Headphones – Basic Information / Notes / Test Procedure

There are many different types of headphones available that have specific purposes. Headphones can assist technicians with mixing or troubleshooting live performances. A set of "quality" headphones should be able to replicate the "highs, midrange, and lows" necessary for the best frequency response and monitor sound sources with crystal clear fidelity. You can perform a simple procedure to test headphones (see next page).

Shure SRH840A

Courtesy of Shure

Developed to provide accurate and well-balanced audio, the SRH840A Professional Monitoring Headphones are optimized for critical listening and studio monitoring. A precisely tailored frequency response and 40mm neodymium dynamic drivers deliver rich bass, clear mid-range, and extended highs. A wide, padded headband and collapsible design combine with Shure's durability to provide the ultimate listening experience. *Courtesy of Shure*

Shure HPAQA1 Threaded 1/4" Adapter

Video Clip!

The Threaded 1/4" TRS to 1/8" TRS connector/adapter is a very useful adapter. This adapter lets you use one set of headphones with the two most popular headphone input jacks. Otherwise, you would need two sets of headphones with different connectors.

Noise cancelling headphones

Noise Cancelling Headphones – The technology is called "Active Noise Cancellation" (ANC), also referred to as "Automatic Noise Cancellation." ANC technology works by first having a microphone capture unwanted ambient sounds (noise) and then having an internal amplifier create sound waves that are "out of phase" with these unwanted ambient sounds. The two combined "out of phase" signals (sounds) will cancel each other out.

Ear Buds – Bluetooth / Wired

Bluetooth earbuds are very popular, there are hundreds of choices, and most models come with ANC. Sound quality, battery life, and connector stability have improved (especially on current models). Wired earbuds can still be somewhat convenient – especially when your wireless earbuds require a charge. Audio technicians should understand how to connect all kinds of devices via Bluetooth.

Broadcast / Gaming Headphones

Typical Broadcast and Gaming style Headphones with Microphone.

Broadcast and Gaming Headphones have built-in microphones and noise canceling and are built for extra comfort. Both types are known for their excellent sound quality. Gaming types of Headphones are designed to help immerse the "gamer" into the experience and can offer "true" surround sound.

Headphone Amplifiers

As an audio technician, you will come across or eventually find a use for a headphone amplifier. This Whirlwind model has four output channels that can drive headphones or earbuds (one signal input feeds all four headphone outputs). Each channel has its own volume control, and both 1/4" and 3.5mm (1/8") headphone jacks are available.

Front

Whirlwind Model HATT4

Rear

Courtesy of Whirlwind

How to Test Headphones / Ear Buds (That use either a 1/4" or 1/8” TRS).

a) Turn the meter on, and set the meter to Ohms – the 200 or 2k (2000) setting.
b) Place the red meter lead on the “tip” of the connector, and the black meter lead on the “ring” of the connector. The meter should read anywhere from 50 ohms up to 80 ohms (depending on the set of headphones) – this is the total impedance of the headphones – the starting point for the following tests.
c) Place the red meter lead on the “tip” of the connector, and the black meter lead on the “sleeve” of the connector. Now the meter should read around “half” of the total impedance (Example: If the total impedance reading in b) is 69.8 ohms, you should now read around 35 ohms – half of 69.8).
d) Now place the red meter lead on the “ring” of the connector, and the black meter lead on the “sleeve” of the connector. Now the meter should read around “half” of the total impedance, you should now read around 35 ohms as well. The “individual” ear piece readings will depend on the “total” reading you get with “b” (which is the total impedance of both ears).
e) If you read a “short” (000 or 000.1) or an “open” on any of the tests above then the headphones are defective (Could be both sides or just one side).

Note: Headphones are basically “two” high impedance speakers (one for each ear) connected to “one” stereo connector.

Video Clip!

The measurement on “one” Ear Bud (above left) indicates a reading of 32.5 ohms. The measurement on both Ear Buds (above right) indicates a reading of 62.2 ohms (which is a little less than both Ear Buds added together but close to an “exact” reading of 65 ohms (32.5 x 2).

If one (or both) of the Ear Buds read Open or Shorted, you can perform another test to check if the “cable” could be defective. First, attach the meter leads to the connectors “Tip and Ring,” then start wiggling/moving the cable around to see if it affects the meter reading. Also, “push and pull” on the cable closest to the Ear Buds to see if the meter reading changes as well. This is a standard process that helps locate any breaks in the cable.

The same test can be performed on Professional model Ear Buds as well. Take a reading on one Ear Bud, then the other Ear Bud, and add them together to find the total impedance.

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