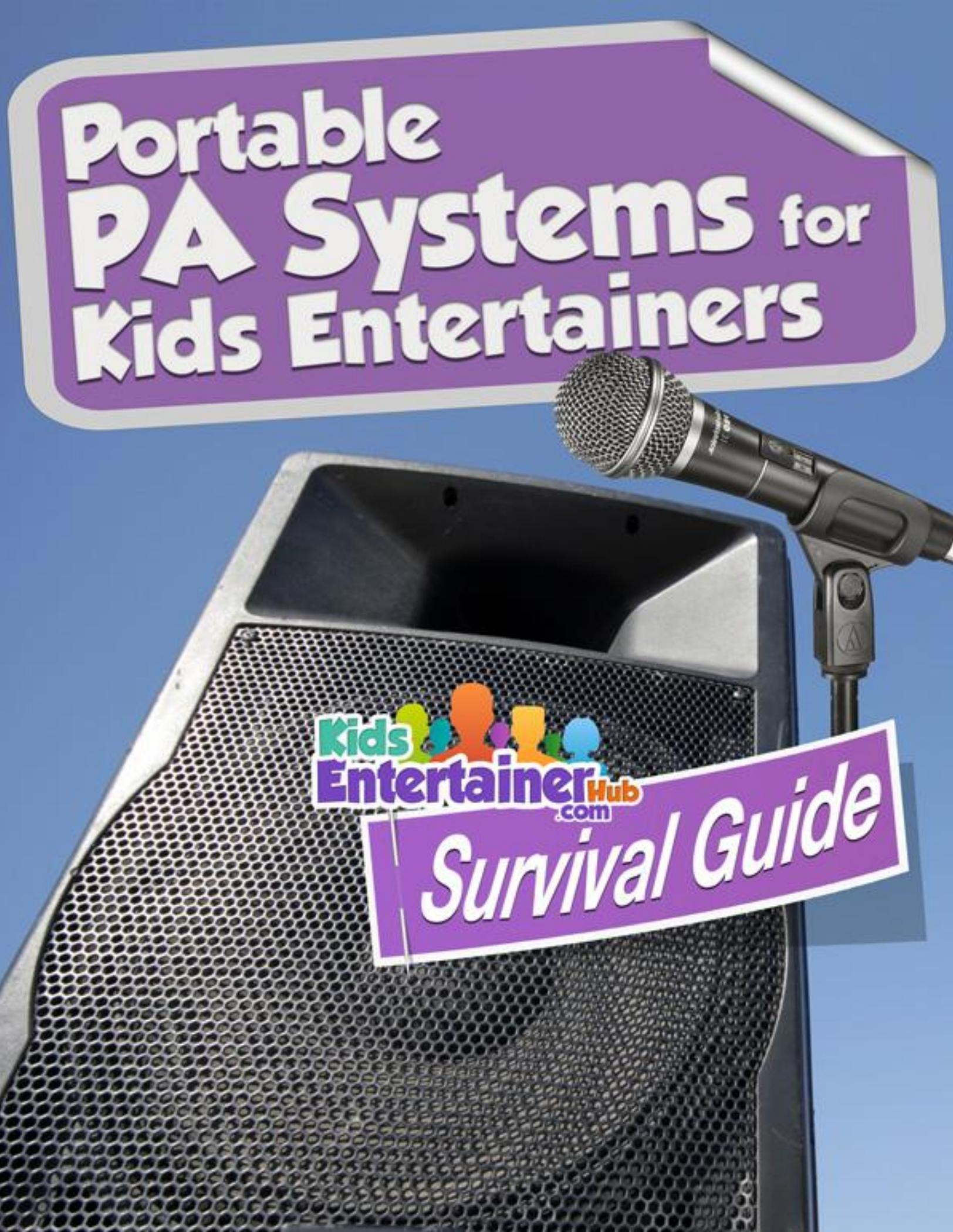


Portable PA Systems for Kids Entertainers



Kids
EntertainerHub
com

Survival Guide

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Introduction

A P.A. system for your magic show is possibly going to be one of the largest single purchases that you can make. For this reason alone, getting the right system is important. But how do you know which is the right one?

Once you start looking, it becomes apparent that there are plenty of choices available. And while some don't even come close to being useful for live performances, most will have their pros and cons. The deeper you dig, the harder it can become to make a decision.

In this P.A. systems guide for magicians and entertainers, we hope to break everything down in simple terms and give you some basic knowledge that will allow you to go out and confidently make your P.A. system purchase and then use it to its best capabilities.



So What Is a P.A. System?

A public address or P.A. system is traditionally an electronic means of amplifying a voice so that a large group of people can hear it. It can range from something like a megaphone right through to the large systems used at arena rock concerts.



Regardless of their size, all P.A. systems have four main components. Understanding how these components work together will give you the basic knowledge you need to operate any P.A. system.

Microphone. The microphone or mic is the piece of equipment that you speak into. It turns your voice into an electronic signal that can be sent along wires or transmitted through radio waves to an audio mixer.

Audio Mixer. This is where the signal from the microphone or music source is processed for clarity and loudness. It can be as simple as a one-volume control switch or as complex as a device with multiple input and output volume and frequency controls and additional special effects processing units.

Amplifier. The amplifier is where the mixed signal from the audio mixer is made louder.

Speaker. This is where the amplified signal is turned back into sound so that our ears can hear it. In very simple terms, a speaker is the opposite of a microphone.

The four components above can be put together in different combinations. For example, a megaphone has all four components in one unit, while a large concert system will have all four components as separate units. Some medium-sized systems will have the audio mixer and the amplifier combined but the microphone and speakers separate. Whatever the combination is, the only thing you really need to know is that without all four components, the P.A. system will not work.

Things to Consider When Choosing a P.A. System

There are four basic things to consider when choosing the right P.A. system for your needs, and we have placed them here in what we call realistic priority. That means we have listed these four factors from what most people *actually* deem to be most important to what they think is the least significant. It would be ideal to put quality second and price last but realistically, we all have some sort of budget restraints that will limit our choices.

1. P.A. Size

How big or how small do you need your P.A. system to be is the top thing to consider when you're shopping around for your own P.A. equipment.

The size of a P.A. system is commonly talked about in measurement of **watts**. A watt is the unit of measurement of energy delivered. In a light bulb, this energy is the brightness, while in a P.A. system, it is essentially the loudness.

A more accurate way of measuring sound is in **decibels**, but we won't go into that as the topic is rather too complicated and quite unnecessary for this book. (For a little more detail on decibels, refer to the P.A. Terms and Jargon section at page 17 of this book.)

To determine the P.A. size you need, you need to consider the following:

- What do you want to amplify? For most kids entertainers, this is their voice and some music.
- How loud do you want the sound to be? For example, do you need to make it so loud that people can't talk over it, or do you want to keep it at a level that is easy on the ears?
- Are you aiming for near-field or long-distance amplification? In other words, do you need to be heard only at close range or at longer distances?
- Do you perform inside or outside or a mixture of both?
- What are your average and your largest audience numbers?

Having answered these questions, you are now closer to finding the P.A system that is perfect for you. Unfortunately there are some sellers or advertisements that try to confuse you with jargons and misleading information. To avoid this, try communicating with the retailers and suppliers in your country or area to see what they recommend.

When choosing a P.A. system, keep in mind that it is not as simple as saying that a 20-watt P.A. system is loud enough to handle an audience of 40 people.

Common Areas of Confusion

There are two main ways that manufacturers of P.A.s confuse the unaware shopper.

1. Unmatched Components

If the main components of the P.A. system are incorrectly matched, the system can have reduced output and clarity.

An example of this would be having a 100-watt amplifier with a small 20-watt speaker. In this case, the speaker is the governing component that greatly reduces the output of the system. You might be able to get it louder than 20 watts, but the sound will be distorted and very low-quality.

However if the amplifier is 20 watts and the speaker is a big 100 watts, then the amplifier would be the governing component and you could easily get your 20 watts of power in clear quality sound.

In either of these cases, if the manufacturers list the highest watt-producing component as the systems output, then they are misleading you.

2. Maximum Wattage or Peak Watts

This is the most common misleading information found when looking at P.A. sizes.

Maximum wattage and peak watts refer to the same thing, and that is the highest level of output from an amplifier. Take note though that the maximum or peak wattage is not a sustainable level of output over time. This means when pushed to this level, the amplifier will cut out or burn out, or at best, the output will be horribly distorted.

A true measurement of P.A. watts is listed with the letters **RMS (Root Mean Squared)**. This is the true sustainable output calculated through a mathematical process using the wattage output of the amplifier and speakers, as well as the ohms they are wired to run at. **Watts RMS is the true size of the P.A. you are looking to buy.**

Tip

If you are looking for a P.A. system to use for outdoor shows, remember that it needs to be much larger than one used for indoor shows. This is because when you are indoors, the sound bounces off walls and you have a lot less external noise to deal with. But when you are outside, the sound dissipates quicker and you have to deal with more interference noise from traffic and general everyday sounds.

2. Price

While price can be a limiting factor on what system you buy, it can also be an indicator of quality. It really is a case of value for your money and paying for quality.

For instance, there are a few generic-type models on the market featuring a 100-watt system with wireless mics and self-contained battery that go for as low as \$200. These may look tempting to the unsuspecting purchaser, but in truth, you won't be purchasing a true 100-watt system with good-quality components if you opt for them. You will have distorted, unclear sound that you will probably be better off without a P.A. system, and worse, the system probably won't last very long due to its cheap, poor-quality components.

If you find that the P.A. you really want is out of your budget range, it is always worth looking at second-hand units. If you find a good-quality system that has been well taken care of by its previous owner, then you have found a real bargain.



3. Ease of Use

Regardless of whether you are a professional sound engineer or a complete novice, the P.A. system you choose needs to be easy to use. The last thing you want to worry about before you start your show is why you can't get your P.A. to work.

Once you have your P.A. set to a standard that you find works well for the majority of your shows, don't be afraid of marking the unit so you can easily see if it is or isn't set up right.

If there are any knobs that you don't need to adjust, then put a tape over them or remove them so the controls would be less confusing to look at.

If your P.A. is going to be used inside a cabinet that you can roll in and out of events, then make sure that the controls are at the back of the system or where you can see and reach them with ease.

Tip

To make sure operating your P.A. system would go smoothly, make sure that all the knobs and switches are marked clearly and are quickly accessible. You don't want to be looking for a torch and your reading glasses just so you can turn up the P.A. or adjust it in any way.

At the end of the day, the P.A. system is there to compliment your magic show, not hinder it or make it difficult. Just like all your routines, you need to become familiar with how your system works. The easier it is to run, the less you have to worry about.

4. Quality

Without going into naming brands and manufacturers, you can determine the quality of a P.A. system logically.

In the audio industry, technology changes all the time and companies are always trying to reinvent the wheel to stay ahead of their competitors. Because of this, people who work in the industry are very quick to review and pass judgment on products. This means if a company manufactures a low-quality product, they are very quickly found out and the products and sometimes even the company fade away fast.

Most retailers of audio equipment won't sell low-quality products because these can be detrimental to their business. You would generally find the cheap and poor-quality products only online, sold by unbranded companies that have no face to them on eBay or in online bargain shops.

When researching an electrical item to purchase, find some models that you think are going to do what you want and then google them. With so many tech-hungry people, there are literally thousands of forums and review blogs and



videos where you can read or see people's firsthand experiences with a product. These forums and reviews are great resources and we highly recommend that you use them. Of course make sure that the person writing the review is not connected with the company manufacturing or selling the product. And don't stop at one review because some people are biased towards manufacturers and brands.

Research your choices.

The Simple Rules of Quality

- If it's brand-new and cheap, then the quality is low.
- If it is priced equal to or above the average of other units, then it's most likely equal or better in quality.
- If it's a brand you know, then it's quality.
- If it's a brand that's been around for longer than 10 years, then it's quality.

Microphones

Microphones are often the most overlooked component of a P.A. system, but spending a little time learning about and understanding them will help you get a lot more out of your P.A. system.

There are four basic types of microphones and choosing the right one for your type of performance is crucial to getting the most out of your P.A. system. But before we go into these four types of microphones, you first have to decide whether you would go for a wired or wireless mic.

Wired or Wireless?

Pros and Cons

A wired microphone is a microphone that is connected to the PA system with a lead that carries the signal. A wireless microphone, on the other hand, sends a radio wave signal to a receiver that is connected to the PA system.

These days, wireless microphones are what's often used in live performances. For most performers, the benefit of not having to worry about tripping over leads or not having a long enough lead far outweighs the extra cost of a wireless system.

But like any other thing, a wireless system also presents some problems.

The most common problem in a wireless microphone system is the battery. All wireless microphones rely on batteries to work. If the battery charge gets too low, then the radio signal won't transmit as strongly, resulting in loss of sound.

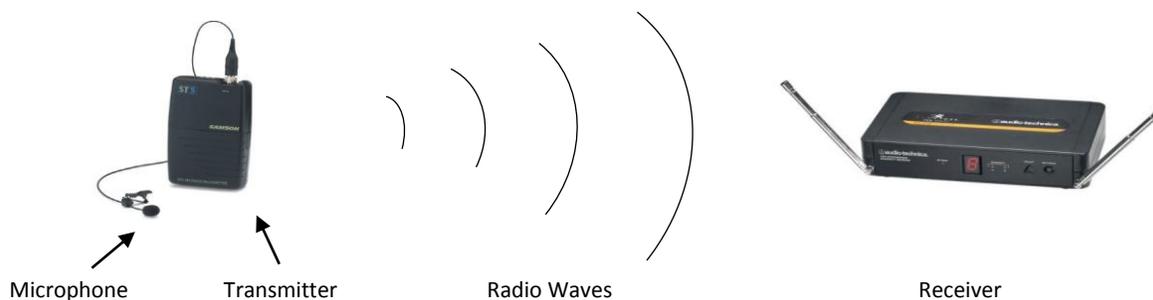
The next most common problem is interference with the radio signal, which can result from a wide range of other radio wave-generating devices. Anything from a mobile phone to a TV station can disrupt your signal. It must be said however that in 98 percent of situations, the interruption is so minimal that you won't even notice it, while the other 2 percent can be avoided with a little basic knowledge on how radio signal works.

Components and Frequencies

Wireless microphone systems have three components: the microphone, transmitter, and receiver. The microphone, as discussed earlier, turns your voice into an electronic signal. The transmitter turns that signal into a radio wave that it sends out into the air. The receiver then collects that radio wave and turns it back into an electronic signal which the P.A. then amplifies.

Tip

As a magician, you wouldn't spend \$100 on a new card routine and then try and perform it with a cheap packet of second-hand, bent, or torn playing cards. Likewise, don't go for the cheapest or easiest option for a microphone. It will only lead to disappointment at some crucial stage of your performance.



Your wireless microphone system works the same way that a radio station works. Each station (or wireless microphone) has its own frequency that it uses to transmit its signal. The only way you can hear that radio station is by tuning your radio receiver to the same specific frequency. If you do not tune it in properly, the signal will be weak and broken up and you won't be able to hear it clearly.

The receiver of your wireless microphone system is like your radio. It is tuned to the radio waves that your microphone transmitter is sending out. If there is a device nearby that is sending on the same frequency (or a very close one), then your receiver will also pick that signal up, resulting in interference. Good and high-quality wireless microphone systems combat this issue by tightening the frequency range that the receiver is looking for.

Wireless microphone systems work in three main types of frequency bands: FM, UHF, and VHF. Issues can arise with all of these frequency band types and different countries have their own laws and standards for dealing with them.

For that reason, the first rule of thumb when purchasing a wireless system is to buy from a dealer in your own country. If you do purchase from overseas, make sure the supplier is reputable and understands what the standards are for the region you will be using it in.

The second rule of thumb is not to buy cheap microphones and wireless systems as these will likely give you more headache than help.

Types of Microphones

The four main types of microphones are handheld, condenser, lapel, and headset microphones.

While many varieties of each of these exist, as well as hybrids that are combinations of two or more of these mic types, we are going to cover just a brief overview of the four main types listed as this will be enough to give you the knowledge you need to make an educated decision on your purchase.

Condenser Microphones

Condenser microphones are generally not used for solo live shows, but rather for large group performances like choirs or in a controlled environment like a recording studio. These microphones are very sensitive and when not used properly, they will loop feedback very quickly. They are also more expensive due to their delicate and sensitive components.



Lapel Microphones

Lapel microphones, mostly available only as a wireless system, are small and designed to be clipped onto your clothing underneath your neckline. While this style of microphone is often used on television, it is also suitable for live performances.

The lapel microphone is usually the cheapest microphone you can find for your wireless system. When set up properly, it is a very effective microphone for solo performers who need their hands free.

But because a lapel microphone is attached to your clothing, you must always take care to ensure that it is close enough to your throat and that it is pointing the right way so it can efficiently collect the sound of your voice. If your lapel microphone is too close, your voice is going to sound muffled, but if it is too far away or it is not pointing in the right direction, it won't pick up your voice properly.

Another issue that is common with lapels is that if you turn your head to the side, you would be talking away from the lapel so your voice won't be amplified effectively. If you are a highly animated performer, this can be a problem. The best way around this issue is to get a headset microphone.



Headset Microphones

Headset microphones are the most widely used microphone for live performances today. Unlike the lapel, it allows you to turn your head in any direction and it won't change the volume of your voice.

Headset microphones can greatly vary in price. Once again, the rule is not to buy cheap.

The most common problem when using any microphone is feedback. This happens when the microphone amplifies the already amplified sound. Essentially, this creates a loop of sound that amplifies itself and gets bigger and bigger until it turns into an ear-piercing scream of sound or a low thundering rumble. It happens in a split second and it can be very harmful to ears. Cheap microphones (particularly headsets and lapels) are more prone to creating feedback. Well-designed headset microphones incorporate a dynamic/condenser setup which dramatically reduces this problem.



Handheld Microphones

As its name suggests, a handheld microphone is a microphone that you hold in your hand. There are neck clips available that can hold this microphone against your chest. While these clips can keep your hands free, they are bulky and limiting.

Handheld microphones are available as wireless or wired. In any case, they are great for entertainers who speak only between routines or talk with audience volunteers and want them to be heard, too.

Tip

To use a handheld microphone correctly, hold it about two inches away from your mouth at an angle pointing towards your upper lip.



How to Get the Most Out of Your P.A. System

To maximise your P.A. system, you should concern yourself not just with getting the maximum volume. Volume is useless if there is no clarity, if the words being spoken or the music being played cannot be easily understood.

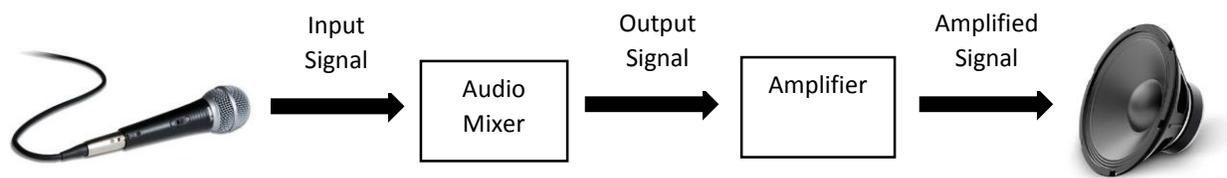
Luckily there is a basic procedure you can follow to get your system sounding its best regardless of its quality, style, or size. This procedure includes the basics that every sound engineer works through whenever they set up a P.A. system. The biggest difference is that the procedure we are about to give you is a one-time setup. Once you have it sorted, you can mark all your controls so that you can easily reset them, and all you will ever have to worry about as you go from show to show is if your master volume needs to be adjusted.

While this is a step-by-step procedure, note that if there is a step involving something that your P.A. system doesn't have, you can simply skip to the next step.

But before we begin discussing this procedure, there are a few things that we need to address.

As mentioned earlier, every P.A. system needs an input signal from a microphone, an audio player, or even an instrument. This input signal will be processed into an output signal and amplified to give a louder output signal, which is turned back into sound by the speaker.

Most people fail to get a good sound from their P.A. system simply because they don't recognise that the input signal even exists. If the input signal is not good-quality, then it will be hard to make the output signal good-quality.



Five Types of Controls

There are five main types of processing controls found in a P.A. system. Not every system will have all five and some will have more detailed types than others, but a quick overview of the main control types is needed before you can begin the setup procedure.

1. Input Gain

This controls the strength of the input signal. It is usually found only on bigger P.A. mixing desks. It can also include the volume control on a wireless receiver.

2. Input Equaliser or Input EQ

This controls the tones of the input signal, basically giving you control over the treble and bass on each channel. Again, this is usually found only on bigger P.A. systems and sometimes on the receiver of a wireless system.

An EQ actually increases or decreases a frequency range in the sound wave. By adding bass, you make the sound more booming. By adding treble, you make the sound more metallic or tinny.

3. Output Channel Control or Channel Volume

This gives you control over the volume of each channel of signal so you can mix the signals to different ratios. An example of this is having background music with a loud voice-over.

4. Master Volume

This is the volume control for all the channels mixed together. It is what allows you to control the overall volume of your P.A. system.

5. Master Equaliser or Master EQ

This controls the tones of the final mixed output signal, giving you control over the treble and bass of the final sound. It works the same as the input EQ.



Whether your P.A. system looks like either of these or something in between, **the basic setup to get the best sound available is the same**. Once you master the steps, you will be able to use any P.A. system the same way.

Again, if your P.A. system doesn't include some of the controls mentioned here and in the setup procedure, just ignore those parts and move on to the next step.

Setup Procedure

Step 1

Turn on your system as per manufacturer's instructions and set all controls as follows:

Input gain control to zero or its lowest level.

Input equaliser to neutral. This means exactly halfway so that no treble or bass is added or subtracted.

Output channel volume to zero or its lowest level.

Master volume to zero or its lowest level.

Master equaliser to neutral. This means exactly halfway so that no treble or bass is added or subtracted.

Your system is now set to what is called **zeroed**. Now we can begin to set up your P.A. system to find its best settings.

Step 2

The first goal is to get a good input signal from whatever microphone you are using. We are looking for a strong, clear signal that has good tonal qualities, not necessarily loud.

To get the signal strength, first bring the master volume up about 2/3 (two-thirds) of the way. Next, bring the input gain up to about half.

Step 3

Use the microphone as you would in a live performance. Talk in the same manner as you would during a show and slowly increase the channel volume until you can clearly hear your voice being amplified.

In most situations, the input gain is best around the halfway point. However, some microphones may need up to $\frac{3}{4}$ (three-fourths) of full gain to get a strong signal.

Be aware however that the more gain you add, the more sensitive the microphone will become. Too much input gain means a higher chance of feedback and distortion.

Step 4

Once you have a strong signal, you may want to adjust the input EQ. Note that to do this properly, you need to stand in front of the speakers at a distance equal to or greater than where your audience will be. It is always worth having a play with the EQ to get a feel of what's possible.

Step 5

Once you are happy with the sound you are getting, it is time to push the volume and find your limits. Increase the channel volume in increments and each time, walk around the system and listen carefully for any feedback or distortion. Once you hit this point, lower the channel volume back a little to a safer level and mark or take note of where the control is.

Even though none of your volume controls are going to be at full, this is going to be your **maximum microphone volume**. If needed, you can take the master to a higher level, but leaving it at the $\frac{3}{4}$ (three-fourth) mark means you have the needed headroom.

From this point on, whenever you need to adjust the volume of your voice, it is best to adjust it using only the **master volume**.

If you have another mic that you use in your performances, just follow steps 2 to 5 again using the appropriate channel.

Different microphones require different settings so if you ever change your microphone, you will need to reset your system again.

Next, you need to set the level of the music that you use in your performances. This is really a matter of personal preference and it will also depend on the style of performance you are aiming for.

Step 6

Again bring the input gain for the channel the music is coming in on up to about 50 percent, and then slowly increase the channel volume while checking the level against the level of the microphone. (Again, do this while talking as you would during a performance.)

If your P.A. system has a vocal priority button and you are happy with the way it works, then by all means use it.

Once you have the mix between the music and the vocal where you feel it is best, double-check your mix by reducing and increasing the master volume to different levels. Make sure the mix stays relative to each other.

Tip

Remember to clearly mark the positions of all your settings. Sometimes in transit or in a hurried setup, the controls will be accidentally knocked away. It will be a lot easier to bring them all back in order if you have the right settings marked rather than go through a full reset.

The master EQ on any P.A. system can be used to adjust the sound to a particular room. Some rooms are like a sponge and soak up the bottom or low tones, while others seem to enhance them. In most circumstances, you can usually get away without adjusting the EQ to a room, but occasionally you will *hear* the need to do this. Learning to properly work with EQs takes a lot of time so if you are really serious about your sound, play with it when you can but don't waste too much energy trying to perfect it.

Some Tips to Improve Your Use of Your P.A. System

- Always remember that your P.A. system sounds very different when you stand behind or beside it. The important thing to note is what it sounds like out the front because this is where your audience is.
- Pointing your microphone at the speakers of your P.A. system will quickly create feedback.
- If you have any components that run on batteries, always remember to recharge their batteries regularly or to replace them often. In some circumstances, a low battery can result in low-signal strengths which would ultimately affect the overall sound of your P.A. system.

Some Terms and Jargon

Channel	A path that the audio signal follows from the input to the output
Clipping	Severe distortion that gives a popping or clicking effect. To avoid clipping, reduce the input gain.
Decibel (dB)	A measurement of loudness using a logarithmic scale. 98 dB is the standard highest level that is safe for hearing for a relatively sustained period of time.
Feedback	The build-up of a frequency looping through an amplifier that reaches an ear-shattering volume
Master	A control affecting the final output of a signal
Mixer	An electronic device used to combine various audio signals into a common output
Watts RMS	The calculated highest sustainable volume for a P.A. system
Watts Maximum	The highest possible volume a P.A. system can reach but not necessarily hold

Comparison Chart of Portable P.A. Systems Used by Magicians from BYMS

P.A. System	ION Block Rocker	Samson XP106	Happie Amp 2	Ibiza Port 12VHF-BT	Samson Expedition XP40i	Samson Expedition XP40iw	Happie Amp UHF Pro	Mipro MA303	Roland 330 BA	Mipro 707	Okayo 100	Paso ProCast 50	Sound Projections SM4neo
Price Range	< \$150	< \$300	< \$300	< \$400	< \$400	< \$450	< \$450	< \$550	< \$800	< \$1100	< \$1100	< \$1100	< \$1750
Watts RMS	NI	NI	15	350 ?	40	40	15	45	30	75	75	30	150
Control Panel	Front top	Back	Top	Back	Back	Back	Side	Back	Back	Back	Back	Back	Back
EQ Control			Y	Y	Y	Y	Y		Y	Y	Y	Y	Y
Vocal Priority				Y			Y				Y	Y	Y
CD										Y	Y	Y	Y
SD Card				Y			Y			Y	Y	Y	
USB Port				Y			Y	Y		Y	Y	Y	Y
Bluetooth	Y	Y					Y						
iPod Dock	Y				Y	Y							
Remote Control				Y			Y			Y	Y		
Ext Speaker	Y		Y		Y	Y	Y		Y	Y	Y	Y	Y
Line Out		Mono	Mono	Stereo			Mono		Stereo	Mono	Stereo		Stereo
Wireless	No	No	Yes X 2	Yes X 2	No	Yes X 1	Yes X 2	Yes X 2 Module	No	Yes X 2 Module			
Band			VHF	VHF		UHF	UHF	UHF		UHF	UHF	UHF	UHF
Multi-Channel			No	No		No	Yes	Yes		Yes	No	Yes	Yes
Mic Type			Hand Head Lapel	Hand Head		Hand	Hand Head Lapel	Hand Head Lapel		Hand Head Lapel	Hand Head Lapel	Hand Head Lapel	Hand Head Lapel
Physical Size	368 X 432 X 292mm	343 X 500 X 343 mm	180 X 290 X 100mm	350 X 560 X 310 mm	245 X 375 X 240 mm	245 X 375 X 240 mm	216 X 320 X 178 mm	210 X 276 X 165 mm	415 X 509 X 323 mm	310 X 445 X 240 mm	300 X 470 X 230 mm	220 X 313 X 215 mm	380 X 585 X 330 mm
Weight	NI	9.5 kg	3.2 kg	15 kg	8.4 kg	9 kg	3.2 kg	2.7 kg	13.8 kg	13.5 kg	16 kg	5.5 kg	16 kg

Some Notes on the Comparison Chart

This chart is only a guide as to what is available on the market. Some of the systems named may no longer be available or the models and the specifications may have changed. Some may not be available in your region or there may be slightly different models.

Making the List

For a P.A. system to make this list, it had to meet only two criteria:

1. A person who has enrolled in the BYMS course must have owned and used the model.
2. The P.A. system must be able to run on both AC and DC power of some form.

How to Read Some of the Information

Price range is based on the average price found online and is listed in US \$.

Mic types are:

Hand = Handheld

Head = Headset

Lapel = Lapel

NI means that no information was available.

The ? after the 350 in the Ibiza Port 12VHF-BT Watts RMS section was put there because we doubt it to be true. It may be correct but we found it only on a website.

Conclusion

From this chart, it is easy to see that each system has its own pros and cons. As the buyer, only you can decide which will work best for your needs and budget.

Explore the market and see what else is available. Compare the models you find to those listed in this chart to get a feel of what each device can or can't do for you.

Remember to consider all your options and what you really want to get out of your P.A. system. Sometimes spending only a few hundred dollars is all you need. But regardless of what you do buy, having a basic knowledge of P.A. systems will always be a benefit to you.

*Acknowledgment

Kids Entertainer Hub thanks Steve Wickenton for compiling this comprehensive PA systems guide.