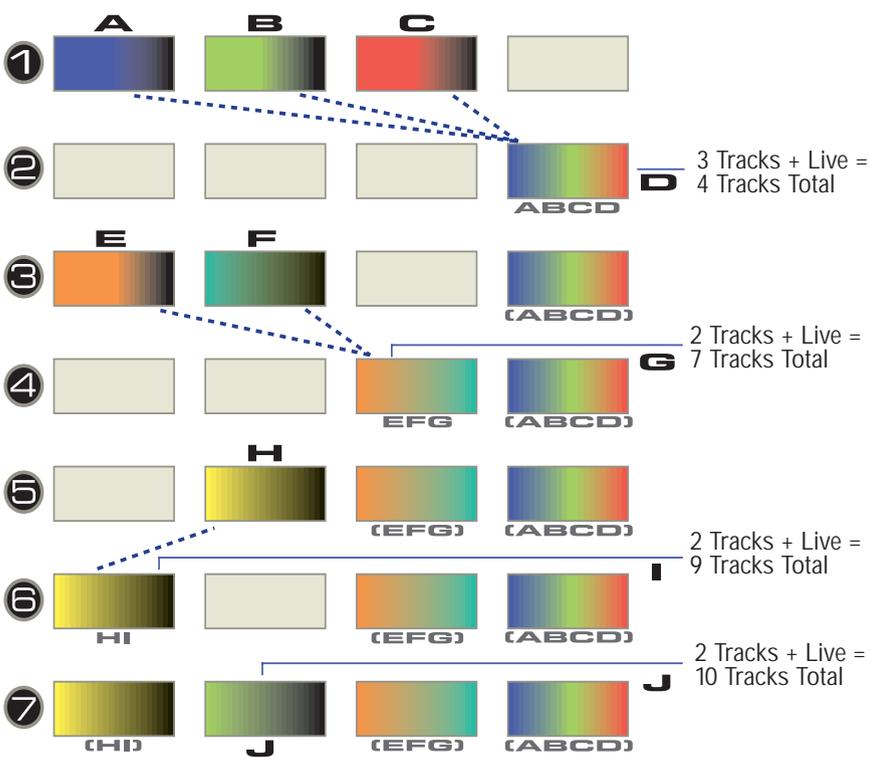


FIGURE 11: Seven steps to bouncing ten signals to four tracks, assuming you perform live with the bounce each time.

and playing along onto a second track. But don't play it exactly like the original. Take a few liberties with the tempo, the articulation (slide into a note instead of hitting it dead on), and maybe even the choice of a pitch or two (but do this sparingly). And instead of close miking yourself, play or sing *way back* from the mic, using a condenser like the SM81. You might even have a second mic pointed at a reflecting wall to capture only the ambient sound (a KSM32 is

good for that purpose). You can even run the track through a delay or reverb after that, so that it *really* sounds ghostly. Then, ever so carefully, mix that sound in with the original track. The result is a "wrong-note reverb" where the "effect" (it's really another track disguised as an effect) is misbehaving and deviating from the original line — a seeming impossibility...unless your recorder is haunted. Great for atmospheric effects.



LAST NOTE

WHERE TO GO FROM HERE

If you've gotten this far, and practiced some of the exercises presented here — and lived to tell about it — you're doing great! The next step should be to purchase and master some outboard effects units, like compressors, reverbs, delays, choruses, etc. That's what you'll need to complete your technical arsenal while you save up and upgrade your existing, core equipment. You can always use more mics, too, acquiring models designed for specialized tasks.

More important than acquiring and mastering gear, however, is trying to get exposed to as many recording situations as you can. Volunteer to help out friends and acquaintances who have little recording experience, but are looking to put together a demo tape. You never know when you'll get another opportunity to mic a Brazilian percussion ensemble, a gamelan orchestra, or even a large chorus of singers. Record as much as you can, develop your ear for microphone qualities, and master the features of your recorder so that you can focus without distraction on your whole reason for being there: developing your ear for music.

SHURE MICROPHONE APPENDIX

SHURE MICROPHONES

SM57:

Outstanding performance and diversity of application make the SM57 the "workhorse" of stages and studios worldwide.

SM58:

Ostensibly the first choice of performers around the globe, the SM58 vocal microphone is a genuine world standard and a true audio legend.

Beta 52:

Optimized for use with kick drums, this supercardioid, dynamic microphone features an integral locking stand mount for fast, easy setup.

Beta 56:

Specifically engineered for drums and instruments, the Beta 56 dynamic microphone's compact, pivoting design makes it the ideal choice.

Beta 57A:

Excellent for acoustic and electric instruments as well as for vocals, the extremely versatile Beta 57A dynamic microphone provides optimal warmth and presence.

BG4.1:

The BG4.1 condenser microphone is a top choice for instrument recording and sampling, as well as for live acoustic instruments.

SM81:

One of the world's great studio condenser cardioid microphones, the SM81 provides precise, detailed sound reproduction, is excellent for studio recording, and is rugged enough for live sound reinforcement.

KSM32:

SHURE's KSM32 has a classic, elegant appearance and even more impressive performance provided by its extended frequency response, low self-noise, high output level, and increased dynamic range. The KSM32 has the flexibility to handle a variety of demanding sound sources, including vocals, acoustic and wind instruments, ensembles, and overhead miking for drums and percussion. In addition, it has the warmth and sensitivity necessary for superb sound reproduction in professional studio production and live sound recording.

For more information, product literature and educational booklets, call 1-800-25-SHURE or visit www.shure.com.

TASCAM PORTASTUDIO APPENDIX

788 DIGITAL PORTASTUDIO

PERFORMANCE SPECIFICATIONS

Frequency Response	20 Hz–20 kHz ± 1 dB
Dynamic Range	Better than 82 dB
Channel Separation	Better than 80 dB
Total Harmonic Distortion	<.01% (1 kHz tone)

INPUT/OUTPUT SPECIFICATIONS

Inputs A-D	1/4" TRS
Aux Input	(2) 1/4" Phone Connectors [Nominal Level –10 dBV @ 15 kOhms]
Stereo Output	(2) RCA Connectors [Nominal Level –10 dBV @820 Ohms]
Monitor Output	(2) RCA Connectors [Nominal Level -10dBV @820 Ohms]
Aux Output	(2) 1/4" Phone Connectors [Nominal Level –10 dBV @820 Ohms]
Headphone Output	1/4" TRS, 60mW per side, 30 Ohms
Remote Port	1/4" Phone, Accepts TASCAM RC-30P
MIDI Ports	(2) 5 Pin Din
SCSI Port	SCSI-2, 50 pin

CASSETTE 4 TRACK

	Porta 02	414mkII	424mkIII
Simultaneous Record/Play Tracks	2 Record; 4 Play	4 Record; 4 Play	4 Record; 4 Play
Mixer Channels	4 Tape Returns	4 Mono Channels 2 Band EQ (2) Aux Sends 2 Stereo Inputs	6 Mono Channels 3 Band EQ <i>Sweep Mid EQ</i> (2) Aux sends 1 Stereo Input
Overall Frequency Response	50 Hz–12.5 kHz ±3 dB	40 Hz–16 kHz ±3 dB (without dbx)	40 Hz–16 kHz ±3 dB (3 3/4 ips)
Overall Signal to Noise Ratio	>43 dB	>85 dB 1 kHz, 3% THD A weighted, dbx on	>90 dB IHF-A weighted, dbx on
Wow/Flutter (WRMS)	<.018%	<.012% WRMS	<.005% WRMS
Tape Speed(s)	4.76 cm/sec (1 7/8 ips)	9.5 cm/sec (3 3/4 ips)	4.76 cm/sec (1 7/8 ips) 9.5 cm/sec (3 3/4 ips)
Pitch Adjustment		±12%	±12%
Inputs	(2) 1/4" Mic/Line In	Ch 1-2 XLR Mic Pre 1/4" Mic/Line In Ch 3-4 1/4" Mic/Line In Ch 5-8 1/4" Line In Hi Z Guitar Line Level In Sub Input RCA unbalanced	Ch 1-4 XLR Mic Pre 1/4" Mic/Line In Ch 5-6 1/4" Mic/Line In Ch 7-8 1/4" Line In Sub Input RCA unbalanced
Outputs	Line Output RCA unbalanced Headphone Output 1/4" TRS	Monitor Outputs RCA unbalanced Line Output RCA unbalanced Aux Send Outs (2) 1/4" Line Headphone Output 1/4" TRS	Monitor Outputs RCA unbalanced Line Output RCA unbalanced Aux Send Outs (2) 1/4" Line Individual Track Outs RCA unbalanced Headphone Output 1/4" TRS
Power Consumption	7W	11W	21W
Dimensions	300x80x205 mm	367x100x247 mm (14.5 x 4 x 9.75 in)	419x115x357 mm
Weight	1.5Kg	2.1Kg (4.5 lbs)	4.9Kg
Fast Winding Time	120 sec. for C-60	110 sec. for C-60	120 sec. for C-60
Optional Accessories		RC-30P Punch-In Pedal	RC-30P Punch-In Pedal

Microphones AND Multitracks



Produced by two of the most-respected names in professional audio, *Microphones and Multitracks* is a quick-start guide that will not only have you making music with your SHURE microphone and TASCAM Portastudio, but have you doing it in the time it takes you to read this guidebook and press the Record button on your deck.

Here's some of what you'll learn:

- Proper mic selection
- Recording system setup
- How to set levels
- Miking techniques
- Multiple track recording techniques
- How to capture the best signal
- Classic recording setups
- Professional tricks and tips

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