Operational Description

The iMuffs package includes two separate devices (see picture below). Using Bluetooth 2.4 GHz radio the iMuffs allows music to be played controlled and listened to all wirelessly from the Apple iPod. The "dongle" wirelessly transmits an audio stream from the stereo output of the Apple iPod to the receiving "headphones" up to 30ft using the interoperable world of Bluetooth. The headphones primarily receive the near-CD quality audio stream from a transmitting dongle connected to an Apple iPod but can also transmit simple remote commands to the dongle, which in turn uses the serial lines on the dongle to control the iPod wirelessly. The headphones can also connect to other Bluetooth devices supporting hands-free or A2DP stereo audio stream.

The headphones are independently powered off an internal 3.7V Li-Polymer battery of 500mah, which is charged when connected to a powered USB port via the mini-USB port on the headphone. The dongle is powered directly off the iPod's battery source, which requires the dongle using serial commands to first successfully identify itself as a recognized device for the iPod in order to receive sufficient power.

For efficient bandwidth of streaming audio a DSP is used in the transmitting dongle, where the analog audio output of the iPod is compressed using the SBC codec and encoded for efficient Bluetooth radio transmission. As the headphones receive the audio stream using Bluetooth radio, the same DSP and SBC codec is used but this time decoding the incoming audio stream to an analog signal or actual music. Using the High-Quality SBC codec the audio is encoded / decoded at 44.1 KHz with a data transmission rate of approximately 328 kb/s which is near-CD quality.

While the headphones are connected to the transmitting dongle for the iPod the built-in microphone in the headphone can allow simultaneous connection to any Bluetooth hands-free supporting device such as a mobile phone to use as a hands-free headset for full duplex conversation while taking advantage of the built in DSP for echo canceling and noise reduction. With this integration the iPod listener can choose between the two devices when connected to a mobile phone that supports Bluetooth hands-free. For example while listening to music if there is an incoming phone call the dongle will automatically pause the current song that is playing to notify the user of an incoming call with an audible ring in the headphones. Once the call has ended or ignored the song will automatically un-pause and the music will start back up from when it was last interrupted.