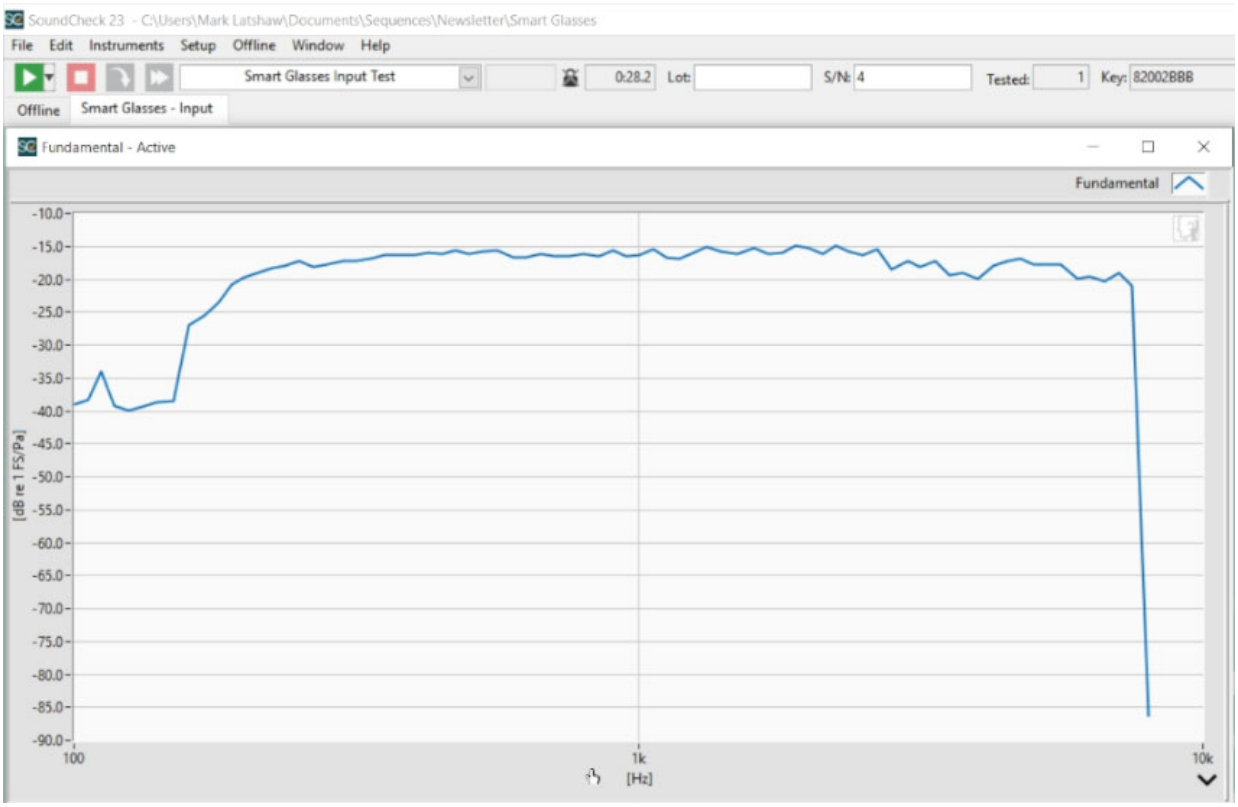
Smart Glasses – Mic Input Test Sequence

Introduction

The purpose of this sequence is to test the microphone input of a pair of Bluetooth Smart glasses. The sequence uses a 1kHz pilot tone accompanied by a Stweep stimulus from 8kHz-100Hz as the stimulus. The sequence prompts the user to put the device in pairing mode, followed by a series of steps that establish connection with the BT interface, in this case the BQC-4149. This involves disconnecting any previously paired devices, fetching the BT address and connecting audio. Once the glasses are paired with the BQC, they are placed on the Head and Torso Simulator (HATS). The stimulus is then played through the mouth simulator and recorded simultaneously through the smart glass microphone.



Final display showing the Fundamental frequency response of the Smart glass microphone

Analysis requires that the stimulus and response waveforms be at the same sampling rate. Therefore, a resampling step is used as necessary. Furthermore, a frequency shift step is often required because there are different clocks on the input and output devices.

The analysis is then performed by comparing the original stimulus to the recording captured by the microphone using HarmonicTrak algorithm that provides the Frequency Response. The final display shows the Fundamental frequency response of the Smart glass microphone.

Hardware Setup & Calibration

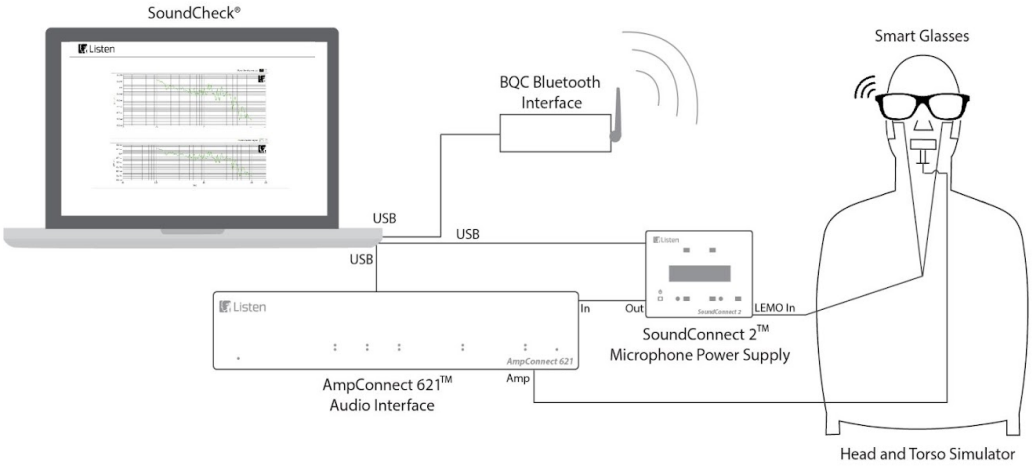
1. Set up the audio interface (AmpConnect 621) and the BQC 4149 BT as shown in the system diagram below.

   Note: The system diagram shows the setup required for testing both outputs and input. That is, this sequence can be used in combination with the one to test the outputs as well. However, for this sequence where only the microphone is tested, SoundConnect 2 is not required.

2. Equalize the mouth simulator by following the Speaker Equalization procedure.
3. Make sure the Digital In 1 signal path uses Unity Digital In (AES 17).dat and is mapped to the Input 1 of the BQC-4149. The sequence uses BQC message steps to configure the Bluetooth interface. If BTC hardware is used instead of BQC, these can be changed and relinked by editing those steps.
4. Note: Post Processing Resampling assumes that converting to a 44.1kHz sampling rate is required. If both the input and the output audio interfaces are operating at the same sampling rate this step can be removed. If your hardware is configured for a different sampling rate, this step must be edited to match your configuration.

The sequence is ready for use.

System diagram



Further sequence development

This sequence has been designed for simplicity and has been written for the microphone input of smart glasses.

Ways in which you could modify or further develop the sequence include:

- Combining this sequence with the Output Sequence to test both the send and receive of the smart glasses at once.

- If the same Bluetooth device is always being tested, the BQC Get Address step can be changed to Automatically Connect to the specific MAC address without requiring the user to select it from the list.
- This sequence only displays the frequency response of the microphone. More measurements can be added to create a more in-depth test.