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Portable Sound Systems

The term '*sound system*' encompasses a wide variety of equipment, and many people do not understand the differences between various types of systems. Much of our work involves what we term as permanent systems. These are systems that are designed with specific functions, acoustic environments and price points in mind. A portable system, on the other hand, is more often chosen with fewer specifications in mind. It may also be used for a wider variety of purposes in many locations. In our experience, portable systems are most often chosen with the following in mind.

- Ease of transportation; small lightweight speakers
- Low cost
- Ease of use; uncomplicated mixer amplifier
- Relatively high power
- Everything in one unit; powered speaker
- Battery operation

A good quality portable sound system can be successfully used for a variety of applications, including some semi permanent situations. It is important though for the purchaser to understand the important differences between a portable and permanent system.

One key difference is the design goals the equipment designers and engineers have in mind when creating permanent and portable equipment. Many of these goals are indicated in the list above. Because the core applications of a permanent system are different than those of a portable system, it follows that the user will not realize complete success if a piece of portable equipment is used in a permanent application, or visa versa.

Speakers

Most portable speakers are designed to be small and light weight, while maintaining as much as possible a full bandwidth high output sound. Speakers that accomplish these goals most successfully are expensive. In the economy end of the market however, there are a number of models that strike a good compromise of these goals.

Perhaps the aspect of performance that is most different between an economy portable speaker and a permanent or expensive portable model is the consistency of sound dispersion. A good speaker will disperse its rated frequency response evenly throughout its rated dispersion angle. This means that a speaker with a rated dispersion of 90 degrees horizontal by 45 degrees vertical will sound the same anywhere within those angles. In reality even expensive speakers do not realize this ideal, however they come close. Many portable speakers, especially the very inexpensive models, fail miserably at this task. It is best for the purchaser if they invest a little more money in their portable system and acquire better speakers, even if it means delaying the purchase for a few months while more money is saved.

We feel the Electro-Voice Sx family of portable speakers offers a good, long-term value. We use the Sx100 and Sx300 models for rental work and in portable systems we sell. These two models employ the same cabinet; the Sx300 model has higher power handling drivers to allow a higher maximum sound output. These models employ a 12" woofer and a high frequency compression driver. The cabinet is rotationally moulded polypropylene, which is very lightweight. Electro-Voice was the first speaker manufacturer to widely use this material for portable equipment. Others have now followed suit. The high frequency horn, which in permanent speakers is a separate component, is moulded as part of the cabinet assembly. The acoustic quality of this horn mould is critical to high quality high frequency dispersion.

Electro-Voice also offers the Sx500 model, with a 15" woofer. a unique feature of this model is that the high frequency horn mould is tilted down 10 degrees. This means that when the cabinet is oriented vertically, as it normally would be, the high frequency horn is actually aimed down 10 degrees. This makes for better sound coverage and means somewhat less sound energy will be directed onto the rear walls of the room, which in turn makes for less of an echo affect in the room.

Other companies offering polypropylene speaker models include Sony, Peavey and Mackie (formerly RCF models).

A disadvantage of polypropylene as a speaker cabinet material is that it is not as dense as wood or wood product materials and, therefore, resonates easier and more actively. This causes colorations in the sound, and sound radiation off of cabinet surfaces (such as the bottom) that one would not typically anticipate encountering. Sony offers one model that is a composite of polypropylene and wood product material in an attempt to solve this problem. It does sound better, however, it is considerably more expensive.

Some manufacturers offer mounting hardware to allow for the mounting of their portable speakers onto walls or ceilings. These are useful in a short-term situation, however, we caution that better results will normally be achieved with more expensive permanent speakers.

Powered Speakers

A recent development has been the introduction of powered speakers. These are speakers with built in power amplifiers. Many accept a simple balanced of unbalanced line level audio signal, while some models offer a small mixer built in. The JBL EON 15PAK model is a good example of this. It has one balanced mic or line level input; two unbalanced line inputs; four bands of fixed frequency tone control; a patch point; headphone output; integrated post hole for speaker stand, and separate power amplifiers for the woofer and high frequency driver. This model can be used as an all in one portable PA system, or as a monitor for a drummer or keyboard player in a larger system.

While powered speakers have good applications, we feel that for the typical portable system they do not offer significant long-term advantages, as you must run both a signal cable and a 120 VAC power cable to each unit. Also, if a driver or amplifier channel goes faulty, it is easier to make substitutions when using separate speakers and power amplifiers, rather than powered speakers.

Mixer Amplifier Unit

Most portable sound systems combine all the electronics parts into one unit; the powered mixer; also called the mixer amplifier. This unit includes the mixer, equalizer, and power amplifier. In a permanent system these parts would be separate components. This is where a major compromise arises. Powered mixers typically do not offer quite as much versatility in the mixer portion, and nowhere near the quality of equalization we can achieve with a separate equalizer. Power amplifiers in powered mixers are usually not quite as powerful as separate units are, although this has improved recently.

The mixer portion often does not have as versatile a tone control section on each input. Other features such as channel mute switches, extra auxiliary output buses, and additional effects return inputs are not always included. Sometimes a PFL (pre fader listen via headphones) function is not included. These are all cost saving items. Most current models however, now include either one or two digital effects circuits for delay and reverberation functions. Note though these built in units do not provide the flexibility of a separate effects device.

Equalizers included in powered mixers are simple octave models with 6 to 9 bands, depending on the manufacturer. One must understand the functions of the equalizer in order to understand why an octave unit is not that useful. The equalizer is used to provide general tonal shaping of the speaker system and provide precise feedback control of problem frequencies. Because feedback occurs at very narrow bands, a narrow band equalizer with constant Q filters is required to control the feedback. Simple octave equalizers, where one control covers a whole octave of frequencies, are nearly useless for feedback control.

If a portable system is to be used in a short-term permanent application, we recommend a good quality one-third-octave equalizer be patched into the signal chain of the powered mixer. The Ashly MQX1310 or MQX2310 models are good for this application.

The power amplifiers included in powered mixers typically range from about 100 to 200 watts (at 8 ohms), whereas the separate amplifier models we use range from 200 to 400 watts. One will also typically find the powered mixer amplifiers do not have as heavy a power supply as separate units do, which means they will not maintain their peak output power for as long a time period. The other disadvantage in a powered mixer is that there are not normally any input controls for the power amplifier portion. This means that you are forced to operate the mixer portion at a low signal to noise ratio if you do not happen to require very loud volume levels. Amplifier input controls would let you run the mixer at the optimum levels and turn down the power amplifier to keep acoustic volume levels down. We have only seen one model of powered mixer that offered amplifier level controls. Unfortunately, that model was discontinued recently.

We have used two brands of powered mixers; Yamaha and Dynacord. Yamaha offers lower end economy models. The EMX660 is a box style model with six inputs and two power amplifiers. It's an economical basic model that offers good value for its list price of about $850.00. The EMX3000 is a console style model offering 8 mic inputs plus 2 stereo line inputs with two power amplifiers. This model has a list price of about $1,295.00 and makes a good choice for those situations where a portable system will be used as a semi permanent system.

Dynacord is a German manufacturer owned by the Telex Electro-Voice group of companies. They offer the Power Mate series with three models featuring up to 16 mic inputs. These models offer a higher physical and electronic quality level than the Yamaha models, however, they are considerably more expensive. The list price on the 16 input model is $3,595.00. This model is aimed primarily at the small touring band.

The power amplifiers in the Yamaha models are rated at about 150 watts per channel. The Dynacord models are rated up to 300 watts per channel. All models provide patch points to allow the easy patching in of outboard equalizers.

Conclusion

We trust this discussion has helped you as you consider what portable sound system to purchase. Keep in mind that whether portable or permanent, the more money invested, the better the quality of equipment you will receive, and the longer you will be happy with its performance. No one needs the hassle of attempting to sell a system that is only a year or so old! A better quality system will also hold its value longer than an inexpensive system will.

Horizon Audio will be pleased to help you determine what the best portable system is for your applications. Feel free to call to arrange a visit with us. Thank you!

ORIGINALLY COMPOSED BY DAVID WETTLAUFER
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