CLAIMS

What is claimed is:

1. An apparatus with acoustic enhancement, the apparatus having a corresponding frequency response, comprising:

a driver unit with a housing having an interior side for integrating together a magnet, a diaphragm, and a primary bass port, the primary bass port being substantially surrounded by the magnet and having a primary bass port chamber with a first end opening facing towards the diaphragm and a second end opening facing opposite of the first end opening, the diaphragm being located on a front side of the driver unit and configured for analog audio reproduction; and

a secondary bass port having a secondary bass port chamber with a third end opening and a fourth end opening, the secondary bass port being coupled at the third end opening to the primary bass port at the second end opening, and the fourth end opening having substantially unimpeded air flow.

2. The apparatus as recited in claim 1, further comprising:

an acoustic chamber configured to prevent ambient noise from substantially mixing with the analog audio reproduction, the acoustic chamber substantially encircling and covering a backside of the driver unit except for where the secondary bass port couples to the primary bass port of the driver, wherein the acoustic chamber and the secondary bass port are configured for collectively tuning the sound pressure levels in the frequency response and the backside of the driver unit corresponds to an exterior side of the housing, the exterior side of the housing being opposite of the interior side of the housing, wherein the second end opening of the primary bass port does not open to the acoustic chamber.

3. The apparatus as recited in claim 2, wherein each chamber has a different pressure during an operational mode.

4. The apparatus as recited in claim 3, wherein the operational mode is when the diaphragm is moving.

5. The apparatus as recited in claim 1, wherein a first air flow resistor is controllable to apply different air flow resistances at the fourth end opening of the secondary bass port.

6. The apparatus as recited in claim 5, wherein a second air flow resistor is configured to apply a fixed air flow resistance at either the second end opening of the primary bass port or third end opening of the secondary bass port.

7. The apparatus as recited in claim 6, wherein the first and second air flow resistors are of a gas permeable construction, the gas permeable construction being selected from the group consisting of paper, cloth, foam, mesh, and felt.

8. The apparatus as recited in claim 1, wherein the secondary bass port is sizable in real time.

9. The apparatus as recited in claim 1, wherein the secondary bass port is configured for tuning the sound pressure levels in the frequency response.

10. The apparatus as recited in claim 9, wherein the secondary bass port is configured for tuning the sound pressure levels within a frequency range of about 100 Hz to 4 kHz in the frequency response.

11. The apparatus as recited in claim 9, wherein the secondary bass port chamber has a corresponding air flow resistance such that lowering the air flow resistance results in increasing sound pressure levels between about 100Hz and 300 Hz in the frequency response for worse vocal clarity and increasing the air flow resistance results in decreasing sound pressure levels between about 100 Hz and 300 Hz in the frequency response for better vocal clarity.

12. The apparatus as recited in claim 1, wherein the secondary bass port comprises a plurality of sections that divide the secondary bass port chamber into sub-chambers, each sub-chamber having a different cross sectional area.

13. The apparatus as recited in claim 12, wherein at least two of the plurality of sections are constructed from different materials, the material being selected from the group consisting of plastic, ethylene-vinyl acetate (EVA) felt, metal, non-metal, rubber, foam, and sponge.

14. The apparatus as recited in claim 1, wherein the driver unit is a dynamic driver.

15. The apparatus as recited in claim 1, wherein the apparatus is selected from the group consisting of in-ear headphones, on-ear headphones, over-ear headphones, open-back headphones, semi-open back headphones, and closed-back headphones.

16. The apparatus as recited in claim 1, wherein the primary bass port is a substantially straight tube and the secondary bass port is a hollow structure of substantially any shape selected from the group consisting of a straight tube, a winding tube, a straight/winding polygonal cross sectional hollow structure, a straight/winding cylindrical hollow structure, a flare out tube, and any combination of these.

17. The apparatus as recited in claim 1, wherein the fourth end opening does not open to an acoustic chamber.

18. The apparatus as recited in claim 1, wherein the secondary bass port is completely contained within a removable casing end cap.

19. An apparatus with acoustic enhancement, the apparatus having a corresponding frequency response, comprising:

a driver unit with a housing having an interior side for integrating together a magnet, a diaphragm, and a primary bass port, the primary bass port being substantially surrounded by the magnet and having a primary bass port chamber with a first end opening facing towards the diaphragm and a second end opening facing opposite of the first end opening, the diaphragm being located on a front side of the driver unit and configured for analog audio reproduction;

a secondary bass port having a secondary bass port chamber with a third end opening and a fourth end opening, the secondary bass port being coupled at the third end opening to the primary

bass port at the second end opening, wherein a first air flow resistor is controllable to apply different air flow resistances at the fourth end opening of the secondary bass port; and

a user switch for controlling in real time the first air flow resistor's application of different air flow resistances at the fourth end opening of the secondary bass port, the different air flow resistances being incremental or continuous values.

20. The apparatus as recited in claim 5, wherein the application of different air flow resistances at the fourth end opening of the secondary bass port results in different sound pressure levels within a frequency range of about 20 Hz to 1.5 kHz in the frequency response.

~~21. An apparatus with acoustic enhancement, the apparatus having a corresponding frequency response, comprising:~~

~~means for converting electrical audio input signal to acoustical audio output signal; and~~

~~means for tuning the sound pressure levels within a frequency range from 100 Hz to 4 kHz in the frequency response, wherein the means for tuning is coupled to the means for converting via a primary bass port of the means for converting.~~

~~22~~21. A method for an apparatus with acoustic enhancement, the apparatus having a corresponding frequency response, comprising:

providing a driver unit with a housing having an interior side for integrating together a magnet, a diaphragm, and a primary bass port, the primary bass port being substantially surrounded by the magnet and having a primary bass port chamber with a first end opening facing towards the diaphragm and a second end opening facing opposite of the first end opening, the diaphragm being located on a front side of the driver unit and configured for analog audio reproduction; and

providing a secondary bass port having a secondary bass port chamber with a third end opening and a fourth end opening, the secondary bass port being coupled at the third end opening to the primary bass port at the second end opening, and the fourth end opening having substantially unimpeded air flow.