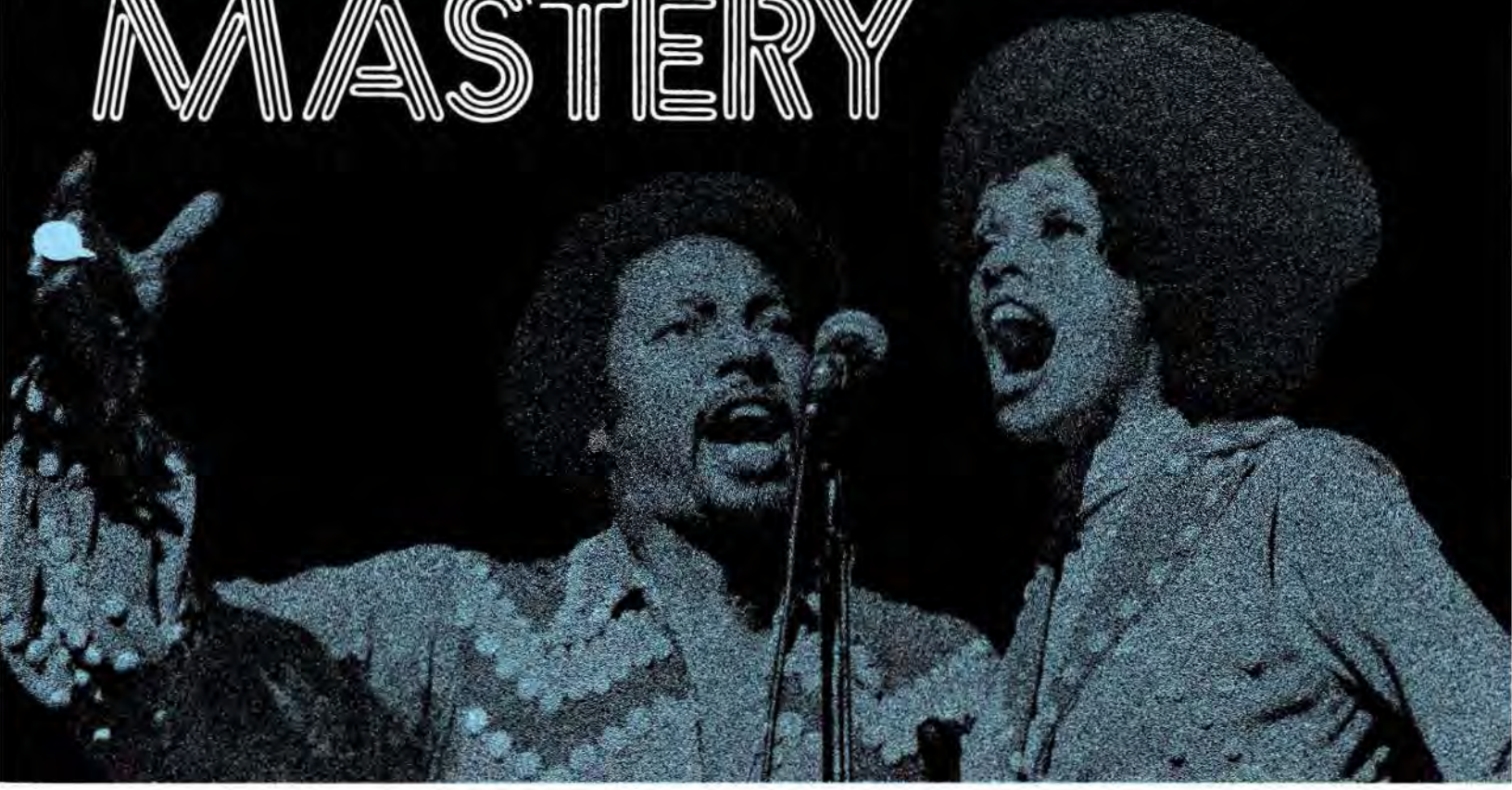
THE MUSIC-MAKER'S MANUAL OF MICROPHONE MASTERY



SHURE®

sound of the professionals

PE50SP
Unidirectional
Dynamic
Frequency Response:
50-15,000 Hz
Impedance: Low
With high impedance transformer included

PE54
Unidirectional
Dynamic
Frequency Response:
50-15,000 Hz
Impedance: High
Built-in stand adapter

PE54D
Unidirectional
Dynamic
Frequency Response:
50-15,000 Hz
Impedance: High

PE54D-CN
Low impedance model

PE56D
Unidirectional
Dynamic
Frequency Response:
50-15,000 Hz
Impedance: High
Built-in "pop" and wind filters

PE56D-CN
Low impedance model

PE588
Unidirectional
Dynamic
Frequency Response:
80-13,000 Hz
Impedance: High
Low cost

PE588B-CN
Low impedance model

Shure engineers talk to entertainers about microphones & miking . . .

For the groups and entertainers who take their sound seriously, this is it—the first real down-to-earth guide to on-stage microphone technique!

It was developed by Shure engineers representing years of practical, in-the-field experience in sound reinforcement for entertainers . . . from the Greek Theater to Carnegie Hall to the great showrooms in Las Vegas to the Grand Ole Opry. And it's loaded with tips on microphone selection and application . . . information many performers simply never knew about microphones and miking.

This Manual of Microphone Mastery is intended only as a guide. Shure recognizes that, after all, what sounds "good" to one musician might not sound "quite right" to another. Try it our way first, and if you don't like what you hear, make the adjustments that give you the sound you like.

Reading this manual will give you most of the basics. After that, you're on your own!

PE515
Unidirectional
Dynamic
Frequency Response:
80-13,000 Hz
Impedance: High
Lowest cost Unidyne

PE55
Unidirectional
Dynamic
Frequency Response:
50-10,000 Hz
Impedance: High
The classic among entertainer microphones

PE548V
Unidirectional
Dynamic
Frequency Response:
40-15,000 Hz
Impedance: High
Built-in volume control

PE53
Omnidirectional
Dynamic
Frequency Response:
40-11,000 Hz
Impedance: High
Smooth sound at low cost

CLOSE-UP VOCALS

When loud instrumental backups are used, the vocal microphone is positioned close up (less than 6″ away) so the vocalist can make himself heard over the high sound pressure level of the orchestra background. Often, he requires freedom of movement, so the microphone is hand-held.

The Problems

Because the vocalist is so close to the microphone, the microphone is highly vulnerable to breath "pop," the undesirable percussive noise created when the microphone hears a strong "p" or "t" sound. And, with high sound pressure levels, "clipping" or overload distortion may occur when the amplifier pre-amp is forced to cope with abnormally high input levels. When the microphone is hand-held, bothersome mechanical noises may also be picked up by the microphone.

Recommended Microphones

For these applications Shure engineers recommend the use of a Shure Unisphere Series dynamic microphone.

1st Choice: Model PE50SP
2nd Choice: Model PE56D-CN
3rd Choice: Model PE588B-CN

These Unisphere models give the vocalist excellent frequency response, with built-in wind and "pop" filters that effectively control disruptive breath noises. They also feature built-in cartridge cushioning that isolates mechanical and handling noises. Shure Unisphere Microphones effectively reduce background noise and help control feedback. The wide dynamic range of the dynamic microphone element also helps prevent overload. All give the performer the great on-stage looks of the popular "ball-type" design.

Accessory Equipment

For the best microphone performance in close-up vocals, Shure recommends the Model A61WS Accessory Windscreen. This effective, low-cost accessory affords outstanding "pop" and wind noise protection, and is a "must" for any outdoor performance. (The A61WS is now available in six vibrant colors that allow the group to color-code individual microphones to individual mixer controls. And, they add a good splash of color to any stage act!)

In the event that overload distortion does occur, the Shure A15A Microphone Attenuator is an accessory worth its weight in gold. From the Shure series of A15 plug-in problem-solvers, the A15A can be plugged into all low impedance microphone inputs and the microphone cable reconnected. Use directly with the PE50SP, PE588B-CN, PE56D-CN or PE54D-CN.

DISTANT VOCALS

The selection and use of microphones for more distant vocal pickup (more than 6″ from the microphone) is a primary concern for any vocalist who wants to be heard over loud background music. Considerations also have to be made for the vocalist who plays an instrument as he sings.

The Problems

When amplifier gain is raised to compensate for a vocalist who is not close to the microphone, the potential feedback situation can be aggravated and higher levels of background noise also may be introduced into the output mix. Furthermore, if the distance pickup is hampered by sound waves reflected off the floor, an unnatural "hollow" sound results.

Recommended Microphones

Because close-up "pop" is no longer a problem, Shure engineers recommend these Shure microphones from the world-famous Unidyne Series:

1st Choice: Model PE54D or PE54
2nd Choice: Model PE515
Special Choice: Model PE548V (See below)

These microphones give the vocalist excellent frequency response, with the feedback- and noise-controlling benefits of cardioid pickup characteristics. (Because the microphones mainly hear sound coming from the front of the microphone, the performer is given the freedom to move away from the microphone and still be heard. And because the microphone turns a deaf ear to sounds coming from the sides and rear of the microphone, audience noises are not picked up.) Speaker placement becomes less difficult too, because the speakers can be aimed away from the microphone to sharply reduce feedback danger. In the event that feedback persists, use a Shure PE610 feedback controller connected between the microphones and the amplifier.

Special Recommendation

Here's a tried and proven solution to one of the most perplexing problems faced by a musical group: how to mike the vocalist who also plays drums or a keyboard instrument. The problem is that his hands are full, and his position relative to the vocal microphone is fixed, so he cannot move closer to it when greater volume is needed. The solution—other than using a soundman to control microphone level—is the Shure Model PE548V Unidyne microphone. It combines all of the problem-solving Unidyne features with a volume control built into the microphone case. This control allows the vocalist to change the volume from his microphone—without returning to the amplifier or mixer controls. So even though the microphone position is fixed, he can lower the volume for softer sounds, or raise the volume for loud selections (provided the amplifier is not already set for the highest volume before feedback).

PIANO

Of all the instruments a group or musician would ever have need to mike, none offers the challenges of the piano. The truth is that there is no limit to the number of ways to go about it, and how you choose to do it depends on the sound desired, the acoustics of the room, the type of piano, and the unique "personality" of the particular instrument. And even after you've found the answers to those questions, good microphone pickup on a piano will probably still be a trial-and-error proposition. But here are some of the things you'll need to know.

The Problem

The "piano problem" is always the same: how to get a good, not-too-bright, not-too-mellow sound at sufficient level to avoid feedback problems, and still give the musician room to play.

Typically, the unsuspecting piano player will attempt to mike his instrument with one microphone. While this can be done on a spinet or upright piano, the result is often an unsatisfactory emphasis of bass frequencies or an excessively "tinkly" sound. When the microphone is moved away from the piano in an effort to get more "complete" sound, volume level drops sharply. Then, when system gain is raised to compensate for this loss, horrendous feedback problems threaten. One of the biggest problems — and one that is virtually unique to the piano — is the overabundance of harmonics and overtones, and the very high levels of transient sound bursts.

Recommended Microphones

In miking a piano, there are no special choices, although the Shure Models PE53, PE54, PE54D-CN, PE55, and PE515 can all help you to get the sound you want. With the exception of the PE53, all are unidirectional dynamic microphones.

As a general rule, the closer you are to the strings and hammer area, the brighter the sound will be. As you move away, you de-emphasize this brightness, and begin to create a more balanced piano sound.

Depending on where the microphone is positioned and which microphone is used, it is possible to further emphasize either high or low frequencies. (For example, a microphone with a rising response characteristic will emphasize higher frequencies and, when used near the strings, will give you maximum brightness; a microphone with a great proximity effect will produce greater power at lower frequencies and give maximum low frequency response when used at the resonant underside of a piano.)

Spinets and Uprights. With a spinet or upright piano, two widely preferred microphone positions are at the piano footwell, and at the top right of the piano with both top and bottom panels removed. It's also possible to go down inside the instrument from the top, although the space limitations are severe.* Of these two options, probably the best spinet or upright sound is achieved when the front panel is removed. This allows you to mike on the string side of the sounding board. (Be careful, however, that you allow enough clearance for the musician to move around.)

This position — because you are near the exposed hammers — will give you a decidedly bright sound, and as you move the microphone away, you'll be cutting down on the bright, "tinkly" sound. Trial and error will tell you when you've struck a happy medium and have reached a good, overall piano sound.

If you prefer, you may also want to remove the panel above the pedals, and position the microphone on a floor or desk stand. With the lid down and the front panel still in place, this position will exaggerate the bass frequencies and give you a very rich, deep piano sound. (When the microphone used is a PE54D-CN, PE55 or PE515 with their pronounced proximity effects, this low frequency sound will be further strengthened.) In this location, a good microphone is the PE53 which does not have proximity effect.

Grands. With a grand piano, two microphones are almost always used. The secret is to raise the top, and position one microphone (such as the PE53, PE54 or PE54D-CN) at the string area, under the top. Then, position a second low impedance microphone under the piano pointing upward on a floor or desk stand. This gives you a microphone on both sides of the piano sounding board to cover both bass and high frequencies, and produces a good balanced sound. Remember: since the sounding board vibrates up and down, *these two microphones must be out of phase with each other*, so there is no cancellation of sound through the system.

Accessory Equipment

Here's another effective soundman's trick that should help you on piano miking. Instead of rewiring a microphone to put it out of phase with the other for grand piano pickup, simply plug in a Shure A15PR Phase Reverser with low impedance microphones. This will automatically reverse the phase of the microphone coming into the mixer channel, and you'll hear a big difference in piano sound.

*The PE54, PE54D-CN and PE515 are small in size, a big "plus" when it is necessary to go inside the instrument.

FLUTE

The fragile, low-volume sound of the flute often requires microphone pickup and amplification for live performances. There's nothing tricky or difficult about it — once you know the microphones and the technique.

The Problem

There is only one way to position the microphone for suitable flute pickup: in the area around the mouthpiece and very near the instrument. But when this is done, a problem of breath noise control appears, since the instrument does require the musician to blow across the mouthpiece.

Recommended Microphones

Shure engineers recommend these microphones for flute pickup:

1st Choice: Model PE50SP
2nd Choice: Model PE56D
3rd Choice: Model PE53 (or PE548V)

All these microphones are ball-type designs with built-in filters for breath noise control. The PE50SP and PE56D are unidirectional dynamic microphones that limit feedback danger, and function flawlessly in a wide variety of live performance applications. (They are among the finest microphones made for vocal pickup.) Both are excellent choices when a group or ensemble requires a microphone that must serve other pickup needs, and is used only part-time on flute pickup.

When feedback is not a problem, the PE53 will do an excellent job on flute pickup. It is an omnidirectional microphone, and gives a very rich, full flute sound.

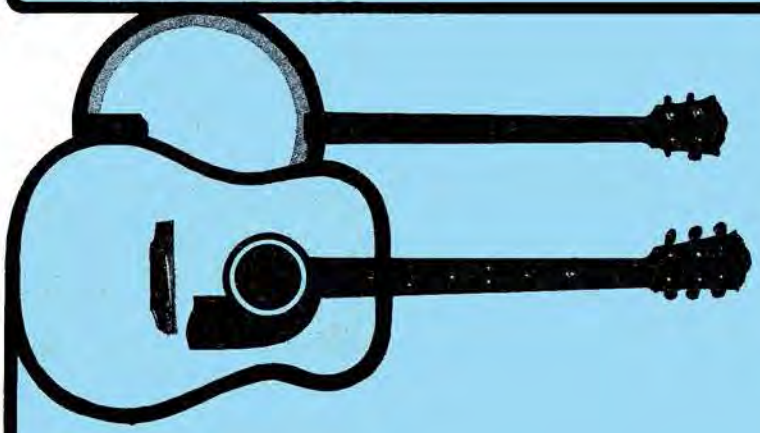
Most of the flute sound comes from the mouthpiece area of the instrument, so the microphone used should be oriented for a sound that satisfies the musician. A good microphone position in flute pickup is at a point midway between the mouthpiece and the first set of finger holes. This "blank area" of about 4" gives the musician the full flute sound, yet allows him to avoid blowing directly into the microphone.

Accessory Equipment

While all recommended microphones have built-in breath noise filters, Shure engineers recommend that for most applications, any of the A61WS Series of windscreens should also be used for maximum breath noise protection.

Alternate Microphone Suggestion

Shure engineers recognize that many musicians prefer a "breathy" sound from their flutes. For these performers, one of the Unidyne Series microphones (such as the PE54D), with a bright, rising response characteristic, will accentuate this sound to give the performer the "breathiness" he prefers.



ACOUSTIC GUITAR & BANJO

Acoustic instruments are among the most frequently miked, because their sounds are so delicate, and with the exception of the banjo, so low in volume level. But with a little know-how and the correct microphone, the job is a cinch.

The Problem

With an acoustic guitar, the musician must position the microphone close enough to the sound hole to reach adequate volume levels — but not so close that the microphone interferes with his playing motions. When a microphone with non-discriminating pickup characteristics is used and system gain must be turned up to get sufficient volume, feedback can become a problem.

Microphone pickup of banjo music is essentially the same, except that the inherent loudness of the instrument makes acceptable output levels easier to reach.

Recommended Microphones

Shure engineers recommend these microphones specifically for acoustic guitar and banjo pickup:

1st Choice: Model PE54D
2nd Choice: Model PE54
3rd Choice: Model PE53

In the studio, recording engineers prefer the sound of a smooth, flat response omnidirectional microphone (such as the "Standard Line" Shure Model 578) for acoustic guitar pickup. But the realities of live performing often preclude the use of an omnidirectional microphone. A band requiring that their microphones handle many functions may choose unidirectional microphones.

For adequate banjo pickup, the microphone should be aimed directly at the center of the banjo head, as close to the instrument as is practical. This way the microphone will capture every nuance of the banjo sound and the only adjustments left to be made will be the adjustments for volume or equalization on that channel.

All recommended microphones are very small in size, so they can be positioned very close to the sound hole of the guitar, or in tight on the head of the banjo. But perhaps more important, each features a slight rising characteristic in response that enables it to capture not only the rich body of the guitar sound, but to emphasize the delicate string sound, adding a very pleasing brightness to the overall sound.

Accessory Equipment

For thousands of performers around the world, the Shure MS-10C Floor Stand and BB-1 Baby Boom are "standard equipment" for live performing. Both adjust for length, and the stand fitting adjusts 360° for boom angle, so the microphone can be located in virtually any position or angle. They're a great team in guitar or banjo miking!

For guitar or banjo plus vocals, the Model CO-1 Microphone Stand Adapter allows a second microphone to be mounted on the boom.

REEDS & HARMONICA

Like the brass instruments, reeds pose no insurmountable problems, but to mike them effectively, you will need to know what microphones to use and how to use them. The harmonica is technically a reed instrument, but it requires microphone performance of a different type, and vastly different technique.

The Problems

The surprising truth about reeds is that their sound emanates only partly from the bell of the instrument; in the case of the saxophone, roughly half the sound comes from the finger hole area, and with the clarinet, almost all radiates from the finger holes. Thus, the object is to cover the instrument effectively to capture and preserve the rich, mellow sound with all its subtleties and unique character.

In miking the harmonica, to generate enough low freqency response and overall volume, the microphone should be held so close that it touches the instrument. But when this is done, the performer must face the problem of breath noise pickup.

Recommended Microphones

Considering all of the implications in reed instrument pickup, Shure engineers recommend these microphones for clarinets, saxophones and harmonicas:

SAXOPHONE & CLARINET	HARMONICA
1st Choice: Model PE55	1st Choice: Model PE56D-CN
2nd Choice: Model PE54D-CN	2nd Choice: Model PE588B-CN

The PE55 unidirectional dynamic microphone gives a particularly pleasing sound to saxophones and clarinets. Similarly, the PE54D-CN delivers excellent reproduction of these instruments, but with its rising response characteristic, often requires an accessory A15RS Response Shaper to filter some of the harshness and sibilance that can slip through.

Special Note on Microphone Flexibility: The PE56D-CN, with its ball-type design and rising response characteristic, is one of the most versatile microphones in the Shure Professional Entertainer line. It is an outstanding vocalist's microphone and can handle numerous pickup problems for the touring performer.

In miking the saxophone, the microphone should be positioned directly above the bell, about midway between the top of the bell and the uppermost set of finger holes. The clarinet must be miked out in front of the instrument, positioned at the midway point along the finger holes.

For harmonica pickup, both recommendations are "ball-type" microphones with built-in wind and breath filters. But because the breath noise levels can get very high, accessory windscreens should be kept handy in the event additional protection is needed.

Even more important is that either microphone will give the performer a very definite proximity effect. The closeness of the microphone to the harmonica will accentuate lower frequencies to give them the strength they need, and either microphone is small enough to be easily handled by the performer.

Accessory Equipment

The PE588B-CN, because of its limited high frequency response, is less susceptible to sibilance and higher frequency sounds. The PE56D, however, delivers much higher output levels at higher frequencies, and should be used with the A15RS Response Shaper and two transformers for harmonica. Any of the A61 Series windscreens will cut wind noise to minimal levels with the PE56D or PE588.

DRUMS

Why mike drums at all, since everyone knows how "loud" they can be? Because that so-called loudness evaporates the instant a group is called upon to perform in a large auditorium, or in the reverberant surroundings of a school gymnasium. Without microphone pickup, the sound of drums can often become the sound of vague noise — with no definition, no tone delineation, and no penetration.

The Problems

The selection of specific microphones for pickup around the drum array poses a problem in miking drums. The need for precise positioning of these microphones can further complicate the matter.

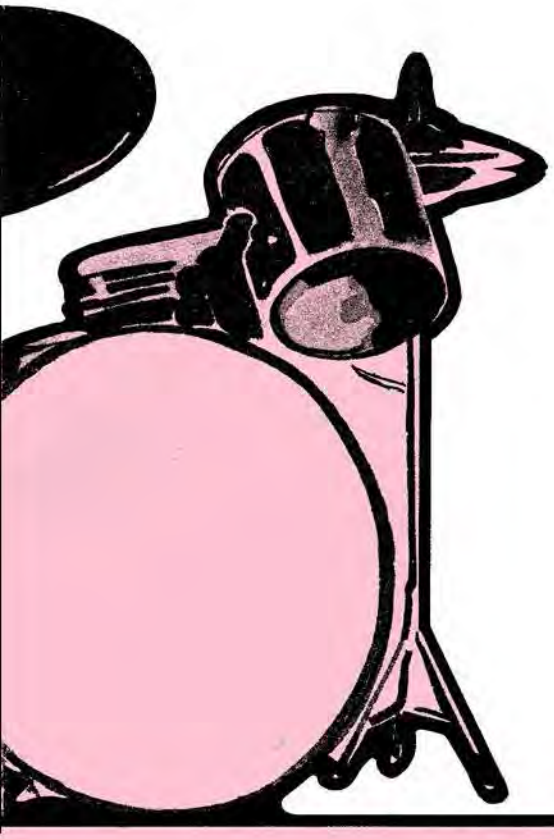
Recommended Microphones

Shure engineers recommend the use of three microphones for adequate pickup of the total drum sound.

Bass:	Model PE54D-CN, PE515
Snare:	Model PE54D, PE515, PE54D-CN
Cymbals:	Model PE53

On the bass: Whether or not the outer drum head is removed, the PE54D and PE515 give the drummer a tight, strong bass sound. Because the microphone must be positioned so close to the drum, there is a proximity effect (the emphasis of low frequencies as the microphone is moved closer to the source of sound). The recommended microphones will accentuate these low frequency sounds, and with their rising characteristic, will add definition to the sound. Neither microphone presents any microphone overload problem.

With the outer drum head removed, the microphone must be positioned inside the bass. Use a low-mounted boom arm to enter the hollow of the drum, or, if a boom set-up is not practical, use a microphone stand in conjunction with a Shure A55M Accessory Noise Isolation Mount to keep mechanical noises from reaching the microphone.



If the outer head is used, position the microphone about one-third the way up the head, as close to the skin as is practical. Again, be sure to watch for mechanical noise pickup, especially on "shaky" platforms and bandstands.

On the snare: If possible, position the microphone just off the outside rim of the snare on the top, mounted on a boom arm extending through from the front of the drum set. This position will give you freedom to attack the entire head surface, without danger of hitting the microphone. Either recommended microphone in this position will deliver a sharp, crisp snare sound, because they respond with the slight rising characteristic described above. **Caution:** Resist the temptation to run the microphone in from underneath the snare; you'll find that this position will give you only the buzz of the snare wires — and none of the real snare sound.

On the cymbals: The PE53 microphone recommended is omnidirectional in its pickup, and since there is rarely any feedback problem with microphones close to percussion instruments, it makes an outstanding performer in cymbal pickup.

Position it either of two ways: above the cymbals, or in underneath the cymbals. This microphone features a wide smooth frequency response that will capture all the initial transients in the cymbal sound, and because its pickup is non-directional, it can also be used to pick up the tom-tom sound when positioned under the cymbals. Either way, you'll find that it captures all the "sizzle" and "crash" of the cymbals.

Soundman Tip: To simplify microphone connections and make balancing easier, run the microphone cables into a mixer (such as the Shure PE68M or M68FC if low impedance microphones are used.) This allows you to balance the overall drum sound independently—and then run only one cable into the mixing board or control console. You'll have a better "tune" on the drums and you'll have used only one console channel.

ELECTRIC KEYBOARDS

Like electric guitars, electric pianos and organs produce no sound of their own, but function instead as giant electric pickups. The miking is done out in front of the instrument speaker to take advantage of the sound of the speaker cabinet, and the technique is one of choosing the proper microphone, and positioning it correctly at the instrument speaker.

The Problem

In miking electric keyboard instruments, the problem is virtually identical to that faced in the miking of electric guitars: locating the best position for microphone pickup, and orienting the correct microphone for optimum response. In other words, the musician gets the sound he wants from the instrument speaker — then puts that output into a microphone so the house sound system can power it into the audience.

Recommended Microphones

Here, there are no "first" or "second" choices. Shure engineers make these recommendations to accommodate the full range of playing styles and speaker arrays:

PE54 or PE54D-CN • PE53 • PE55

As with the electric guitars, each microphone offers somewhat different response characteristics. Understanding how each performs will enable you to select the one that's right for your sound.

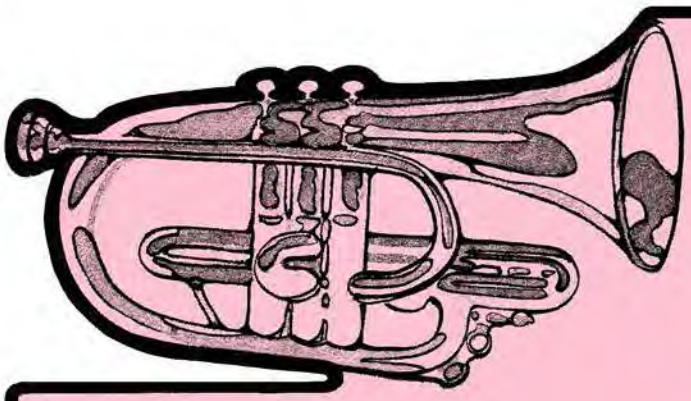
The PE54 and PE54D-CN are unidirectional dynamics that offer a slight rising characteristic that adds brightness. It gives electric pianos and organs a lighter, sharper sound that many musicians prefer. Its response also makes it a good choice for separately miking the high frequency speaker cone in a multi-speaker system. The PE54D-CN is also a fine performer—with or without the mellowing A15RS Response Shaper (and transformers when used with the PE54 or PE54D)—when effects or rotating speaker cabinets must be miked.

The PE55 is also a unidirectional dynamic, but offers a response that makes electric pianos sound more mellow. The PE55 is an excellent choice when a smoother, richer organ or piano sound is desired. In multi-speaker systems in which the speaker cones are miked separately, the PE55 does a great job on the low frequency cone.

The PE53 is an omnidirectional dynamic that gives a very smooth overall sound to pianos and organs. Or, use it to pick up the sound from a high frequency speaker cone. It's a very good choice in applications where feedback is not a problem.

Whatever the microphone, the positioning technique is the same as with electric guitars: Locate the exact position of the speaker cone (or cones) behind the speaker grille cloth "by ear," and position the microphone on a floor or desk stand directly in front of it. Then adjust microphone level as necessary.

A Set-Up Trick: When effects or rotating speaker cabinets are used, or when the instrument speaker employs more than one speaker cone, an accessory microphone mixer (such as the Shure M68FC or PE68M) can be of enormous service in setting up a multiple-microphone system. Instead of running the microphone cables directly into the control console, run them into the mixer. You can then run the mixer cable into the console. This gives you individual adjustments on every microphone—and only one line into the console. Once it's set up, it makes adjustments on the microphone a snap.



BRASS

In their competition with super-amplified instruments, horns don't always come across with authority and definition, and the need for miking arises. But simply playing directly into a microphone isn't the whole answer.

The Problem

Trumpets, trombones and other brass instruments pose several problems in miking technique: many microphones will reproduce the horn sound with a hard, cutting sound that isn't always desirable, and with high sound pressure levels, a preamp overload may occur.

Recommended Microphones

To minimize or eliminate the problems of amplifying brass instruments, Shure engineers recommend these microphones:

1st Choice:	Model PE50SP
2nd Choice:	Model PE54D-CN
3rd Choice:	Model PE53V
Optional Choice:	Model PE54D

These microphones all use dynamic elements, which are virtually impossible to overload due to their wide dynamic range. If a bright, biting sound is desirable, use a Model PE54D-CN (or any of the other choices), positioned about a foot or so in front of the horn. However, most performers and soundmen prefer to have the brass sound smoother and more mellow; in this case, two outstanding choices are the Shure Models PE50SP and the PE54D-CN. Both are low impedance microphones whose horn response can be made even smoother with the A15RS Accessory Response Shaper (see below).

When feedback is not a problem or when several horns must share the same microphone, the omnidirectional Model PE53V is an excellent choice. Its wider pickup pattern assures that all horns will be heard, and its sound, most pros agree, is particularly pleasing on brass instruments.

Accessory Equipment

The Model A15RS Response Shaper just mentioned is really a "miracle accessory" when miking brass instruments. It simply plugs in between a low impedance microphone plug and the amplifier input, and very effectively filters the sibilance and "hard edges" of the brass sound. The A15RS is compatible with the PE50SP, PE54D-CN and other low impedance microphones.

The PE53V has a built-in volume control which can eliminate preamp overload.

ELECTRIC & STEEL GUITAR

With the exception of ultra-hard-rock concerts in mammoth auditoriums and at outdoor festivals, the age of the "million-watt" amplifier arrays is all but over. The trend, at least in reasonably sized clubs and showplaces, is to the smaller, often-portable amplifier that cannot deliver the power to cover big areas, but can deliver precisely the "sound" the musician is after. In these many cases, the need to mike an already-amplified instrument arises. Here's how to do it:

The Problems

The only problem a guitarist faces is getting the sound he wants from his instrument speaker — then getting that speaker output directly into the correct microphone. When the microphone used is right for the job, and is properly positioned in relation to the speakers, the sound system will get a good, strong electric guitar sound out to the audience.

Recommended Microphones

For the microphone pickup of amplified guitars, Shure engineers recommend these microphones:

Bass: PE55
Lead: PE54 or PE54D-CN
Steel: PE55 or PE54D-CN

To locate the best position on the front of the instrument speaker for microphone placement (the speaker cone location), simply place your ear at the speaker grille cloth, and turn up system gain — but without touching the instrument. The area with the loudest "hiss" is the area at which the microphone should be aimed. (Obviously, any attempt to mike an amplified guitar on the strings of the instrument would be fruitless.)

The essential response difference between the recommended microphones is that the PE54 and PE54D-CN offer a slight rising response beginning at about 2kHz that gives them a brightness to accentuate higher frequency sounds.

For bass guitar pickup, the PE55 is suggested because it tends to give a solid, definite bass sound that numerous soundmen prefer. Its de-emphasized high end minimizes extraneous string sounds and noises, too.

Conversely, the brightness of the PE54 or PE54D is usually desirable when miking a higher frequency lead guitar. Here, the PE54's emphasize the twang of the strings, and carry the higher frequencies with greater strength and clarity.

On steel guitars, the microphone chosen depends largely on the style of play and sound desired. For a hard, "biting" sound, the rise in response at higher frequencies offered by the PE54's makes them the best choice. If the objective is a more mellow, more melodic sound, the PE55 should be used. (An ideal compromise would be to use the PE54 or PE54D in conjunction with an A15RS Response Shaper and A95D and A95FD transformers. The A15RS would remove the "hard edges" from the steel guitar sound, yet can be quickly unplugged to free the microphone for other vocal or instrumental pickup assignments when required.)

Reminder: When considering whether or not to mike an electric guitar from the instrument speaker, keep one fact in mind:

Much of the sound you've grown to like is due to the unique acoustics of the instrument speaker cabinet. When you choose to run your guitar cable directly into the amplifier of a house system, the resultant sound will not be the same as what you're used to hearing. *If you like the sound of your instrument speaker, stay with it by miking the guitar from the speaker cabinet.*

Music Makers' Mini Microphone Matcher

Recommended Microphones	Placement	Accessories
CLOSE-UP VOCALS **Shure Unisphere Series** 1) Model PE50SP 2) Model PE56D (PE56D-CN) 3) Model PE588 (PE588B-CN)	Less than 6" from entertainer.	Model A61WS Windscreen. **For Overload Distortion** Model A15A Microphone Attenuator (with PE50SP, PE56D-CN, PE588D-CN, PE54D-CN **ONLY**)
DISTANT VOCALS **Shure Unidyne Series** 1) Model PE54D (PE54D-CN) 2) Model PE515 Special Choice: Model PE548V	Greater than 6" from entertainer.	
PIANO **Shure Models** 1) PE53 2) PE54 3) PE54D-CN 4) PE55 5) PE515	Varies with desired effect. **General Rule** Microphone with rising response characteristics near strings for maximum bright sound. Microphone with proximity effect at resonant underside for low frequency response. **Spinets and Uprights** Piano foot well or top of musician's side. **Grands** Use two microphones—one at the string area and one under the piano.	A15PR with PE54D-CN.
FLUTE **Shure Models** 1) PE50SP 2) PE56D 3) PE53 **Alternate Selection** Shure Unidyne PE54D (if the musician prefers a "breathy" sound)	Midway between mouthpiece and first set of finger holes.	A61WS Windscreens (to avoid breath noise).
ACOUSTIC GUITAR & BANJO **Shure Models** 1) PE54D 2) PE54 3) PE53	Aimed directly at center of banjo head or sound hole of guitar, as close to the instrument as practical.	MS-10C Floor Stand. BB-1 Baby Boom. CO-1 For Guitar or Banjo plus Vocal.

Recommended Microphones	Placement	Accessories
BRASS **Shure Models** 1) PE50SP 2) PE54D-CN 3) PE53 (for mellow smooth sound)	About 1 Ft. from horn.	A15RS Response Shaper (PE50SP, PE54D-CN **ONLY**). A15A (for overload) (With PE50SP, PE54D-CN **ONLY**).
ELECTRIC & STEEL GUITAR **Shure Models** Bass: PE55 Lead: PE54 or PE54D-CN Steel: PE55 or PE54D-CN	Aim toward speaker cone assembly in speaker cabinet.	**Steel** A15RS with PE54D-CN.
REEDS & HARMONICA **For Saxophone & Clarinet** **Shure Models** 1) PE55 2) PE54D-CN	Saxophone & Clarinet—Directly above bell.	
Harmonica **Shure Models** 1) PE56D-CN 2) PE588-CN	Harmonica—Microphone should be held so close it touches the instrument.	A61 Series Windscreens. A15RS Response Shaper.
DRUMS **Shure Models** Bass: PE54D (PE54D-CN) or PE515 Snare: PE54D (PE54D-CN) or PE515 Cymbals: PE53	**Bass:** On boom arm as close to outer head as possible. One third of the way between the floor and the top of the drum. Inside drum when outside head is removed. **Snare:** Just off the outside rim, on boom arm coming from the front of the set. **Cymbals:** Above or below the cymbal.	A55M Noise Isolation Mount if a boom arm is not used.
ELECTRIC KEYBOARDS **Shure Models** PE54 or PE54D-CN (for bright sound) PE55 (for mellower sound) PE53 (for smooth overall sound)	Aim toward speaker cone assembly in speaker cabinet.	M68FC and PE68M when more than one microphone is used with rotating speaker cabinets or when more than one speaker cone is amplified.

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