

Why portable

By 2002 it was clear that recorded music would shift to smaller and more portable devices, with the iPod being the most successful. Soon the entire industry jumped on that wagon, and the need for small sound systems exploded.

Indeed, Kloss provided the SoundWorks in the late 1990's, which was one of the first and most successful 3 piece systems for the PC market.

But most of these systems were not meant to compete with the component stereo system that had become the standard way to listen to music.

The idea behind the iTravelers was to create true high fidelity sound in any location from any of the new, portable music players.

They would be as easy to operate as the cellphones and laptops that were now everywhere.

They would be good enough to compete with 3 piece "sub/sat" systems and even the large and bulky fixed component stereo system that had become commonplace in the last 25.



Audiophile performance out of a plastic cabinet

With the unique engineering capability of our 150 years design team, we were able to achieve a combination of performance and small size which was not available elsewhere.

This was achieved by combining a completely automatic rechargeable battery system with a low distortion, long excursion driver in a rugged, acoustically transparent cabinet designed for easy handling.

The small size and single driver means that there are no sonic disruptions between drivers in the vital frequency ranges that can smear and distort the sound. With an extended bass response despite the small size, and the ability to place them in the best listening position, this system is able to recreate a completely natural and realistic sound stage.

This took attention to detail and meant optimizing every component and space most effectively so the sum is greater than the parts.

The result is a unique asymmetrical industrial design and package that is simple, elegant, functional, and timeless.

Each speaker incorporates a built in carrying handle and cord storage, and each speaker can hold 6 AA batteries.



Selected drivers

Drivers are the key part for high fidelity sound reproduction. It takes precise design, quality materials, high class manufacturing, and process and quality control to make the long excursion, low distortion drivers required for these speakers. Cheap or badly designed and manufactured drivers cannot be corrected for mid and high frequency response peaks and dips, and their efficiency will suffer as well be incapable of a controlled bass response.

Extended smooth high frequency response is difficult to achieve and this area has elements of art as well as science. Many small systems incorporate several drivers. Even well designed multiple driver loudspeakers have a crossover frequency which is usually within the critical range that determine the realism of the system. When two drivers reproduce the same signal, the total response will be affected in many ways over many frequencies, and the response is compromised. A single driver avoids all of these realism destroying effects. The 2 inch diameter drivers have the long excursion and low distortion that is necessary for this application. The paper cones are well damped so that the frequency response extends to 15 Khz without severe peaks or dips. This is a critical feature so that the response can be adjusted consistently.

The magnet structure uses a neodymium magnet for it's high strength, small size, and light weight. They are mounted such that the imaging is enhanced.

High grade electronic

The electronic components are carefully chosen for low signal distortion, low power, and accuracy. The circuitry is properly designed for minimum noise and distortion. Simplicity of operation is achieved by using a microprocessor to control the speakers, including all battery management, automatic turn on and turn off, and status indicators. This intelligence allows a custom designed algorithm to be used in charging the batteries to maximize the operating time and minimize the possibility of damage from overcharging or defective batteries. The electronics are in the right speaker, so that is the master. If only the right speaker is present, and the left is not plugged into it, the stereo audio signal is switched to mono automatically.

A wide range of signal levels is accommodated by incorporating a volume control and output level limiting circuitry so that the speakers will not distort even if a high signal level is applied.

Two mixing audio inputs allow for both a PC or Laptop connection at the same time a MP3 player or other audio source is used. The speakers can be powered from any 12-15 VDC supply capable of at least 1 amp. The power supply included is universal and light in weight. The connection from the right, master speaker to the left, slave speaker is made with a mini-usb type connection. These are very high quality and reliable connectors. The molded plug is a unique shape to prevent accidental use with computers, cameras, or any other device which is not meant to be plugged into the speakers directly.



Same performances with smaller components.



Selected components

The electronic components used in many small powered speakers distort the audio signal and add unnecessary noise. This is especially true of capacitors which are not meant to be used in low distortion audio circuits. However, they are cheaper than parts which have no effect on the signal. High quality parts can still be used in ways which degrade the signal if the design engineers are not skilled in the art of high accuracy signal circuits. The operation of the speakers are accomplished with a microprocessor that is specifically programmed for these speakers. They take care of themselves and all that is needed is a source of signal. The audio circuits are precisely adjusted for octave by octave frequency response and tonal balance, with high tolerance, audiophile grade components for the lowest distortion and noise. The circuitry self-adjusts for signals that would cause overload. Our chief engineer spent many hours listening and adjusting the tonal balance to achieve that elusive "real" sound. Once it is experienced, that realism makes the system disappear so that only the music remains.

Soundstage

A stereo image which recreates the original soundstage requires 2 closely matched full range speakers placed approximately equidistant from the listener. For a small portable and "personal" system, a trade-off can be made between loudness and bass response. Single driver speakers avoid image destroying phase and directionality shifts inherent in multi driver speakers. Properly designed small drivers will provide a low-distortion and smooth frequency response from low to high frequencies.



Bass response

True high fidelity reproduction of a stereo audio signal that gives the full experience of a personal concert requires separate full range speakers. If they are small they can be located so the listener can experience the sound image as it was recorded. This is impossible with a single box which is no more than 18" (45 cm) wide in a boombox type configuration. All such systems waste the resources of a second speaker because they are in effect mono at a normal listening position. Some have pseudo-stereo effects which may widen the apparent source, but that will blur the image and just doesn't work well on many types of music.

A bass response with no peak or valley of more than 2-3 dB down to 65 Hz is also necessary to achieve satisfactory realism. Conventional small speakers of less than 80 cubic inch (1.3 liter) volume have a bass response cutoff above 100 Hz and often have a peak above that frequency. The "standard" designs for passive vented loudspeakers in this size dictate this in order to achieve a reasonably flat low frequency response. This is the simple physical reality given the size of the box.

There are other designs which utilize resonant structures and have a single response peak that may be lower in frequency. The Bose "Wave" Radio system is an example of this and has a strong peak around 80 Hz. A peaked response may give the illusion of bass, but soon becomes tiring and leaves out many notes. Kick drums go "boom" instead of thump. The dinosaur's foot steps lose their impact. All bass notes sound like the same note.

Most very small speakers use a port. But they usually follow standard design parameters which dictate that the port output is at the same level as sound level of the driver. The iTravelers took a different approach and the port plus box resonance peak is much lower than "normal". This meant that the sound level at these lower frequencies was too low, especially between the resonance and the cutoff frequency of the driver and box itself. To make up for this, the bass frequencies are boosted so as to increase the output from the port. This increases the velocity of the air moving through the port and also requires a large excursion with low distortion from the driver. However, this bass boost reduces the overall loudness available because the bass notes will distort the signal sooner than the mid range notes. This is a compromise solution that extends the bass response at the expense of overall loudness. This works for a "personal stereo" because the listener is close to the speakers, therefore they still give a satisfactory sonic experience.

Mid high frequencies

Middle frequency levels are carefully adjusted, especially in the critical 100 to 1KHz region.

There is also a unique and unusual driver mounting feature that improves the imaging.

Final voicing and tonal balance required hundreds of hours of listening to a wide variety of music, with emphasis on female voices.

The analog filters are adjusted to within dB.

The result is the design which recreates a precise and realistic sonic experience.

A compact subwoofer for louder playback

While the iTravelers are loud enough for personal use, in a large room and noisy environment they aren't really loud enough. There is also a lack of the 2 lowest bass octaves. A subwoofer can improve both of these deficiencies.

A sub/sat system can work well if the satellites have response to at least 100 Hz, because any signals above that can be localized. Also, the output of the subwoofer has to be low distortion, low noise, and not have significant energy above 100 Hz. It preferably extends the bass response to approximately 45 Hz, because that is the lowest note on a string bass and is about what is available on many recordings. The audio output must be free of peaks so that each note can be heard.

A subwoofer of 200 cubic inches with a 3 inch driver was designed which met these requirements. It is a ported system which uses the same philosophy as the iTraveler in that the system is tuned lower than normal and the response is corrected by signal processing circuits. The port is noise free because of a unique, curved design which reduces the tendency to create turbulence and noise at high signal levels. This allows a much smaller cabinet volume and port diameter than has been used before.

The 3rd driver has extreme excursion capability along with low distortion. This combination gives sufficient level at low distortion to match the iTraveler properly.

For this application, the audio signal is passed through the electronics of the subwoofer and then to the iTravelers. This allows a DSP based crossover to separate the signal to the iTraveler and filter out signals below 100 Hz. The signal to the subwoofer is adjusted to flatten the response and also has a signal limiter for signals which would overload the amplifier.

The power amplifier in the subwoofer is a 20 watt switching amplifier, so that there is little power wasted. It also incorporates a built in universal power supply which also will run the iTravelers and keep them fully charged when they are attached.

The resulting system provides response to 46 Hz without compromising the image and soundstage of the iTravelers. The power supply of the subwoofer and the removal of signals below 100 Hz allows the iTravelers to play about twice as loud.

A wired remote volume and input is included so that if the subwoofer is placed out of the way a volume control and input are still accessible.

1. The level controls on both the sub and the remote operate the same, and both control the volume of the whole system. Set the maximum volume wanted with the control on the sub with the remote volume all the way up. Then use the remote volume as necessary.

2. The iTraveler's volume control works on just the iTravelers, and has no effect on the sub. You can, if needed, turn the speakers down some which will make the bass louder in relation to the iTravelers.

3. The minijack on the remote is a mixing audio input the same as the one on the sub. So you can plug in your iPod or MP3 player there, while your PC is plugged into the sub, for example. The audio signal has to go into the sub so that the signal is split with just the low frequencies going to the sub and the highs to the Travelers.

4. The frequency response of the sub is about 45 Hz to 100 Hz. The crossover has a very steep slope on the high end, so very little vocal sounds can be heard from the sub. The distortion and wind noise from the port have been reduced sufficiently so that the bass sound is only heard as part of the two speaker soundfield.

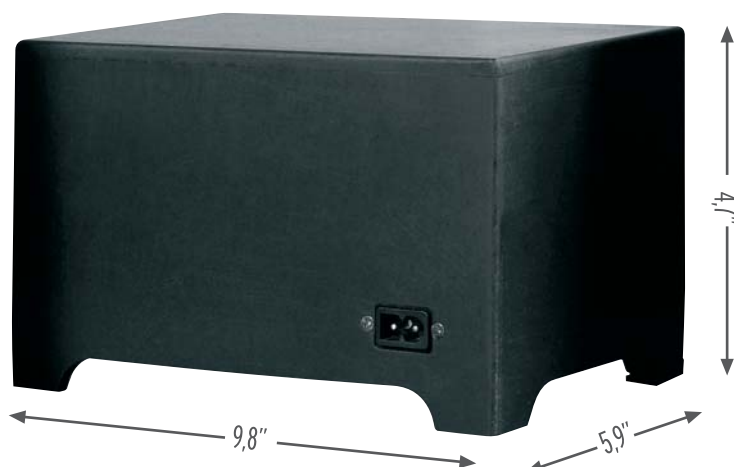
The audio signal to the iTravelers has been filtered so that they get about 100 Hz to 20 KHz, with some additional frequency response shaping added to that signal.

The remote control volume is for both speaker and subwoofer.

The iTraveler volume control is always only for the iTravelers.

The power supply is international, and can handle 100/220 VAC.

Just use the correct power cord for whatever country you are in.



You can use them with any source

Many systems incorporate an iPod specific dock. This feature adds unnecessary cost and complexity. Any portable player with a cheap male to male mini-stereo cord can be connected because all portable audio sources have a headphone output and have volume and tone controls. This is the simplest way to connect to a portable system.

A common use will be in combination with laptops and PC's whose sound cues need to be heard even when the listener is listening to a different audio source. This can be easily accommodated with 2 mixing inputs, one for the PC and one for any other device.



Rechargeable battery system

The use of non-rechargeable batteries in any audio system which is meant to be high fidelity means that the batteries will have a short life or be very large and heavy. This is because of the power needed to reproduce full range sound at reasonable levels. The most common battery size is AA, so that is what should be used. They should be replaceable because even rechargeable batteries wear out. The charging system must carefully manage battery charge and discharge so as to maximize run time and avoid damage to the batteries or equipment, and should also inform the user about the battery charge status. NiMH batteries especially require a very specific charge and discharge process in order to have a long life.

The AC power supply should be lightweight and universal voltage. Heavy, country specific supplies are not the right solution for a simple, portable system.

Any battery compartment that uses coil spring type contacts will not work because the high current to and from the batteries requires special contacts.

A portable system is subject to drops and shocks which will damage weak battery compartments and connections.

A long operating time on battery power requires optimum use of that power. Six cells give the minimum voltage that the drivers require as well as the correct voltage to efficiently operate the electronics.

Each speaker has a 6 AA cell battery compartment. A total of 12 cells can be used for the longest operating time, but the system will work with only 6 cells loaded into either speaker.

Easy of use

No manual is needed if the operation of the system is clear to the user. With only a signal and power input, it will be obvious to even non-technical listeners how to set them up. Putting in batteries must also be easy, with the proper orientation clearly marked, and cause no damage if they are put in the wrong way.

Just like a cellphone, if the batteries last for a day or even a weekend without charging, then the speakers become a simple "grab and go" device. It should manage when it needs to turn on, turn off, charge the battery, etc. If the batteries become too discharged for normal operation, then the system has to shut off to avoid distorted sound and damage to the batteries.

It should give clear information about the status of the batteries so the user can plug them in when a recharge is needed.

Modular System

- When the left speaker is disconnected the right speaker will play both channels (left and right).
- Full stereo effect even at moderate volume with both 2 speakers connected.
- With 2 speakers + subwoofer, higher sound pressure and flat frequency response down to 45 Hz !



Mono
1 speaker
L+R



Stereo
2 speakers
L & R



Stereo + subwoofer

iBag

iBag is designed to carry the Ingenious iTraveler speakers. It's an exclusive and elegant bag that delivers maximum travelling comfort.

Its spacious interior - comprising two external pockets and numerous accessory compartments - was designed to carry both speakers and indispensable accessories such as USB and firewire cables, sync cables, headsets, remote control, docking station, chargers and batteries. Available in leatherlike or vinyl versions, the iBag is perfect for use on the move and also great for keeping your iTraveler system in order at home.

iBag is available in:

- leatherlike with white stitching for white or black iTraveler



- white and black stripes for white or black iTraveler



- white and colored stripes for colored iTraveler



2 compartments for accessories storage

Leatherlike iBag for white or black iTraveler



Colored stripes vinyl iBag for colored iTraveler