How to Set Up the Ideal Home Recording Studio



Presented by YAMAHA and PERFORMER MAGAZINE



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HS Series POWERED STUDIO MONITOR



POWERED SUBWOOFER



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How to Set Up the Ideal Home Recording Studio

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Welcome to an informative four-part series that will provide realworld advice for setting up your first home recording studio, copresented by Performer Magazine and Yamaha. In this installment, we'll take a closer look at what to look for when shopping for home studio equipment, especially when it comes to figuring out which components you'll need, how they interact together, and what specs you actually need to pay attention to (and which aren't as important to get started). Yamaha has been kind enough to loan us a number of products from their professional audio range, which we'll be incorporating into our series as we go – including a Steinberg UR44 USB audio interface, several sets of headphones, including the HPH-MT7 (as well as the MT8's) and a pair of their legendary HS8 powered studio monitor speakers. Let's begin by looking at the most important areas of home recording studio equipment.

ANATOMY OF A HOME RECORDING STUDIO SETUP

Recording studios have come a long way since the days of multi-million dollar complexes with 30-foot long consoles and flying faders. It's now possible to record professional-quality albums at home, with gear that costs a fraction of what those old commercial studios paid. With that in mind, let's break down the essential equipment you'll need to get your own home recording studio up-and-running.

HOME STUDIO COMPUTER (CPU)

The computer is the heart of the modern-day recording environment, whether it's a six-figure studio or simple bedroom rig. Our recommendation is to get the most processing power and RAM your budget allows for – trust us, you'll need it. Your DAW and plug-ins (more on those below) have the capabilities to eat up CPU power and memory at an alarming rate. And don't skimp on the sound card (for obvious reasons), if possible. You'll also be well-served to invest in an external hard drive for backup storage in addition to a cloudbased storage system for redundancy purposes (in other words: you've worked hard, so safeguard yourself from lost data!). Another element of the computer setup that many home users neglect, at least to start, is a powerful GPU (graphics processing unit), which may allow you to extend your desktop to a pretty elaborate multi-ple-monitor configuration, if your built-in hardware does not already allow for this. More monitors mean more screen real estate, and if you plan on tracking and mixing a lot of

channels in your projects, spreading them out can make the process a whole lot easier to see at once.

DAW & SOFTWARE PLUG-INS

Great, you've got a tricked-out computer system all ready to go. Of course, the next step is to get set up with a DAW (digital audio workstation), the software you'll be using to record, mix and edit your tracks. Along with your DAW, you should also research what audio plug-ins and software effects you may wish to use for your projects. Plug-ins extend the capabilities of your recording software, and may mimic external hardware devices you're familiar with like modulation effects, guitar cabinet simulators and reverb units.

Your DAW is going to be where you spend the majority of your time during your sessions, so research a few different options to see what's available. The Steinberg UR44 USB audio interface we've set up (more on interfaces below) comes with Cubase AI. Cubase is a popular and easy-to-use piece of software that would make an excellent choice for anyone looking to get into home recording. Arming tracks to record, editing tracks and mixing them together is fairly straightforward, and adding your own plug-ins or using some of the add-ons included in the package is a breeze. As a bonus, Cubase works seamlessly with the entire range of Steinberg interfaces, making for a tightly-integrated recording ecosystem sure to take the hassle out of setting up a studio rig for the first time.

MICROPHONES AND CABLES

Depending on your needs, there are a wide variety of mics to consider for your home studio (dynamic, large diaphragm condenser, small diaphragm condenser, USB mics, etc.) – each of which will require (typically) XLR cables. Increasingly, we are seeing more high-quality digital mics with USB and even Thunderbolt connectors, which makes direct hookup to your Mac or PC (and now mobile devices) a snap. Without quality mics to capture the sound of the instruments and vocalists you wish to record, your mix is doomed from the start. What's the old adage? Garbage in, garbage out...

USB AND THUNDERBOLT AUDIO INTERFACES

Even the best mic in the world is useless if you can't get the sound it picks up into your system. In order to actually get audio (and MIDI) signals into your computer, your guitar cables, DI lines, MIDI controllers and microphone cables all need to go somewhere. That's where an audio interface comes into play. This unit connects your audio and MIDI sources to your computer, typically featuring a combination of mic preamps with analog-to-digital convertors, DI inputs, monitor controls, headphone ports and gain adjustments. We mentioned the Steinberg UR44 above – this USB interface features 4 mic inputs (mic pres), phantom power for condenser mics, front headphone jacks, MIDI in and out, plus rear outputs for powered studio monitor speakers. A setup like this provides everything a home recording studio would need to get started, and as you require more inputs, you can graduate to more advanced systems. But to be-



opposite: Yamaha HS8 monitor speakers

right:

Yamaha Reface CS synthesizer and MIDI controller gin with, a unit like the UR44 is an incredibly powerful and easy-to-use option that will get you ready to begin recording, right out of the box. Just plug in your new interface via USB, configure your DAW to recognize the unit, plug in your mics or instruments and hit 'Record.'

CONTROL SURFACE FOR YOUR DAW

Sure, you can sit there with your mouse and keyboard and try to control your mix "in the box," so to speak, but it's typically easier (and more fun) to feel tactile controls under your fingers. Control surfaces take the pleasure of mixing with physical faders and knobs and turn that into a practical solution for home studios. Control surfaces have come a long way in recent years, and work with most major DAWs and operating systems. If you want to be able to control your sessions in a more traditional manner, your control surface may become

the most indispensable tool in your home studio arsenal. These units don't transmit any audio signals, rather they typically operate by sending MIDI data to your computer that, in turn, tells the on-screen controls what to do. Most units will also enable you to map certain features to some or all of the physical controls, for greater customization of your workflow. Most first-time home recording studios overlook this bit of hardware when first getting set up, and our advice is to not make that mistake.

MIDI CONTROLLERS

If you'll be using virtual (software-based) instruments as part of your setup, investing in a good MIDI controller or synth that doubles as a MIDI controller is going to be essential. The good news is that most audio interfaces and DAWs are already set up to handle MIDI in/out and editing. And if they don't have MIDI I/O

(luckily our Steinberg UR44 does), most modern-day MIDI controllers and synths with MIDI allow for MI-DI-over-USB, meaning you can bypass an audio interface completely and connect directly to a computer. Now, the reason we mention synths is that while you can certainly buy a MIDI controller on its own (say, a MIDI keyboard with a few octaves of range), those devices only do one thing: transmit computer data to your DAW. That's great and all, and you can obviously command entire symphonic performances from such devices, but if your budget allows, it might make more sense to purchase a synthesizer that also can act as a MIDI controller. That way, you get the great sound of the synth in question, plus the ability to use it to transmit and (in many cases) receive MIDI data to and from your DAW. One of our favorite lineups of the past few years is the Reface Series from Yamaha. Consisting of four great synthesizers (our fave be-





ing the Reface CS), each one doubles as a handy, portable USB MIDI controller.

STUDIO MONITORS

What good is mixing a song if you're not hearing it properly? Unlike consumer hi-fi speakers, which often color the sound to make for a more pleasant listening experience, Studio Monitors often offer a FLAT frequency response, which ensures that your mix will sound great on virtually any system. For years, the go-to for home recording studios and commercial studios alike have been Yamahas. You've probably seen the classic white speaker drivers in countless photos and videos. We've been testing out the HS8 8" powered monitors, and the legendary sound Yamaha is known for comes through loud and clear during tracking and mixing. Our recommendation is not to skimp in this area – hearing your mix through pro-level monitors will be crucial when it comes to crafting the right sound for your project. The HS8's offer additional controls for high trim and for compensating for your room environment. These features can make the difference when it comes to producing your project the right way.

STUDIO MONITOR HEADPHONES

Of course, you'll also want to test your mix on headphones, to really hear all the nuances you've created. We recommend a pair of good closed-back studio monitor headphones so you can test your tracks without room bleed and ambient noise leaking through, as you'd get with open-back headphones meant more for hi-fi listening. By now, you probably won't be surprised to find that Yamaha has got you covered here, too - we've been regular users of the affordable HPH-MT7 headphones for more than a year, as well as their big siblings the HPH-MT8's.

> opposite: Steinberg UR44 USB audio interface

above:

Steinberg Amp Simulator

below:

Steinberg Cubase Al project



PART 2

How to Choose the Best USB Audio Interface



this page: Steinberg UR Series interface

opposite: front panel of the Steinberg UR44 USB Audio Interface

WHAT IS A USB AUDIO INTERFACE?

Some of the most common questions we get asked are, "What is the best USB audio interface?" Or, "What's the best audio interface for Mac?" Or simply, "What's the best cheap audio interface?" If you're new to computer-based recording, let's start with the basics: what is a USB audio interface? Put simply, think of your interface as the command center of your recording experience: it allows you to take analog audio signals coming from input sources like microphones, instruments, mixers and other external devices, and convert those into digital signals your DAW (digital audio workstation, or multi-track recording software) can understand and process.

We've focused on what makes the best USB audio interface for good reason. For starters, USB has been a ubiquitous standard on computers since the late 1990s. Most laptops and desktops have at least one, if not multiple USB ports available. Second, USB audio interfaces make great choices for mobile recorders, since they are bus powered; this means that the unit can be powered from your computer, and doesn't require an external power source or brick-style power adapter to lug around. So, if you're recording on-the-go, you don't need to find a wall outlet to power your recording rig – nice! And lastly, for the beginner crowd, USB audio interfaces are typically the most affordable options available, and easiest to set up, offering great bang for the buck.

ENCLOSURE AND FOOTPRINT

The best USB audio interfaces feature rugged enclosures, and will typically offer a small, convenient footprint that won't hog precious desktop space in your new home studio environment. We especially appreciate the strong metal housing the Steinberg UR44 comes equipped with, and the unit itself takes up no more space than your average hardcover book. When looking for the best USB interface for your particular needs, make sure the units you're considering don't have cheap plastic housings. Even if you don't plan on taking your rig on-the-go, one tiny accident can cause some serious damage in more cheaply-made units. Trust us, we've been there.

CHOOSING THE RIGHT NUMBER OF INPUTS

Most manufacturers offer several models of audio interfaces in a range, where the typical differentiator is the amount of inputs the unit has. Here we come to one of our biggest pieces of advice for newcomers, and it may sound counterintuitive. But when shopping for the best USB audio interface, you may not need to gravitate towards the models with the most amount of inputs. Think of your specific needs, and remember what an interface's job is: it takes incoming audio signals and converts those to digital for your DAW. Now, unlike large analog recording consoles, where you typically need a dedicated channel for each track in your session, your interface doesn't work this way. Only purchase a USB audio interface with the amount of inputs you'll likely be recording simultaneously, since the mixing will be done through software. You can mix 64 channels in your opus, but you don't need 64 inputs at once (we hope).

So, if you're a singer/songwriter, you might be able to get away with a simple 2-channel interface, meaning the unit features two microphone preamps that will allow you to simultaneously record a vocal mic and acoustic guitar mic at the same time. Likewise, even if you're in a larger band, four inputs may be all you need at once. Again, your DAW will likely be able to stack your session with as many tracks as you need for the song you're working on (the only restriction being hard-disk space nowadays), but since you're likely not recording 16 tracks at once, don't overspend on your interface if you don't have to.

One thing to consider, as well, is the usefulness of line-level inputs that most good-quality interfaces will have. What this means is that you can route audio from a stereo mixer, for example, into your DAW as a means to record entire live performances, jam sessions or even as a way to get a full stereo drum track with, say, a six-mic setup into an interface that might only have four mic inputs on-board. Just something to think about...

WHY PREAMPS AND A/D CONVERTORS ARE CRUCIAL

Once you've figured out how many total inputs you'll need (including mic preamps, line inputs, MIDI – which we'll get to in a second – instrument inputs, etc.), it's time to really compare specs on the units you're considering. The best USB audio interfaces on the market feature top-end convertors, and the UR44's 24-bit/192 kHz resolution and sampling rate mean that you'll get high-definition audio cleanly into your DAW. 16-bit might be fine for CD masters and even audiophile listening, but recording is a different beast than listening. As you add tracks to your session, you'll want to ensure an ultra-quiet noise floor. So, a higher bit-depth will give you that capability during the recording process, so when you output the finished product for release, you're not encountering any noise issues. And higher resolution means more samples of your music are being taken at any given second, leading to higher quality audio in, and higher quality out.

Be sure to read reviews and look at USB interfaces that have high-quality mic preamps. The UR44 we've been testing comes equipped with four ultra-clean Class-A D-PRE preamps from Yamaha, which we've been incredibly pleased with (especially at this price point). Also, be sure that your interface provides switchable +48 V phantom power for any condenser microphones you have in your arsenal that require it. It would be a real shame to set up your rig only to find out you can't use your favorite mic with your new interface.





IS MIDI I/O STILL IMPORTANT IN 2017?

As more and more keyboard and synth manufacturers start support MIDI-over-USB, the talk has become whether traditional MIDI I/O (input and output) is even relevant anymore. In short, we believe it still is, especially for artists producing beats and manipulating virtual instruments in their DAW. Don't get us wrong, connecting your new MIDI controller right through an open USB port is easy, we admit, but there's the rub. You've gotta have an open USB port, and since your interface is already taking up one of those slots (and computer manufacturers seem to get skimpier and skimpier with I/O each passing year), you might run into issues where you can't record audio and have your MIDI controller working in your DAW at the same time. So yes, we still believe that traditional MIDI inputs and outputs will remain important features when you're looking for the best USB audio interface to suit your application.

Keep in mind, too, that you may encounter a case of GAS (gear acquisition syndrome) that leads you down the path of older keyboards, samplers and controllers that don't feature MIDI-over-USB anyway. In that case, you'll be glad you opted for an interface that still featured standard MIDI I/O. Heck, your stage show may even require MIDI to trigger lighting effects that sync with your music, and you'll be kicking yourself if you've cut corners in this area down the road. That's right, your interface can be a handy live tool, as well!

HI-Z INPUTS MAKE LIFE EASIER

One of the best features we've come to love in recent years is the Hi-Z support we've seen on many modern audio interfaces. Combo inputs now allow for either 1/4" or XLR connections in one spot, such as on the front panel of the UR44, with two of those inputs allowing direct connection of your guitar or bass, without the need for miking a cab or using an additional DI box. In a world where virtual amps, cabinets and plug-ins can offer you any guitar sound imaginable, plugging straight into your interface is a huge convenience (again, even more so for the on-the-go artists who don't want to lug extra gear around, or who don't want to fiddle with mic placement on guitar amps). Hi-Z could be your guitarist's new best friend, especially in home studios where space is at a premium, and miking a loud amp just isn't practical (neighbors, anyone?).

Steinberg has a few VST plug-ins to complement the Hi-Z inputs found on their UR series interfaces, including VST Amp Rack and VST Bass Amp. Amp rack features a complete suite of classic amps, fx pedals, mics and speaker emulators that will enable you to dial in just about any sound to suit your needs, without the need to buy, rent and lug a ton of hardware to your sessions. Likewise, for bassists, the VST Bass Amp also allows you to convincingly recreate tons of desirable tones in your DAW to get the right sound on your bass line with just a single cable going from your instrument to your interface. Simple, powerful, and saves you money. What more could you ask for?



FRONT PANEL MONITORING

The most important aspects of selecting the best USB audio interface for your home studio are typically going to be the quality of the mic preamps, understandably, and the amount of inputs and outputs available for your needs. We understand this, but there are also some "nice to haves" that shouldn't go overlooked in your quest. And some of that has to do with front panel monitoring. Setting the right amount of input gain ensures your audio won't clip going in, and helpful LED monitors on the front of your unit can provide visual cues when you're "in the red."

Of course, another handy feature to look for is easily accessible, and independent, headphone monitoring. The Steinberg UR44 features two headphones monitor outputs, so multiple band members can listen to what's going on at once, with their own dedicated volume settings.

OUTPUT FOR ADDITIONAL STUDIO FUNCTIONS

We've talked quite a bit about inputs, but outputs are just as important when searching for the best USB interface for your studio. The right number of outputs will allow you to extend the capabilities of your interface even further. For starters, you can add an external headphone amp that will allow even more participants to monitor the session as you're recording. Or, you can route audio to external hardware-based fx and processing units, and then back into the interface. There's a lot that can be done with software, but sometimes a nice piece of hardware is just the ticket for getting the right sound on a track.

Additionally, your interface should feature easily accessible "main outs," or "main monitor" jacks to



hook up studio monitor speakers. These are separate from your line outputs and allow you to connect high-quality studio monitors to listen to your recording sessions in real-time.

DAW COMPATIBILITY, OS COMPATIBILITY AND BUNDLED SOFTWARE

With each passing year, the PC/Mac debate and compatibility issues seem to erode even further meaning that most capable USB audio interfaces won't be OS-specific anymore. Those days are thankfully behind us, although you should always check to make sure any interface you're considering can work with all major audio recording platforms. We've used the Steinberg UR44 with the included version of Cubase AI and have found it a seamless process to setup and start recording. But you could use almost any modern audio software as the UR lineup supports ASIO, Core Audio, or WDM standards. The best USB audio interfaces these days even offer support for your tablet, in this case iOS support in the UR44 comes standard and is easy to setup with the Cubasis app and a simple, inexpensive iPad camera connection kit.

That said, it is nice when the interface you're considering comes bundled with useful (key word, useful) software. The Steinberg UR44 comes with Cubase AI (as we've mentioned), a fully-capable version of Steinberg's own DAW as well as a basic fx suite consisting of the Sweet Spot Morphing Channel Strip, the REV-X reverb and Guitar Amp Classics. See? Stuff that you'd actually want to use, not bloatware to make bullet points on the box look appealing in the store.

AND FINALLY, A WORD ON LATENCY

All of this doesn't amount to a hill of beans if you're encountering noticeable lag times when monitoring your recordings. One of the last specs to key in on, and scour reviews for, is how well the interface handles latency. Realistically, at least for our needs, no latency is acceptable, and the UR44 we've been using for the past few weeks offers zero-latency monitoring. Those Hi-Z inputs are meaningless if you're not hearing back what you're playing on guitar in real-time. Even the tiniest discernible lag will throw off your recording and all sense of timing in the performance you're trying to capture. We've used lesser interfaces and have nearly tossed them aside as garbage because they couldn't handle a super-simple guitar line with even the slightest effect on it.

PART 3 How to Mix with Studio Monitor Headphones



MULTIPLE MONITOR SOURCES

To start, why should you bother with a set of headphones at all? One of the first purchases we see many first-time home studio users make is a pair of studio monitor speakers. And that makes sense; you want to be able to listen to your sessions as you're tracking and mixing, and studio monitor speakers are voiced to deliver a true audio response without the coloration of, say, hi-fi speakers.

But there are a few reasons that studio monitor headphones are important. For starters, it's always a good idea to reference your work using multiple monitor sources. What you're hearing out of your speakers might sound great now, but it's important to hear what you're recording through other sources to get a sense of how the music will sound on various playback systems. And of course, one of the most popular methods for music consumption is through consumer-grade earbuds and headphones. So auditioning your tracks through a set of headphones makes sense, not just to hear what the end-user will experience (even though studio monitor headphones are voiced a bit differently than consumer-grade models in most instances), but also because the music will exhibit a different spatial depth when listening on a closed auditory system, like headphones, than an open system (such as speakers moving air in a room). In short, the soundstage will be more pronounced with the sound directed at both ears in true stereo, without the room environment and sound treatment affecting what you hear.

Second, we recommend studio headphone monitoring during both tracking and mixing to hear the subtler nuances of the tracks you're working on. Especially true when layering lots of complex overdubs, it can be more difficult, at times, to truly hear each of your tracks in true separation even through the best of studio monitor speakers, if things are becoming a bit congested in the mix. At times like this, it's especially prudent to reference your work through headphones to isolate any issues that may be causing muddiness or spatial confusion, which we feel can often be done more accurately through a pair of properly-voiced studio monitor headphones.

left:

HPH-MT7w studio monitor heaphones from Yamaha

OPEN-BACK VS. CLOSED-BACK STUDIO MONITOR HEADPHONES

We'll keep this short, while open-back designs might be great for pure audiophile listening, we don't recommend them for home studio use, other than to audition final masters from a listener's perspective. For tracking and mixing, however, we exclusively recommend closed-back headphones that were specifically designed and voiced for studio recording. The Yamaha HPH-MT7's we've tested are an ideal choice for recording. They are voiced especially well for mixing, specifically in the way they are voiced, and are very nicely suited for on-the-go production. The MT8's would be ideal for tracking and more intense critical listening. And the MT5's offer the most affordable entry point to studio monitor headphones without sacrificing quality.

Open-backed designs can introduce unwanted bleed from the room, while in turn also bleeding out audio into the room. Neither is ideal – you don't want any audio seeping into your brain that isn't coming from your DAW and you don't want loud audio from your session throwing off anyone else trying to work in the space. So open-backed designs, at least as far as we're concerned, are a non-starter for the studio.

Of the MT7's, we had this to note in our initial evaluation:

"In our tests, we were pleasantly surprised at the flat response and colorless reproduction the HPH-MT7's had to offer. Too often at this price point, some sort of coloration seeps in and can affect the way you hear your mixes, and ultimately alter the way your tracks sound (and not always in a positive way). Most of the time, we've found that adds up to an increased (and often unnecessary) bass boost. Thankfully, this wasn't the case and these new Yamaha studio headphones offered a "what you hear is what you get" type of vibe, exactly what you want in the studio. Bass was present and clear, without an over-emphasis on low-end frequencies. No mud, no fuss."

STUDIO MONITOR HEADPHONE SPECS

There are some things to consider when it comes to specs. As we've mentioned, our recommendation is to stick to models specifically designed for studio usage, and not necessarily consumer-grade headphones. Many of those models offer coloration to the sound being reproduced, which in a recording or mixing situation, is not ideal. Especially prevalent are overzealous bass-boost "features" that will disrupt the natural bass curve of the music coming from your DAW. Instead, focus on studio monitor headphones that not only feature comfortable earcups and headbands, but also flat frequency responses of at least 20Hz – 20kHz (many higher-end models will offer reproduction at both higher and lower frequencies, and though we won't get into the science of hearing in this article, even frequencies that are technically outside of the audible range for humans can make a difference in what you're hearing) and good sized drivers.

In speakers, drivers will usually be measured in inches (in the United States), but for headphones look for specs of at least 40mm and higher. The larger the voice coil, the more air can be moved, not just resulting in louder volume (your headphone amp will play a solid role in volume, as well), but also the range of frequencies that can be accurately (and that's the key word) reproduced. In plain English, the more accurate the sound, the better attuned to the music you can be when focusing on your session work. Trying to mix or record in an environment where you're not hearing back a true representation of what you're laying down in your DAW can have disastrous effects on all aspects of your project, most notably in over- and under-compensation in both high and low ends of the spectrum. The last thing you want is to boost all the highs only to find out they were fine all along, you were just using lousy headphones and now your tracks are entirely too bright and trebly.

THINGS TO LISTEN FOR DURING TRACKING AND MIXING

Again, listening to multiple sources will give you a better overall perspective and understanding of what's going on in your music. When it comes to headphone monitoring, there are some specific items to note. To start, headphones allow you to really isolate the stereo imaging you've created in your tracks. Having both the left and right channels directed at each individual ear in isolation can make for perhaps an unnatural, yet revealing study of how you're placing instruments in 3D space. Issues with panning and stereo placement can become instantly evident (even sometimes exaggerated) when listening back through proper headphones, and corrected efficiently before mastering.



above: Yamaha SessionCake

> Second, you'll be able to more faithfully tune into quieter passages and layers that have been more buried in the mix. Is that synth part audible enough in the bridge? Does that acoustic guitar need to be panned in the verse so it's not competing with the piano that's dead-center? Or should we double a vocal line here where it's sounding a bit thin? Choices like this can often be made more intelligently after referencing the track through speakers first, then headphones to isolate things in a more distraction-free manner.

HEADPHONE AMPS

Until now, we've been dealing with headphones in isolation. But they need to be plugged into something to work, right? And you might find yourself in a situation where more than one person needs to hear what's going on at once. That's where headphone amps come into the picture. Now, your audio interface will likely offer monitoring options either on the front panel (if they're smart) or on the rear. But if your interface only has one headphone port, you may want to look into a dedicated studio headphone amp designed specifically for recording needs. These devices will often offer very clean power and multiple outputs and independent volume controls – meaning you can have several people listening in at once, each with their own settings.

One especially interesting product worth mentioning briefly is the new Yamaha SessionCake. With this device, you can daisy chain multiple units together for mobile, impromptu sessions that can be recorded to an iOS device or even affected by apps on your phone.





left: HS Series studio monitors from Yamaha

HI-FI SPEAKERS VS. STUDIO MONITOR SPEAKERS

What good is mixing a song if you're not hearing it properly? Unlike consumer hi-fi speakers, which often color the sound to make for a more pleasant listening experience, Studio Monitors typically offer a FLAT frequency response, which ensures that your mix will sound great on virtually any system. For years, the go-to for home recording studios and commercial studios alike have been Yamahas. You've probably seen the classic white speaker drivers in countless photos and videos. We've been testing out the HS8 8" powered studio monitors, and the legendary sound Yamaha is known for comes through loud and clear during both tracking and mixing. Our recommendation is not to skimp in this area – hearing your mix through pro-level monitors will be crucial when it comes to crafting the right sound for your project. The HS8's offer additional controls for high trim and for compensating for your room environment. These features can make the difference when it comes to producing your project the right way.

SIZE MATTERS

Home studio spaces can be a tight squeeze and we know budgets can be even tighter; still, we don't typically recommend speakers with woofers under 5" for best results. Now while there are some surprisingly decent studio monitors equipped with 3" main woofers, the first thing you're going to sacrifice with smaller speakers is frequency range and any sense of deep bass. And if you're not hearing as much of the spectrum as possible, you're missing out on nuances in your recordings that could come back to bite you when it comes time to mix or master your work.

Now, most mere mortals can't technically hear above 20kHz, but many powered studio monitors are "extended range," meaning they are capable of reaching 30kHz or even higher. Why does this matter? Because even though you might not be able to "hear" extreme sounds (the same goes for ultra-low bass frequencies), believe it or not your brain might be able to actually "feel" some of those waves. And there have been studies on the emotional response to music with frequencies above and below our "normal hearing range" cut out and/or added in. We don't have time to dissect psychoacoustics here; the key takeaway is the larger the speaker cone, the wider the response. So, an 8-inch woofer, like those packed into our HS8 monitors, will be able to reproduce deeper bass (down to 38Hz) than a smaller 5-inch model in the range (the HS5, which can reproduce sound accurately only down to 54Hz).

Your budget might dictate, to an extent, the size of the studio monitors you choose, but if you plan on tracking/mixing deep electronic bass or even gut-punching metal, try to go for the biggest models that fit your wallet and studio space.

If you absolute cannot afford, nor have the desk space for, larger studio monitors, you may wish to add a subwoofer down the line to help handle some of the lower frequencies based upon your cutoff point.

PASSIVE VS. ACTIVE

As with PA speakers, you're typically not going to be running into many passive home studio monitors, meaning speakers that do not require power to operate. Powered speakers are much more common in the home studio realm, and typically will not only come with their own clean power amplifier built into the system, but also some additional controls that passive speakers simply cannot or do not offer. Just be aware that you'll need an available power outlet in your studio rig to accommodate studio monitors.

KEY SPECS AND FEATURES

Aside from woofer and tweeter size and frequency response, there are a number of key features to the HS Series speakers that make all the difference in quality, and are some things you should keep an eye out for when you're running down the spec sheet. For starters, powered monitors need a high-quality amp to drive the speakers cleanly (you don't want clipped, distorted sound, do you?), and the HS8's come equipped with a bi-amp design with separate dedicated amps for both the woofer and the tweeter. One of the benefits to a high-quality amp is that it will deliver consistently flat responses across the spectrum. Be wary of monitors that don't disclose their amplifier types or specs.

Next, take care when choosing speaker enclosures (the actual material the "boxes" are constructed from). The HS Series is built using a dense and resilient MDF material, which is perfect for reference-quality playback due to its inherent ability to dampen acoustic response. Bottom line, the enclosure can be responsible for eliminating (or at least helping to reduce) acoustic issues, rattling, and problem-child resonances that lower-quality monitors may suffer from.

So far, we've taken a look at the box, the amp and the actual speakers, but what about the connectivity? Powered studio monitor speakers aren't going to have standard speaker wire terminals like your stereo; rather, they will likely accommodate balanced XLR or 1/4" inputs. It's crucial to match the inputs on the studio monitors you're selecting with the outputs available on your audio interface. If the monitors you're looking at don't have XLR inputs, but for some reason that's the only available output type on your interface or console, it's time to make another choice. Thankfully, the HS8 monitors we've been running offer both XLR and 1/4" inputs for flexibility.

And lastly, look for extra sound-shaping capabilities and other adjustments that will help tailor your monitors to your specific acoustic space. For example, the HS8's offer



room control capabilities as well as additional hightrim features to help tame frequencies in your room. You want the most accurate reproduction possible, so these high-end features can make all the difference in a home production.

HOW TO POSITION STUDIO MONITOR SPEAKERS

We'll defer to Jay Frigoletto, expert mastering engineer with Mastersuite, who's written on the subject in-depth for Performer:

"A common technique is to arrange monitoring on an equilateral triangle with one point being the listening position and the other two points being speakers aimed at the listener at 60° angles. Symmetry is important. You don't want to be twice as far from the left wall as the right, or rotated with one speaker farther from the front wall than the other. Try to keep some space between speakers and walls. Direct sound, following a straight path from speaker to ear, mixes in undesirable ways with reflections from nearby surfaces such as walls, tables, and mixing consoles.

The reflected path, from speaker to wall to ear, is longer than the direct path, resulting in a copy of the sound arriving just after the original. Sound is comprised of alternating higher and lower pressure, or in electronic transmission, positive and negative voltage. When a delayed signal combines with the original, one may be cycling positive, and the other, negative. These energies work against each other, reducing level at certain frequencies (destructive interference). Both signals being in a positive cycle results in reinforcement at some frequencies (constructive interference). Neither case is welcome because it changes the frequency response of the sound from your speakers.

The easiest way to determine placement of treatments to absorb early reflections is to grab a mirror and enlist the help of a friend. While you sit at the listening position, your friend places the mirror flat on the wall, moving it until you can see a speaker. Center your treatments there. Sound and light travel in waves and reflect in similar ways (angle of incidence equals angle of reflection), so the mirror shows the first reflection paths from your speakers to your listening position. Ceilings, floors, and consoles also can be a source of unwanted reflections."



right: the "monitor triangle" diagram

A QUICK WORD ON BASS TRAPS

Again, we'll let Frigoletto address proper setup in your home studio:

"Low-frequency absorption, or bass trapping, is essential in small rooms, and acoustically speaking, any room in a house is a small room. Standing waves are a particular case of constructive and destructive interference between parallel walls causing certain frequencies to either ring or all but disappear at specific locations (anti-nodes and nodes). One node will exist exactly half-way between the front and back walls, so it's best to have your listening position in front or behind the half-way point.

The poor bass response in un-trapped rooms contributes to many home studio mixes having problems in the low end. If you are missing bass at your listening position, you're probably in a node. It may seem counter-intuitive to trap bass when you don't have enough, but that's exactly what to do. The missing bass is caused by sound bouncing between two walls, with the low pressure in one direction combining with the high pressure in the other, thereby cancelling each other out. If you trap the bass, it won't bounce back, eliminating the cancellation and restoring an even bass response.

The simplest bass trapping is a thick porous absorber in the corners or on the back wall, often called a "super-chunk." The classic material for these and many other absorptive treatments is Owens Corning 703 semi-rigid fiberglass boards in a frame covered with Guilford FR-701 fabric. The thicker the panel, the better the low-frequency absorption. Leaving a small space between panel and wall also improves low frequency performance. Four-inch panel depth gets you into the lower mid-range, but for real bass trapping, you'll need it to be several times thicker."

CLOSING THOUGHTS

We hope this installment has helped guide you on your way to setting up studio monitors for optimal recording and mixing in your home studio. Keep in mind that this series is aimed primarily at the beginner home studio user in an effort to dispel common myths about home recording, and to make the entire process much less intimidating than it might seem at first.

Head to https://usa.yamaha.com/products/proaudio/ index.html to learn more and to find the products that will fit YOUR home studio needs.



left: HS Series High Performance Amp Unit