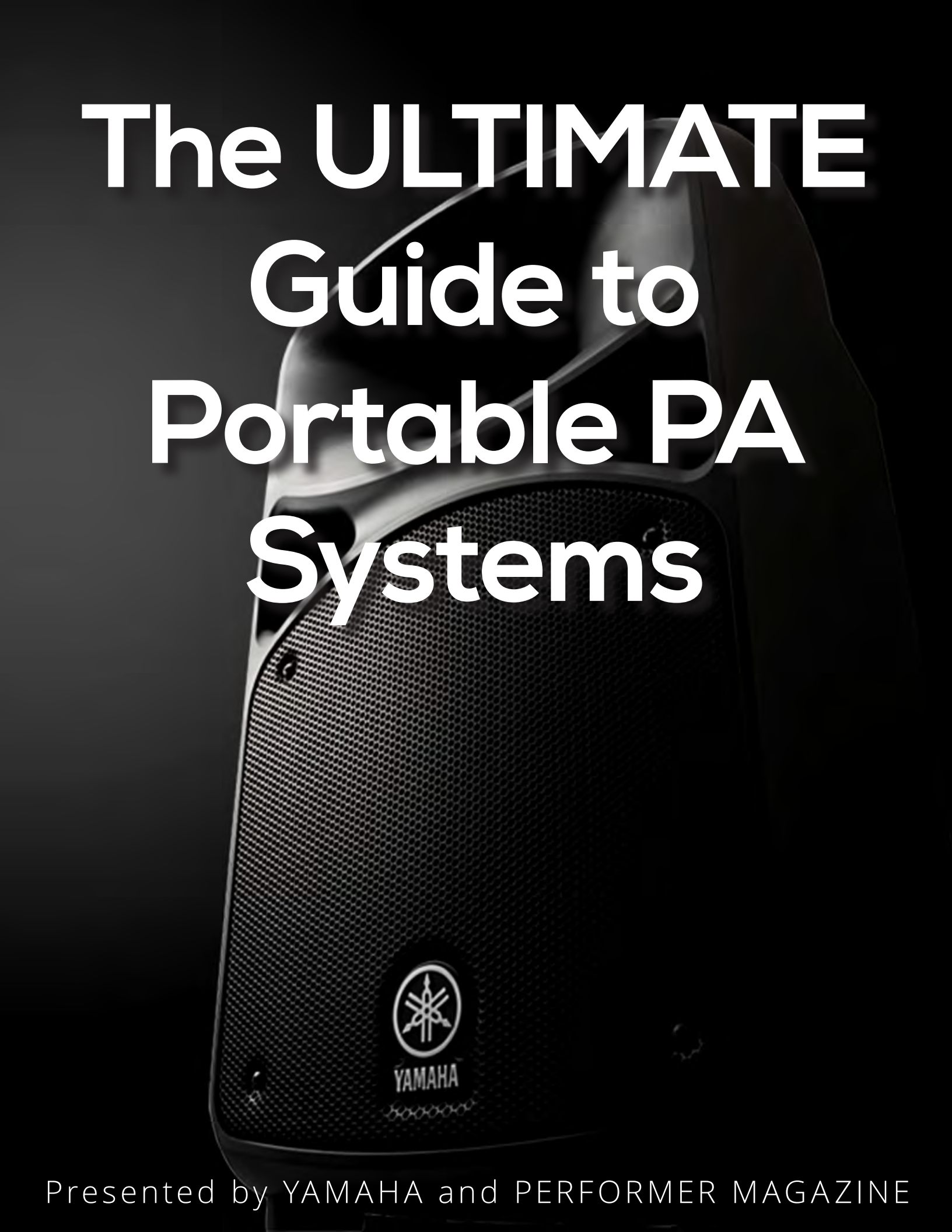
The ULTIMATE Guide to Portable PA Systems



Presented by YAMAHA and PERFORMER MAGAZINE


All the World's
YOUR Stage.
When it comes to portable live sound solutions, it just doesn't get any better than STAGEPAS. With more power, more features, improved functionality, and even better sound, Yamaha's new all-in-one PA systems continue the STAGEPAS legacy of providing everything you need to transform any environment into your own stage.
PORTABLE PA SYSTEM
STAGEPAS

TABLE OF CONTENTS

Performer Magazine
www.performermag.com
Twitter: @performermag
Facebook: @performermagazine
Instagram: @performermagazine

Yamaha
www.yamahaproaudio.com
Twitter: @yamahamusicusa
Facebook: @yamahamusicusa
Instagram: @yamahamusicusa

SECTIONS

PART 1

What is the Best Portable PA System For Your Band?

Welcome to a four-part series that will provide real-world advice about portable PA systems, co-presented by Yamaha and Performer Magazine. In this installment, we'll take a closer look at what makes up a portable PA system, what makes the best portable PA system for your band, and what features of a portable PA system are most important when choosing the best model for your needs. 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 the new STAGEPAS 400BT, a powerful portable PA system with Bluetooth, and its sister units the STAGEPAS 400i and STAGEPAS 600i. Let's begin by looking at the basics of portable PA systems and some of the features to look for.

WHY CHOOSE A PORTABLE PA SYSTEM?

The big question for most bands is: "Do I need to purchase my own PA system?" In our opinion, especially in today's DIY climate, the answer is absolutely yes. While most traditional live music venues will have their own house sound systems, we find that more and more solo artists and bands are playing an increasing amount of non-traditional venues, such as fairs, street performances, coffee houses, house concerts, private and corporate events, and many other live gigs where a full PA system and sound engineer are not typically provided.

So, in those instances, having your own PA system, and more importantly, a PORTABLE system that can be loaded in, set up and torn down quickly, is a must-have. In most instances, a portable PA system consists of a compact mixer and two PA speakers that are designed to work together as a cohesive unit. Most of the time, they are built in such a way that they either fit together when not in use for easy carrying, or into a custom-built case/enclosure that also aids in easy travel. So, what sorts of features should you pay attention to when searching for the best portable PA system for yourself or your band? Let's start with the "portable" aspect of these products...

SIZE, WEIGHT, AND TRUE PORTABILITY

A true "portable" PA system should

be lightweight and offer a compact mixer and speakers that are engineered to work together. The beauty of today's portable PA system is that not only have they been designed to work as a cohesive sound system, but neat design tricks have been employed to make them truly portable, which used to be code for, "Hey, it fits in a van, so we can get away with calling it 'portable.'"

Take the STAGEPAS 400i, which we've tested in the past, for example. The entire configuration, including the mixer and two speakers, can easily fit in the trunk of a compact car, or the front seat of a sedan. Now, that's portable. Furthermore, the entire setup weighs under 40lbs total, meaning loading in and out of a gig is a breeze. It also only requires one person to move the entire setup, mixer and speakers, into and out of a venue, which is great if you don't have a road crew assisting for smaller gigs. And finally, the design team at Yamaha has cleverly devised a way to fit the mixer into the speaker enclosure for ultimate portability. Set up, even for a novice who's never had to put together a PA before, takes under two minutes in our tests.

POWER AMPLIFIER

So, you want a portable PA system that's truly portable. Check. Next up, we should talk about power. Conventional wisdom would dictate that the more watts, the louder the system. And while that's technically true, doubling the wattage of a PA system, for example, doesn't simply double the volume level, or decibel output.

And while that's a more complicated topic for another day, increasing the power of the amplifier section of your portable PA system will have one key feature that you'll be able to benefit from right away, and that's clean headroom. The more power your system can produce (for example, the STAGEPAS 600i has a max output power at 4 ohms of 680 watts, 340 coming from both left and right channels), the cleaner the sound will be when pushed at higher volume levels. And for gigs with big crowds where you need to max out the volume, you'll be thankful you spent the extra dollars when your band's not clipping or distorting during your set. There's nothing that leaves a worse impression with a crowd than an act with lousy sound.

MIC INPUTS, PHANTOM POWER AND HI-Z

For solo artists and singer/songwriters, the number of inputs might not be such a big deal. But if you start playing with an accompanist (say, for wedding gigs), or expand to a full band down the line, you'll want a portable PA system that offers flexibility. And that doesn't just mean more XLR mic inputs, it also means more kinds of inputs. Picking a portable PA that features a mixer with just the right number of mic inputs for your current situation might be limiting down the line. So, look for additional features that could come in handy, depending on the

opposite: Yamaha STAGEPAS mixer (close-up)
right: Yamaha STAGEPAS mixer snapped in place

types of shows you'll be playing (and setting up sound for), in the future.

You may only have a handful of dynamic mics now, but you could expand your live rig to include some nice condenser mics down the road. And in that case, choosing a portable PA system because it's cheap, may come back to haunt you. Make sure you have phantom power (usually indicated by a +48v label) on board to be able to handle these types of mics now and in the future. Also, be sure the systems you're looking at have hi-z inputs or switches, that will allow you to connect instruments with passive pickups (acoustic guitars, electric guitars, basses) without the need for an extra DI box in the chain. Sometimes going direct through the PA makes more sense for an application than hauling additional amps and mics (especially for small, non-traditional spaces where space is at a premium). Thankfully, the STAGEPAS lineup features at least 8+ channels in its mixer, phantom power and hi-z switching for direct needs.

ON-BOARD FX

Depending on your needs, built-in effects may or may not be crucial to your portable PA checklist, but we've found through our own testing that the digital effects being included in today's mixers blow away those included just a few short years ago. In other words, if you've dismissed onboard effects in the past, it might be time to re-evaluate. Again, if you're going with a portable PA, it means you're in charge of your own sound for the evening, so having a touch of reverb at your fingertips (or via footswitch like with the STAGEPAS lineup) can be a handy tool for giving your sound a little extra life.

Another nice touch that we've found with the STAGEPAS lineup (and sometimes on more high-end units) is feedback suppression. This is accessed via a simple pushbutton on STAGEPAS models, and in our tests virtually eliminated all unwanted (and clichéd) feedback on our test stage. Another excellent feature to put on your checklist when it comes time to make a purchase decision.

BLUETOOTH CONNECTIVITY

Bluetooth connectivity might not sound like a necessity either, depending on your current setup. But more and more manufacturers are adding Bluetooth capabilities to their portable PA lineups.

It enables solo artists, for example, to wirelessly stream backing tracks from their smartphones or tablets without the need to take up another line input on the mixer. You can also stream music between sets through the PA while on break.

SPEAKERS AND OUTPUTS

Of course, a portable PA system isn't worth a darn if the included speakers aren't high quality. Now while that goes without saying (yeah, we said it anyway), one thing a lot of bands and artists overlook in the speaker department is "throw" and coverage. Basically, these terms refer to how far the sound will carry and in what direction, and how much of the crowd (or what angle of coverage) will be taken care of by both the left and right speakers working in tandem. Look for the widest coverage and throw you can, as this will ensure that the entire audience is hearing your set, and not just those lucky enough to be directly in front of the speakers.

Another aspect of portable PAs that often goes overlooked is additional outputs (not just speaker mains). Having extra outs on your mixer will enable you to have the flexibility of an installed PA system, like you'd find at a traditional rock club. This means adding floor monitors and potentially subwoofers to expand the capabilities of your system, if you have the space and your needs require these for the type of gig you're playing. What's cool about the STAGEPAS 400BT we've been using is that adding a powered sub automatically assigns a high-pass filter to the STAGEPAS speakers without any additional futzing around.

And lastly, if you're able to shop in-store as opposed to online, really take a good look at the enclosures and speaker grilles before you buy. The STAGEPAS systems are really rugged and can take a fair amount of abuse while on the road (we've lugged ours around town in the back of cars and SUVs and they've held up perfectly to all the bumps and potholes a New England winter can throw at them).

CLOSING THOUGHTS

Now, keep in mind these are the basics you'll need to get started when choosing the best portable PA system for your band. Head to https://usa.yamaha.com/products/proaudio/index.html to learn more and to find the portable PA products and accessories that will fit YOUR band's needs.

Continue reading the following pages for the next parts of the series that will focus further on setting up a portable PA for your next gig, mixing house concerts and non-traditional venues, and pro tips for mixing vocals with singer/songwriters.

opposite:
STAGEPAS compact mixer (full view)

below:
STAGEPAS speaker used as wedge monitor

PART 2

How to Set up a Portable PA System

this page: complete STAGEPAS portable PA system with speakers, mixer and cables

opposite: basic setup diagram

GETTING STARTED WITH YOUR MIXER

Since sound travels from your microphones and instruments to the mixer first before anything hits the speakers, we'll start there as our first set-up point.

To start, remember safety first. Now, while you probably won't cause damage to most modern solid-state gear by plugging it in with the power switch already engaged, why take the chance? Make your connections first, then turn on the power.

The good part here is that since you're working with an integrated system that was designed to function together, the hookup between your mixer and speakers should be simple. In most cases everything should be clearly labeled, come with the necessary cables and the connections between your mixer output and speaker inputs will match since they were designed that way. If you'd purchased a separate mixer and PA speakers, you would have had to make sure that both featured the same types of connections. For example, a mixer with only balanced XLR outputs and speakers with 1/4" inputs aren't going to work together.

But again, portable PA systems are designed to match, so you're in the clear. Make sure your vocal mics and instrument mics are plugged firmly into the appropriate channels of the mixer with quality XLR cables, and that phantom power is engaged for any condenser mics that might require it. The STAGEPAS models

we're featuring also have Hi-Z inputs, which are super handy for plugging guitars and basses (high imprudence sources) direct without the need for additional DI boxes. Just push the Hi-Z button on the channels that support it to engage the proper connection.

Now you can power everything on.

SOUND CHECK

With all of your instruments and vocal mics routed through the mixer, it's time to get a level check. The nice part of the STAGEPAS lineup is the addition of a master volume level. If you're coming from the guitar world, you may be familiar with the master volume feature of your amplifier. For small to medium gigs, or performances where other audio sources still need to be audible (conversation at a wedding gig's cocktail hour, speeches at corporate gigs, etc.), it can be handy to be able to keep the overall volume limited, while adjusting individual channel volumes to taste.

Each channel of your mixer will have usually its own overall volume control (typically at the bottom of the channel strip either via a fader or knob) and additional EQ parameters as well as fx settings. You may also find that you have global settings on your mixer that apply to all active channels, such as additional fx, reverb, feedback suppression and more.

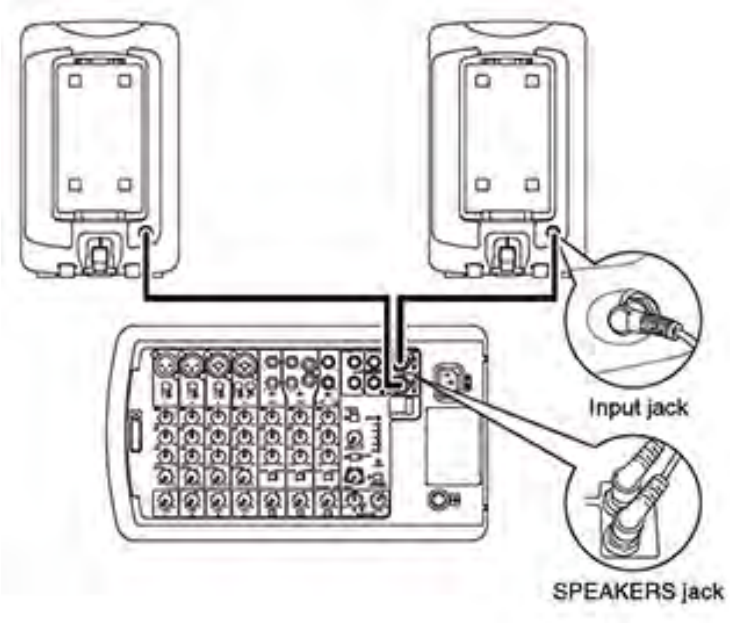
NECESSARY SETUP ACCESSORIES

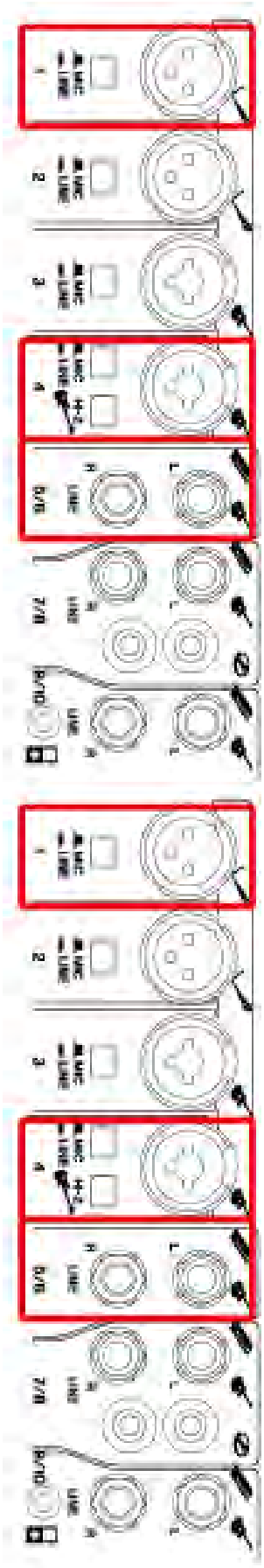
One of the nice things about portable PA systems is that the mixer is typically compact enough to travel well (hence "portable") but oftentimes this means that finding a place for it on stage, from a logistical standpoint, can be a challenge. Luckily, many manufacturers provide handy mounting solutions that alleviate this problem, and allow you to control the mixer easily during performances without the need to "MacGuyver" a solution. We've been using the Yamaha M770 mixer stand during our tests, which makes things super-simple.

Another handy accessory you might want to add to your set-up process is a function-specific footswitch. Now, while not all portable PA systems come with this capability, our STAGEPAS 400BT allows you to use the optional FC5 footswitch for controlling reverb. In fact, the same footswitch doubles as a sustain pedal for your synths, so if you already have one for your keyboard, give it a try with your STAGEPAS to see how well it controls reverb with the gentle press of your foot. You might be surprised at how useful a feature that can be on stage, on-the-fly.

BLUETOOTH PAIRING

The last setup duty you might want to take care of before the gig starts is to pair your Bluetooth device with your portable PA, especially if you plan on streaming backing tracks or "break music" during your intermissions. Typically, the device you're streaming from will be able to locate your





portable PA system automatically when Bluetooth is enabled in your device's settings, so set up should be a breeze. STAGEPAS also lets you pair up to 8 devices, so all of your band members can pair their devices.

Pairing is pretty straightforward – hold down the Bluetooth button for a moment to arm STAGEPAS for pairing. The Bluetooth light will start flashing at this point. Enable Bluetooth on your device, if you haven't done so already, and select your STAGEPAS model from the device list on your phone or tablet. Once you've finished pairing, the Bluetooth light on your STAGEPAS will remain steady.

Once you're paired, the process for connecting your device the next time you want to use it is just as easy. Press and hold the Bluetooth button for a second, the Bluetooth LED will flash, and you'll select your STAGEPAS model from the device list on your phone or tablet. Depending on which STAGEPAS you are using, Bluetooth signals will route to either channels 7/8 or 9/10.

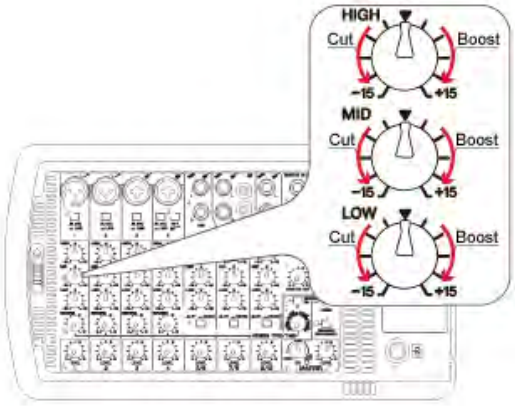
PRO TIP: If you're using a phone for music playback, you can put the phone in airplane mode to eliminate the annoyance of alerts and phone calls for your audience.

We've spent the majority of this installment talking about the mixer, but sufficient time should also be spent positioning your PA speakers for the best sound depending on your particular venue. A general rule of thumb is that the main PA speakers should be higher off the ground than the tallest audience member. So, a good 6-8 feet high is a general starting point. You want the sound to project to the rear of the venue, and not be blocked by audience members if the speakers are placed too low off the floor. You also want high-frequencies to be able to travel, as opposed to being absorbed by physical objects in their way.

Even though you're using a portable PA sys-

tem, you should still have industry-standard mounting options available. The STAGEPAS units, for example, are all easily pole-mountable. We've got our up on sticks, and have even used them as wedge monitors. Even better, they feature StageLok connectors, which ensure that your speakers are mounted quickly and securely, and aren't going to change positions once they're set-up.

The nice thing about a portable PA system is that total set-up time can be under 2 minutes once you're got the hang of things. And since most systems, like STAGEPAS, are designed for ease-of-use, it's really just a matter of making the connections, adjusting your mix, and positioning the speakers for the best sound possible.



PART 3

How to Mix Sound for House Concerts and Non-Traditional Venues

Before we begin, let's define house concerts for those who may be unfamiliar; house concerts are, as the name implies, live performances typically booked at a residential dwelling. Now, if you haven't been hip to the house concert scene before, there are lots of benefits. House concerts typically pay (both in terms of financial compensation and oftentimes meals/lodging), they can be promoted easily by the host to a wide network of friends and potential attendees, they offer a great opportunity to sell merchandise to a captive audience, and afford performers the ability to "fill in" off-dates on the road during larger tours. The only downside, however, is that they rarely come with their own sound system, which is where the portable PA system fits in perfectly. We've come to know many artists over the years who continually book (and make a living off) house concert tours with nothing more than a vehicle, a guitar, and a portable PA system.

SO, DO YOU REALLY NEED A PORTABLE PA FOR HOUSE CONCERTS?

In short, yes. We've had first-hand experience attending such events without the benefit of PA systems, and the results have been less-than-ideal. For starters, house concerts typically appeal to acoustic-based singer/songwriters and solo artists, which means that without a full, amplified band, it might be difficult to hear the performance optimally (or the overall sound might be a tad thin) if it's entirely acoustic with no vocal mics or instrument amplification.

You may start out booking house concerts thinking that just an acoustic guitar and your voice will be enough to fill a small space, but when you begin stacking the odds against yourself with rooms that weren't acoustically designed or treated, outside noise, chatter amongst guests, and you can quickly see why a portable PA system is a sound investment for anyone thinking about joining the circuit.

In addition, it lends an air of professionalism if you are able to provide a quality sonic experience; word of mouth is very important in future bookings and recommendations in the house concert and coffeehouse communities.

Flexibility. A portable PA system enables even the most intimate gigs to be more flexible by providing additional inputs for things like guitars (via Hi-Z ¼" jacks), small keyboards or synths, vocals and backing tracks. Don't just think of what your current solo show might look like: future-proof it.

Improved sound. Running all of your music through the PA enables you to fine-tune the mix, even if the instrumentation at smaller gigs is sparse. This can make all the difference in the world. An audience struggling to hear vocals over your acoustic guitar strumming or synth pads will be less likely to recommend you to friends, buy merch, or see you again in a more traditional, larger ticketed venue.

Backing tracks. Even if you're hitting the stage (so to speak) as a solo act, there's no reason you can't bring some backing tracks with you to round out the accompaniment. Some might frown on this, but we don't see the big deal. A portable PA will often include line-level stereo inputs for traditional stereo devices (if you're using old school CDs) and models like our STAGEPAS 400BT have onboard Bluetooth integration, so you can stream backing tracks right from your phone or tablet during the set.

Built-in fx. Just because you've booked a small, solo gig doesn't mean the sound has to be dry. We really appreciate the musical, digital reverb options available in the STAGEPAS lineup. Adding a touch of reverb to vocals in a room that offers no natural reverb is an easy way to tastefully "thicken" the sound without a lot of fuss. In fact, the digital reverb functionality included with the STAGEPAS portable PA lineup gives you the ability to change the type of reverb with one simple knob. A pro tip There's a footswitch input on all the Stagepas models to mute the effect. Perfect for when you want to talk between songs, or make announcements.

Subwoofer options for DJs. So far, we've been focusing primarily on acoustic solo artists in small settings. But house concerts don't just have to be singer/songwriter-oriented. Similar rules apply to DJ's spinning records at house parties, as well. With a portable PA system like STAGEPAS, you get all the inputs you need for your mixer, phono-to-line-level preamps, and subwoofer outputs for extended bass.

CONTROLLING FEEDBACK WITH A PORTABLE PA SYSTEM

The biggest hurdle when it comes to taming sound at house concerts is eliminating feedback (or more accurately, feedback loops) with your portable PA system. Feedback loops occur when sound is processed through your mixer, into the amplifier and to the PA speakers, then "fed back" and picked up by a microphone positioned in front of these speakers.

Even in small rooms, you can take simple steps to avoid this issue.

Eyes front, speakers front. This is a simple motto that's meant to impart one simple piece of wisdom into your brain during setup: keep the speakers well in front of your vocal microphone. Position PA speakers further forward, towards your audience, than your vocal mic, and you cut the risk of creating a feedback loop in the first place. This might be tough in someone's living room or a cramped coffee house, but make it work the best you can. It's your first line of defense.

Kill the monitors. For small gigs like this, a portable PA system is all you really need. That said, we've seen performers set up wedge monitors at small gigs, which can also be a contributing factor to feedback in tight spaces. Kill the wedges (they're likely overkill anyway) and try in-ears instead (or simply no monitoring if the space is truly small enough).

Use a directional mic. Simple as it sounds, this can help is improving gain before feedback occurs, in many live situations.

Rat tails are gross, get them away from you! An oldie but goodie, imagine the XLR cable coming from your mic as the tail of a rat. If the rat tail is pointed away from you, the mic is picking up your voice and you run a far lower risk of positioning the capsule directly in front of the loudspeakers by accident. Lead singers who frequently move into the crowd and "point the mic" for the audience to sing often get hit with bursts of ear-splitting feedback because they had the "rat tail" pointing back at themselves, while they were right in front of the venue's sound system, thus enabling a feedback loop to take hold and annoy anyone in a 100-meter radius.

Know your space. In a house concert setting, you'll likely be running your own mixing board (which, due to space issues, will probably be easily accessible). Real pros will learn over time which frequencies and ranges of frequencies are the problem children of the night, and will be able to easily adjust EQ settings on-the-fly to alleviate feedback problems, and get on with the show. Drop that offending frequency a few dB and you're oftentimes good to go. Many artists carry cheat-sheets with them in their guitar cases, which describe the sound of the feedback, and instruct which frequencies dip with the EQ controls.

FEEDBACK SUPPRESSOR FUNCTIONALITY

Having said all that, Yamaha has made feedback suppression even easier in the STAGEPAS line, with the aptly titled "Feedback Suppressor" found on the unit's compact mixer. To engage this function, simply depress one button near the master volume, and even if you've formed the perfect storm for feedback to occur, the system's circuitry manages to somehow keep it in check, ensuring a clean and clear performance without the headaches. Probably our favorite feature of the STAGEPAS portable PA, and one we've never turned off in our weeks of testing the unit.

USING DIRECT INPUTS WITH ACOUSTIC GUITARS

If you've taken all the advice above, AND engaged the feedback suppressor (assuming you're using a STAGEPAS portable PA, that is), you've probably eliminated 95% of all possible problems for small house concerts and non-traditional venues. The last item to take care of is that acoustic guitar. For intimate settings, we recommend going direct into the mixer (and not un-amplified), for a few reasons.

For starters, traveling on the house concert circuit usually means you're traveling light. So, ditch the DI box and extra cables and make use of the instrument inputs on the STAGEPAS' mixer. Not only does it mean one less piece of gear to bring along, but fewer cables means a cleaner signal (and fewer tangles during load-out).

And from a mix standpoint, you don't want the acoustic guitar to dominate the room. So even though it might sound counter-intuitive, you can run the guitar through the PA with your vocals, balance out the mix on the board, and that way you've ensured the vocals aren't struggling to compete even though you've actually made the guitar louder than it would have been unamplified. Plus, you now have the added benefit of being able to add fx like reverb to the guitar to give a bit more depth to what may have been a very dry sound.

PRO TIP: mix the guitar just loud enough so that in the room, your audience is really only hearing the acoustic come through the speakers, and not the guitar's soundhole. If you've ever suffered through awful YouTube guitar videos, you know one of the more annoying things is hearing both the guitar's strings through the camera mic, as well as the "dirty" sound coming from the amp. Many times in these videos, the amp is quieter (or simply too far away) than the actual guitar itself. Similar rules apply in a live setting; it can be a bit disorienting to be hearing the guitar's natural sound hitting you a fraction of a second out of time with the guitar coming through the speakers (even with the best low-latency systems), and it can just sound "off" if the balance isn't right. Don't engage in aural confusion with your audience!

Lastly, you'll note that we haven't mentioned miking the guitar's sound hole and running that signal to the mixer. For good reason. We are trying to eliminate feedback, after all, and the mic-to-soundhole gambit has been the cause of countless squeals for decades at coffeehouses all across the world. With today's mixers offering Hi-Z inputs, there's really no practical reason to lug around extra mics and XLR cables to house concerts or other intimate performances, and sit there fiddling with the setup for any more time than is necessary to get the right mic placement on the guitar so it won't feed back. Lose the mics, lose the DI boxes and go straight into the mixer. For these types of gigs, it's a no-brainer.

PART 4

Pro Tips: Live Mixing for Vocals

S-S-SUSSUDIO (KILL THE SIBILANCE)

Unless you're covering Phil Collins, those annoying "s" sounds can be problematic in a live mix, especially if your portable PA system doesn't have an on-board de-esser (and most won't). So, if you find that your vocalist is hitting those "s" sounds a bit too harshly, learn which frequencies to cut and you may be able to nix the issue at the board. And this doesn't just affect vocalists in a musical setting; there's nothing worse than a public speaker whose speech is ruined by unwieldy sibilance.

Since most sibilance can be traced to the 5-8kHz range, a slight trim using the High EQ knob on your portable PA's mixing board might be all you need to tame the problem. Which leads us to…

CUT FIRST, OR "LESS IS MORE"

For vocals especially, when fine-tuning a mix, oftentimes you'll have the urge to "ride the faders," thereby increasing either the volume of the vocal channel, aspects of its EQ curve, or both. While that seems like a natural instinct (bigger

is better, right?), we recommend that you try identifying and cutting offending or troublesome frequencies first using EQ and volume trims. For live mixing, especially, killing the problem can be the solution you're really looking for in order to get a better sound, rather than just boosting something without addressing the underlying issue.

Now, if the problem is simply that the vocals are too low in the mix, then yes, go ahead and gently increase the volume until it's as clear as you'd like in the overall sonic balance. One thing that can oftentimes come in handy is a high-pass filter for live vocals. Since HPF's only allow frequencies higher than a certain cutoff point through the filter, you can eliminate boomy bleed from drums, bass or other on-stage instruments coming through the vocal mic when you're performing in more intimate stage settings.

One of the settings we really like on the STAGEPAS lineup is located in the Master control section, and it's the 1-Knob Master EQ. What's great about this is that if you aren't a trained engineer who knows every single instrument and vocalist's frequency range, it doesn't matter. You can still get great vocal sounds either for music or speech with the sweep of one dummy-proof knob. For portable PA users, this can be a life-saver, since a lot of bands setting up these units will likely be in charge of their own sound mixes.

COMPRESSION

As it relates to the studio, we continually hear a lot of albums that have far too much vocal compression applied. One of the problems this creates is a lack of dynamics in what should be one of the most dynamic parts of the track: the vocals.

In a live setting, try dialing back the compression settings, if you're using compression at all on your vocal channel, and instead use the volume fader to control how the vocals sit in the mix. If you must use compression, we recommend trying a ratio no higher than 3:1 for live use, along with shorter release/attack times.

A NOTE ON BACKGROUND VOCALS

So far, we've been talking almost exclusively about lead vocalists in the mix, since they're typically the focus of the song. But since many groups feature background harmonies, there are some ways to make sure those sound good in a live setting, as well. For starters, EQ'ing background vocalists is a bit different than your lead. You can feel free to experiment here a bit more if feedback suppression is a concern (see

our previous article for more on that). More aggressive EQ'ing on background singers is usually OK for the mix, just be sure that volume-wise, the leading tone (harmonically, that is), gets the most volume.

For background vocals in unison (not harmonized), try your best to level-match them for best results, at a volume that's not competing with the main vocal line. We tend to find, although this isn't always the rule, that imbalanced unison male vocals, especially, are really egregious even if they're lower in the mix. So, smooth that out at the board, and you shouldn't have any issues.

For harmonized vocals where you can clearly discern the chordal harmony, try to balance the vocals so that no one voice is louder in the mix. Here's where a touch of compression at a low ration (even 2:1) can come in handy. Try treating these vocalists as one unit (even if they're on separate channels), and apply the same volume, EQ and fx levels to each for cohesiveness.

A NOTE ON VOCAL FX

While the studio is a great place to experiment with all sorts of crazy fx to nail your sound, in a live setting those don't always translate as well.

There are, however, many applications where tasteful reverb or echo can be useful on an emotional vocal performance. The STAGEPAS 400BT that we've been using has as great, sweep-able reverb setting that is on/off switchable, and allows for variable control between hall/plate/room and echo fx. The DSP inside these Yamaha units is very musical, so you won't experience any digital anomalies like stepping or other such issues when you change the rate of the effect

on-the-fly (that would be really terrible in the middle of a live performance).

For most situations, the old adage of "less is more" still rings true. Just as with compression, the key in most instances is to add a tasteful amount of reverb that adds a lushness to the vocal signal without overpowering the actual performance, drenching it in muddied layers of echo. The STAGEPAS series all offer a footswitch input to mute effects between songs for a more professional performance, as well.

The other issue you may run into with applying too long an echo/reverb time to your vocal mix is reflections caused by the space you're performing in. If you're setting up a portable PA system in less-than-ideal spaces, then walls, ceilings and floors can bounce sound around and compete with the reverb/echo effects you've added to your signals. This leads to a confused audio sensation with your audience, which from a sonic standpoint, can be nauseating.

For spaces with their own natural reverb, like high-ceiling churches, make use of the natural reverb and trim the on-board fx for a more focused vocal sound.