UT FET47

LARGE-DIAPHRAGM CONDENSER MICROPHONE

Owner's Manual

THANK YOU!

Thank you for purchasing the United Studio Technologies UT FET47. We realize how many microphone choices are out there, and we are honored that you have given us a chance. We have done all that we can to exceed your expectations in a quality microphone, in terms of craftsmanship, feel, appearance, and most importantly, sound. We make our microphones not to be good for a price; but to simply be the best we can make them, and to be as good as the best products available. We have scrutinized and labored over not just the major parts; but every component from end to end, as well as the circuit design and mechanics. With proper care, our products should last a lifetime of use and beyond.

CHAD KELLY

United Studio Technologies, LLC.

Baton Rouge, Louisiana USA

PRODUCT SERVICE

REGISTER YOUR PRODUCT

Before we begin, please take the time to visit **www.unitedstudiotech.com** to register your product. To ensure you receive proper and uninterrupted warranty support for your product, please register your unit within 14 days from purchase.

UPDATES TO THIS MANUAL

Occasionally, we may have updates to this manual. All current manuals can be downloaded at **www.unitedstudiotech.com**. For your convienence, every page of this manual displays the version number at the bottom of the page.

SAFETY

Warning: To reduce the risk of electric shock, do not open the device as there are no user-servicable parts inside. **Refer servicing to qualified personnel!**

1. Read and keep these instructions; heed all warnings, and follow all instructions.
2. Do not expose this device to rain and moisture.
3. Clean only with a dry cloth.
4. Servicing is required when the device has been damaged in *any* way.
5. Always connect with a standard 3 pin XLR (male XLR to female XLR) cable that is in good working order.
6. Always fully connect microphone cable on both ends before engaging +48v Phantom Power.
7. Always disengage +48v Phantom Power and give the microphone a few moments to fully discharge before disconnecting the microphone cable.
8. DO NOT pass this microphone signal directly through a TT (tiny telephone, tip-ring-sleeve) or TRS (¼ inch, tip-ring-sleeve) patchbay! A preamp, of course, can be followed by a patch bay; just not a microphone signal.
9. This microphone ships with a silica gel packet. Do not discard it; this ensures that moisture/humidity does not accumulate on the mic capsule diaphragm and that no part of the device begins to oxidize. If the silica package becomes lost or discolored, replace it with a new, good quality silica gel packet.

WARRANTY SERVICE

United warranties this product to be free from defect in materials and workmanship for one year from date of purchase, for the original purchaser to whom this equipment is registered. This warranty is non-transferrable.

This warranty is void in the event of damage incurred from unauthorized service to this unit, or from electrical or mechanical modification to this unit. This warranty does not cover damage resulting from abuse, accidental damage, misuse, improper electrical conditions such as mis-wiring, incorrect voltage or frequency, unstable power, disconnection from earth ground (for products requiring a 3 pin, grounded power cable), or from exposure to hostile environmental conditions such as moisture, humidity, smoke, fire, sand and other debris, and extreme temperatures.

United will, at it's sole discretion, repair or replace this product in a timely manner. This limited warranty extends only to products determined to be defective and does not cover incidental costs such as equipment rental, loss of revenue, etc. Please visit us at **www.unitedstudiotech.com** for more information on your warranty, or to request warranty service.

This warranty applies to products sold in the United States of America. For warranty information in any other country, please refer to your local distributor for United Studio Technologies. This warranty provides specific legal rights, which may vary from state to state. Depending on the state in which you live, you may have rights in addition to those covered in this statement. Please refer to your state laws or see your local retailer for more information.

NON-WARRANTY SERVICE

If you have a defective unit that is outside of our warranty period or conditions; we are still here for you and can get your unit working again for a modest service fee. Please visit us at **www.unitedstudiotech.com** to contact us about setting up a repair or for more information.

With the proper care, your United gear should last a lifetime and provide a lifetime of enjoyment. We believe the best advertisement we can have is a properly working unit being put to great use. Let's work together to make it happen.

CHAPTER 1: NOW LET'S GET STARTED!

1.1 CONNECTIONS AND POWER

The UT FET47 requires 2 things in order to properly function: a 3 pin XLR cable, and 48V phantom power.

The first is simple; plug the XLR cable to the output jack on the bottom of the UT FET47. Then connect the cable to your recording device, preamp, or mixing console. Ensure that the cable is properly working...

Sorry, we had to spell that out.

Engage 48V phantom power on your device. If your device does not provide 48V phantom power, an external, dedicated power supply will be required for operation.

1.2 HARDWARE CONTROLS

The UT FET47 is a cardioid pattern, large diaphragm, transformer-balanced condenser microphone designed for a very wide range of recording studio applications. It's operation is fairly straightforward; and as with any microphone; the more attention given to setup and placement, the better the results will be. The UT FET47 features a high pass filter for eliminating subsonic information such as floor vibration and rumble, and a -10 pad for use in very loud sound pressure situations such as kick drum, amplifiers, and especially loud vocalists.

HOW TO KNOW IF YOU NEED THE PAD ENGAGED?

It is good practice, unless you are certain you will need it, to start without the pad engaged. You will know you need the pad if the signal is distorted, clipping, or 'flatlined' even after properly spacing the microphone from its source. The pad will allow for an additional 10dB of headroom in the amplifier circuit for these situations.

WHEN TO ENGAGE THE HIGH PASS FILTER?

In studio recording, we feel it is usually good practice to record an audio source at 'full bandwidth' and to precisely tailor any band-limiting in the modern workstation. This provides much more accuracy than a single switch on a microphone can provide; and the switch at this point is more a carryover from an earlier time. There are a number of sound sources, however, where one can be fairly sure that frequencies below the switch cutoff frequency are not going to play a major part in the makeup of the audio source, or at least not in the finished (edited/processed) form that the audio track will take. This includes voice, guitar, drum overhead, and possibly some acoustic instruments. This is particularly true of live voice broadcast (podcast, radio broadcast) and narration (books on tape, etc). Because low frequencies have very large waveforms, a high pass filter on the microphone can sometimes reduce the chances of clipping or allow a slightly hotter signal to be captured, without the damage from moving microphone stands, doors, and rumble from nearby traffic, etc.

As a general rule, if engaging the HPF causes no audible loss to the 'body' of the source signal; it is safe to engage. If it does feel that it takes something away, and if the application is professional recording, then best to not engage the switch and tailor the signal at a later point in the process.

WHEN TO USE A POP FILTER?

It is generally good advice to use a pop filter any time you are recording a vocalist. You should always get the best pop filter you can, one that is as sonically neutral as possible. Once you have found the proper distance for spacing a vocalist from the microphone; the pop filter can be set in place to properly maintain that spacing.

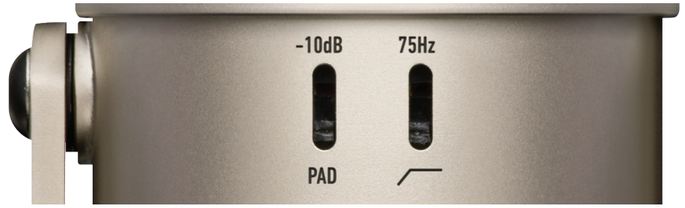


Fig. 1: The UT FET47 control section.

1.3 PROPER SETUP

Because the UT FET47 is a cardioid-only microphone; setting up the microphone is as easy as simply finding the right distance from the sound source and ensuring that the microphone is fairly on-axis (pointed at) the sound source. As a general rule, starting about 12 inches from the source is a good starting point. For particularly loud or soft vocals, you may need to bring the microphone a bit more out or a bit more in, respectively. For sounds with particularly loud transients, such as the beater of a kick drum, a starting position from a bit further out is more advisable. Depending on the application, particularly when used

in a pair for stereo use (drum room, stereo overhead mics, etc), more space may be required in order to capture a proper stereo image.

One useful way to look at microphone spacing, aside from a technique to avoid clipping, is to think of spacing as a continuous ratio between room ambience and source signal. How much of the room do you wish to capture, in relation to how much of the source. If you wish the sound to be a bit more ambient and softened by natural room reflections; a more distant spacing is ideal. If you wish for a more dry, warm, direct, or intimate sound; very close spacing is preferred. As always, this can only be done within the limits of what fidelity allows. The closer you are to a source, the greater the chance of clipping or distortion. The further out you go, the more gain is required and therefore the more noise is added to a signal; and the greater the chance of introducing more unwanted sonic artifacts. It's also worth noting that, as Joe Meek first discovered with close-mic'ing technique; the closer one is to the source, the more dynamics and the more separation from other live instruments the signal will have. Conversely, the further out one goes; the less dynamics and less separation it will have as room reflections tend to smear and even out a signal. Signals recorded at a greater distance tend to need less dynamic control than they otherwise would require. This effect is sometimes referred to as room compression.

1.4 MITIGATING "REAL WORLD" PROBLEMS

While your UT FET47 should provide clean, trouble-free operation in just about any given situation; we'd like to take a moment to go over some real-world problems we've encountered in our combined years of experience, and how best to navigate through them.

NOISE, INTERFERENCE, AND RADIO

Though rare, we've encountered this issue with other microphones in the past. Usually the result of operating near a radio broadcast station or other large antennae. Though sometimes these situations cannot be 100% resolved; they can usually be reduced down to an acceptable level by reducing the amount of exposure the signal path has to the source of interference. This means using the shortest length of microphone cable possible, avoiding the use of audio snakes or in-wall connections; especially if unsure of the length or quality of that wiring. Snake cable with a shared foil shield are the worst of all in this situation; as the foil shields on individual channels can branch out to act as an antenna to pick up signals from the air.

Not all microphone cables are created equal; and if there were ever a case for a very well constructed microphone cable with really low noise and good CMR (common mode rejection), this is one. It's also crucial to ensure the mic cable has a proper and dense enough shield, with 100% shield coverage, and is

terminated properly to pin 1 on both ends. While we don't recommend specific brands here, some general advice is that a braid shield will have small gaps in the shield due to the braid geometry which, though usually OK, in high-RFI (radio frequency interference) environments, are not ideal. A thick woven shield is better, and a shield that is coupled with a layer of foil or conductive plastic is better yet; ensuring total shield protection. Double-shielded microphone cable is the best of all, for high-RFI environments.

BUZZ, HUM, AND GROUND LOOPS

Though rare, microphones along with all electronics can misbehave when not properly grounded. Like most phantom-powered condenser microphones, the UT FET47's XLR pin 1 grounds the microphone chassis and circuit. This pin mates to the pin 1 XLR input of your preamp, console, or recording interface, and from there to the earth ground on the IEC power connector for that device.

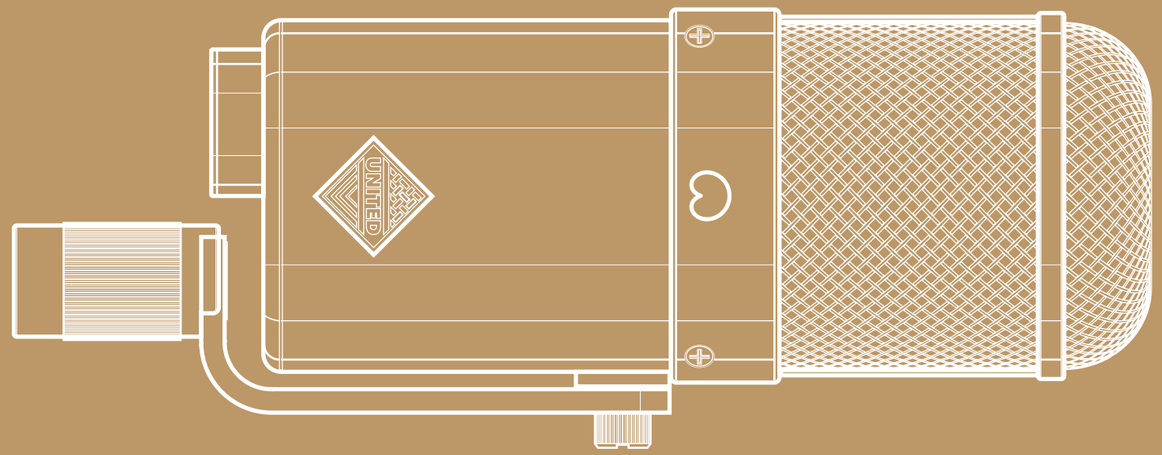
Things become tricky if this device itself does not have a 3-pin standard IEC power cable, but instead uses a 2 pin 'wall-wart' or 'line-lump' supply. In some cases, you may have a small interface which has no power supply, relying on bus power from a computer's USB, firewire, or Thunderbolt connector. This situation is sometimes referred to as 'vicarious grounding', where a ground connection is passed through several devices through various analog and digital cables before finally connecting to the 'house grounding'. Computers, unfortunately, can be a source of significant EMI (electro-magnetic interference). While these situations cannot always be fully remedied, especially with field recording; at least being aware of these potential issues when setting up and selecting equipment can spare you from the worst of these effects.

For instance, if your interface, laptop, preamp, etc. all have no earth ground, which is entirely possible with laptop recording; you may intentionally select a device to connect in the chain that the microphone can ground to. An example of this would be connecting an outboard preamp or other processor to the interface, so long as it has a 3 pin IEC power cable that is plugged in and an audio connection such as XLR or TRS that can connect to the interface. This will 'ground' the interface, even if the piece of outboard gear is not being used in the signal chain. Additionally, well constructed and shielded digital cables, particularly with robust ferrite rings clamped on one or both ends, can help reduce any noise contamination from a digital device into the microphone.

In any case, for safety and good operation, it cannot be recommended that the UT FET47 be operated in a situation where there is no access to earth ground to ground the microphone's pin 1 connector.

CHAPTER 2:
ABOUT THE UT FET47

2.1 **RECREATING A CLASSIC**



Initially

designed as a solid state replacement for the discontinued tube model; the classic FET microphone became a classic unto itself and has remained a workhorse of commercial studios since its initial release in the early 1970's. Known for its well balanced, bold sound and slightly forward mid-range; it became a favorite for outer kick drums, vocals, bass guitar cabinets, and more recently for professional drum sample recording. As the FET version had no vacuum tube or bulky power supply to contend with; it became known as the 'durable' 47 that could be placed in front of high SPL sources without the worry of microphonics.

The classic FET microphone was discontinued after about fifteen years of production, with working or restored models fetching a very high price on the vintage market, and becoming harder to come by. The UT FET47 is our answer to the classic workhorse model; and while we've spared no expense to ensure it stands up to the original, we also worked hard to ensure that this microphone would not be priced outside the budget of most recording engineers. We made our UT FET47 to fill this void in every way but in the price; and just like the classic, to be rugged enough to be passed down from one generation of recordists to the next.

2.2 **A HOLISTIC DESIGN APPROACH**

The UT FET47 represents several years of research and development, to attempt to capture the essence of one of the most beloved classic early solid state condenser microphones and recreate it for the modern recordist. We went through several iterations of PCB design, mechanical designs, capsule design, transformer options, and so on. We worked with the best microphone circuit engineers, capsule engineers, mechanical engineers, and transformer designers — ensuring every step of the way that we maintained direct and personal control over everything that went into our product.

It's a common approach these days to emphasize specific, critical components where a manufacturer placed most of their investment and attention; and not to spend much time on the rest of a circuit. From the onset, we didn't want this approach. Every component in a design affects quality, and a chain is only as strong as its weakest link. We looked at every resistor, capacitor, transistor, connector and switch. We labored over picking the right thin film resistor here or tantalum capacitor there; we sought out NOS (New Old Stock) polystyrene capacitors and FETs just to get the right sound. Everything matters. This is our approach to gear design.

2.3 **THE HZ SERIES MICROPHONE CAPSULES**

In the world of microphone capsules, there truly are two types: handcrafted, and mass produced. At least until now. Handcrafted capsules are artisan-made, one at a time, and costly. They are used in microphones that are made in small numbers, which sell for high prices. Mass produced capsules are cost effective, usually fairly consistent; but sometimes tend not to be as open and natural, or to possess those intimate, larger than life qualities that are difficult to put into words. Some have said that 'mass produced capsules tend to sound mass produced', and we would agree. With very large scale capsule production, it is difficult to maintain a laboratory grade clean environment. Sometimes there are sacrifices made in the quality of brass millwork, the quality of mylar, in addition to suffering from the QC issues which arise from capsules not getting that crucial bit of personal attention (such as particulate residue from the deburring process, ripples in the mylar, inconsistent tensioning, etc.) Mass produced capsules also are not generally tested until they are loaded into a microphone, if even then. Our first challenge in starting a new microphone brand was to overcome this long-standing issue. We were simply not going to take the easy route of using a mass produced capsule. On the other hand, if we went with a handcrafted capsule; we would only be selling a few microphones and at much higher prices.

We worked with acclaimed capsule designer and manufacturer Eric

Heiserman (https://heisermanaudio.com) to develop a commercially produced version of his recently perfected German style dual-backplate K47 capsule. Eric worked with the United team and our capsule manufacturer to faithfully reproduce his capsule. This process was exhaustive, requiring the analysis of everything from the sourced Mylar to the thread types of screws; but after many months and many iterations, we finally achieved what we had hoped for in the HZ Series capsules.

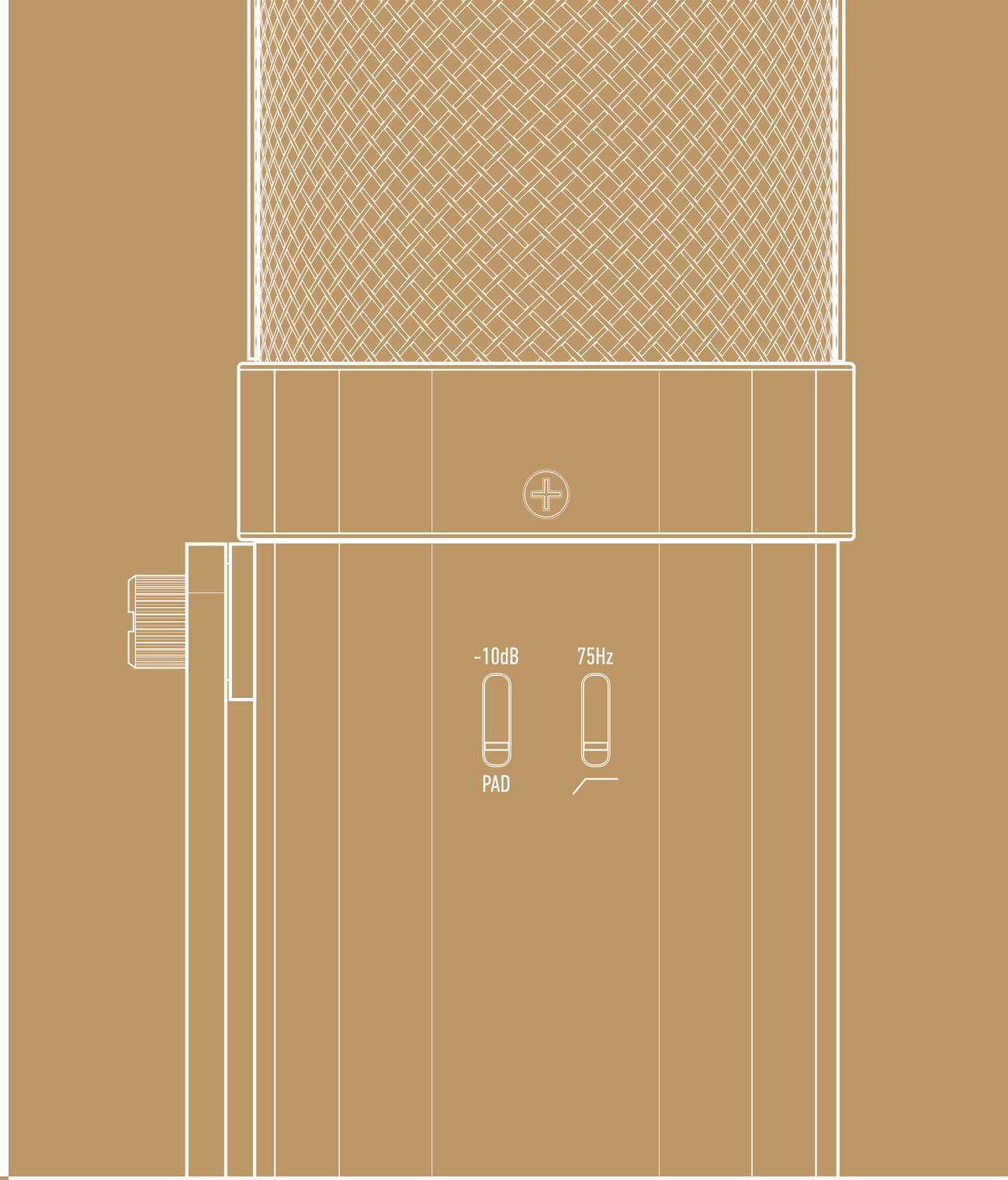
While many of Eric's design secrets will remain so, one superior attribute of the HZ series capsule we can reveal is the use of dual, matched backplates. While traditional M7 and K47 capsules are milled from a solid brass backplate; this hinders the capsule's ability to achieve good side-to-side matching, with variances on one side tending to affect the performance of the other. By milling and then mating backplates which have been measured and matched to one another, a far more accurate and consistent quality from side to side and capsule to capsule can be achieved.

The HZ series capsule is still manufactured only a few at a time, stringently QC'd, listened to, and only are used if they meet both our and Eric's expectations. We believe these capsules offer the best of both worlds; they are clear, big, and three dimensional, without adding sibilance, harshness, or excess brightness and presence. In short, we love these capsules and believe you will too. Because they utilize laboratory grade PET film (Mylar) and are assembled in a clean-room environment, these capsules should provide a lifetime of great recordings.

2.4 **CHOOSING A TRANSFORMER**

We auditioned many recreations of the original German transformer; but quickly settled on a premium offering from Cinemag Transformers in California. Their answer to the classic part is truly a piece of art; a large, hefty transformer made from a 'striped core' of interleaved sets of high nickel and steel laminations, and wound to the specs of the original. While it would have been safer to use a much smaller or less expensive transformer; we simply refused to compromise. You'll be glad we didn't.

Our design approach requires us to never be simply loyal to any one transformer brand or other component brand; but only to achieving what is, to our ears, the best possible sounding end result. To that end; we work with a number of transformer manufacturers. In the case of this microphone; the Cinemag was truly everything we could hope for.



CHAPTER 3: WAXING PHILOSOPHICAL

3.1 ROOM ACOUSTICS

Probably no factor in recording is as important as room acoustics. No matter how good a microphone and other equipment may be; recording in an untreated room is usually a recipe for disappointment. Drums will sound brash and cheap, vocals hollow and cavernous. Reflections from untreated and parallel walls of ordinary homes and commercial spaces create a comb filtering effect that can wreak havoc on audio fidelity, and almost never work in favor of the recordist. Fortunately, these issues can be remedied sufficiently on a home budget and do not require booking time in a professional studio.

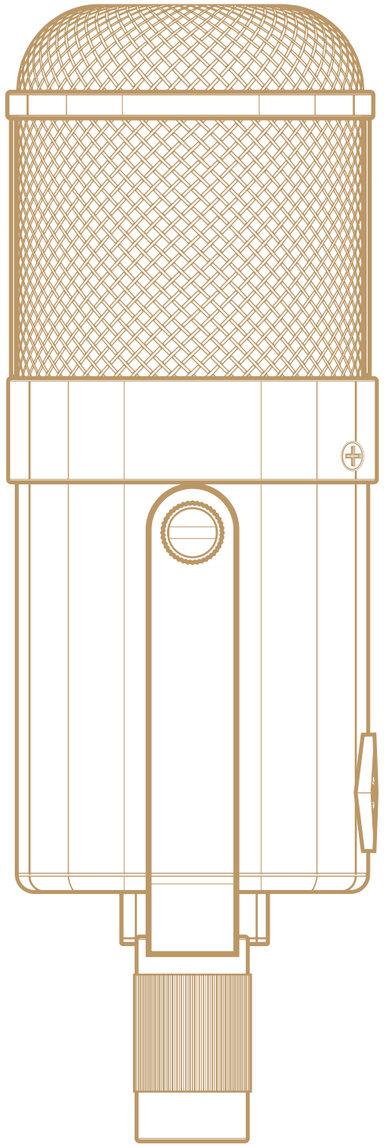
The first solution is to treat the room. There are a number of affordable acoustic panel and foam solutions on the market which do a satisfactory job. It is not necessary to over-treat a room; but the needs of every room are different. It is worth taking the time to research, understand the problems of your room, and decide how lively or deadened you want your room to be. Typically, it is more than sufficient to treat a room with just the minimal needed to make the room sonically neutral. If you can do this, then you will have a room that is acceptable for tracking, editing, and mixing.

The second solution is more localized. If you only plan to record voice, perhaps you don't need to treat the room. Any of various brands of 'vocal shield' or portable vocal baffle will sufficiently decouple the microphone from its rear wall reflections and deliver an amazing improvement to the sounds you are able to capture. This one investment can often make the difference between a recording that sound professional and one that does not; regardless of the quality of microphone, preamp, or interface. The importance of taking a bit of time to isolate the mic from its room reflections cannot be overstated.

3.2 MICROPHONE CHOICES AS AN ARTIST'S PALETTE

One of the joys for those who get to sometimes work or record in a big studio is the great microphone selection that professional facilities often have available. These impressive collections are usually amassed over a long period of time, and often include fine specimens of tube, solid state, transformer-coupled, transformerless, large diaphragm, medium diaphragm, and small diaphragm condensers, as well as dynamic and ribbon microphones. They will usually have both vintage specimens as well as new designs.

For all the expense and grandeur, what this truly boils down to is merely a studio's ability to pick the right microphone for the right application; pulling from a palette of options that range from very dark to very bright, with many many shades in between. Microphones with different pickup configurations



and amounts of off-axis rejection, and microphones with unique textures that may complement a given situation, such as smoothness or warmth. Every voice has a slightly different sibilance range, and sometimes one can find a mic whose presence peak does not emphasize those sibilant frequencies. Some microphones are better for male vocals, some for female. As a general rule, professional producers and engineers tend to pair a microphone to an artist that brings out qualities lacking in the source, or de-emphasizes qualities the source has too much of. For instance, a brighter and thinner voice benefits from a darker microphone which has more girth and body. A deep, powerful voice can call for the opposite kind of selection to help bring out top end and articulation. A microphone with some degree of neutrality usually guarantees that it will work on the widest possible range of situations with good results. These are not hard and fast rules, but generally hold true.

Any great mic locker begins with one mic, and the UT FET47 is an excellent first choice as well as a welcome addition to a more established studio's collection. With its big, fairly neutral sound and slightly forward midrange presence; the UT FET47 is the perfect studio 'workhorse' microphone to use in a variety of ways throughout a session.

CHAPTER 4:
TECHNICAL SPECIFICATIONS

Type	Condenser Microphone
Capsule	HZ Series 34mm all-brass, dual-backplate K47
Diaphragm	Dual-diaphragm, 6 micron, 24k gold sputtered Mylar (PET film)
Power Supply	+48v Phantom Power (via XLR)
Ground	Pin 1 XLR (required)
Frequency response	20 Hz - 20 kHz
Polar Pattern	Cardioid
SPL	136 dB (145 dB w/ Pad) @ <.5% THD
Output Impedance	140 Ω
Amplifier Type	Field Effect Transistor
Self noise	<10 dB (no pad, no HPF)
Output	Cinemag USA transformer balanced, pin 2 hot
Body	Nickel electroplated, solid milled brass
High pass filter	75 Hz (-12dB down point)
Pad	-10dB
Connector	24k gold plated XLR
Mount	Self-contained stand swivel mount adapter
Dimensions	Height: 210mm / 8.2" Width: 69mm / 2.7" Diameter: 63mm / 2.4"

Welcome to the United family!

Don’t forget to register your product
at **www.unitedstudiotech.com**