including op amp 224 with a single input but can include other amplifier configurations. In some embodiments a differential amplifier 227 is added to the output of the microphone preamp for additional noise control. In the case of microphone preamp 208 an op amp can be used (but isn't required) to amplify the microphone signal. FIG. 2 shows only one of the operational amplifiers inputs to connect to the amplifier, using either the "inverting" or the "non-inverting" input terminal to amplify a single input signal with the other input being connected to ground. Since a standard operational amplifier has two inputs, inverting and non-inverting, we can also connect microphone signals to both of these inputs at the same time producing another common type of operational amplifier circuit called a Differential Amplifier. The resultant output voltage will be proportional to the "Difference" between the two input voltage signals and works well to reduce common mode noise.

In particular, differential amplifier 227 takes the differential microphone signals 223 from the microphone preamp 208 and due to the nature of differential amplification reduces common mode noise, resulting in further microphone noise reduction reflected at the Differential Amp output signal 225. It should be noted that although FIG. 2 shows the amplifier 227 with 2 inputs, other embodiments of the invention are constructed with the amplifier 227 acting as a second stage of amplification but having only a single input. The mic itself may be single ended but differential mic signals can be achieved by changing the manner in which the mic or opamp is connected. This clean signal is then applied to the Analog to Digital Converter block 116 of DSP 112, resulting in a clean digitized microphone signal applied to the computer bus 114, for use by the computer 250. The ground 204 for the power supply is shown isolated from the second ground reference 206 for the secondary side of the transformer 214. This second ground reference 206 is also representative for the ground 206 for the microphone preamp, but again is isolated from the computer bus ground 211, i.e., a third ground reference. The computer bus ground reference is also representative for the DSP 112 and the differential amp 227. The ground of the differential amp is the same as that of the DSP 112 in order for the ADC to convert the correct Microphone signal into the digital domain.

FIG. 3 is a diagram illustrating sample power supply noise reductions in the presence of lightly loaded graphics cards in accordance with some embodiments of the present invention. FIG. 4 is a diagram illustrating another view of sample power supply noise reduction in the presence of lightly loaded graphics cards in accordance with some embodiments of the present

CLAIMS

What is claimed is:

1. An audio processing system for use with a computing device, the system comprising:

an isolation block configured to receive a supply signal, the supply signal comprising a positive voltage and a first ground reference, the isolation block configured to reduce power supply noise present in the supply signal by providing an output comprising a positive output voltage and second ground reference, the second ground reference isolated from the first ground reference;

a microphone preamp circuit configured with one input receiving a microphone signal, providing a microphone preamp output signal, and wherein the microphone preamp circuit is powered by the positive output voltage from the isolation block and the second ground reference, and

a digital signal processor block configured to receive the microphone preamp output signal, convert the microphone preamp output signal to a digital format, and to transmit the digitized microphone preamp output signal to the computing device;

wherein the isolation block comprises a switching circuit and a transformer, the second ground reference on the secondary side of the transformer is isolated from the first ground reference.

2. The system as recited in claim 1 wherein in use with the computing device, the computing device is one of a notebook computer or a desktop computer and the supply signal is received from a power supply connector and the digitized microphone preamp output signal is transmitted to a computer bus on the computing device.

3. The system as recited in claim 2 wherein the power supply connector is a PCIe Power Socket and the computer bus is a PCIe bus.

4. The system as recited in claim 1 further comprising a differential amplifier connected between the microphone preamp circuit and the digital signal processor block and wherein the differential amplifier is configured to reduce common mode noise from the microphone preamp output signal.

5. The system as recited in claim 1 wherein the switching circuit comprises a push-pull configuration.

6. A method for reducing noise in a microphone circuit comprising the steps of:

isolating a low noise power supply from a noisy power supply; and

configuring the microphone circuit to receive power from the low noise power supply,

wherein the step of isolating the low noise power supply comprises providing an isolation block configured to receive the noisy power supply, the noisy power supply comprising a positive voltage, the isolation block configured to provide an output comprising the low noise power supply and a second ground reference, and wherein the isolation block comprises a switching circuit and a transformer, the second ground reference on the secondary side of the transformer is isolated from the first ground reference.

7. The method as recited in claim 6 further comprising applying the microphone preamp output signal to a differential amplifier to reduce common mode noise.

8. A computer audio card for coupling to a computing device, comprising:

an auxiliary power socket configured to receive an auxiliary power connector supplying supplemental power from a computing device power supply;

a microphone preamp configured to receive a microphone signal and amplifying it before transmission to an analog to digital converter (ADC);

an isolation block configured for conditioning the supplemental power by isolating the supplemental power from power delivered to the microphone preamp; and

a digital signal processing block configured for receiving a digital signal from the ADC and for processing the digital signal.

9. The computer audio card recited in claim 8 wherein the digital signal processing block is configured to transmit the processed digital signal to a computer bus coupled to the computing device.

10. The computer audio card recited in claim 8 further comprising a microphone differential amplifier in the microphone amplifier circuitry for reducing common mode noise.

11. The computer audio card recited in claim 9 wherein the computing device is a desktop computer, the computer bus is a PCI Express bus, the auxiliary power connector is an auxiliary PCIe power connector, and the auxiliary power socket is configured to receive the auxiliary PCIe power connector.

12. The computer audio card recited in claim 8 wherein the microphone preamp is connectable to a microphone via an input jack.

13. The computer audio card recited in claim 12 wherein the microphone input jack is located on an external audio control module.