

Overview

Advancements in IP telephony have given rise to variety of audio communication applications. Aftek recognizes the need of building quality audio products and has developed required expertise to help customers build world class products.

Services

Aftek has vast experience with respect to audio communication solutions. It spans from designing hardware systems to analysis of audio quality and audio processing algorithms like echo cancellation for audio quality improvement.

Aftek has designed and developed audio solutions for its customers such as:

- ♦ Door phone, which supports audio communication over Ethernet
- ♦ Wireless IP phone that supports audio communication over Wi-Fi
- ♦ Ethernet IP phone with an integrated line and echo canceller module
- ♦ Purely analog telephony solution, which supports audio communication over a differential pair

Aftek's services for audio based solutions encompass :

Audio Circuit Design

✓ Entire hardware design process for mixed signal design including:

- ♦ Analog front-end design for microphone pre-amplifier (Transistorized, IC based, op-amp based) and speaker power amplifier (Class A, Class AB and Class D)
- ♦ Digital processing blocks such as audio codec over I²S, AC97 and USB
- ♦ Signal conditioning design to achieve noise immunity and high SNR

✓ Acoustic and line echo canceller chip circuit design and implementation with considerations for factors mentioned below, which play a critical role in a full duplex audio communication system where problem of echo is dominant and tough to eliminate.

- ♦ Acoustic coupling path
- ♦ Mechanical coupling
- ♦ Electrical coupling
- ♦ Microphone and speaker placement
- ♦ Separation and orientation

✓ Half duplex design for speaker phone and telephony applications

Audio Board Layout

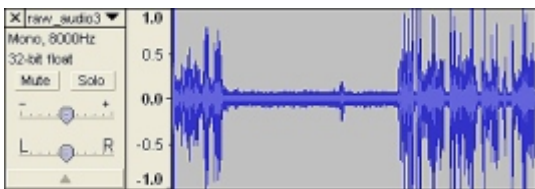
- ✓ PCB layout considerations such as impedance matching, termination and shielding for audio traces with separation from noisy digital signals
- ✓ Separation of ground and power planes for audio power amplifiers
- ✓ Careful placement to provide efficient routing and easy plane partitioning to reduce noise pickup and EMI radiations from class D amplifiers
- ✓ Use of star grounding technique
- ✓ Flooding all unused PCB area with ground so that unwanted high-frequency energy in the signal lines can be shunted to ground through capacitive coupling



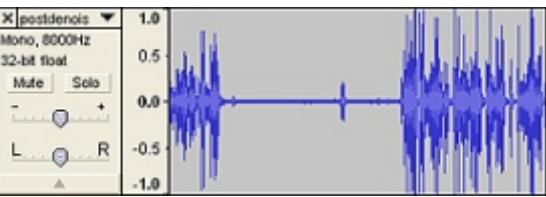
Expertise

- Circuit design
- Board layout
- Analysis and verification
- Codecs
- Algorithm development (e.g. Echo cancellation)

Raw Audio



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About Aftek

Aftek Limited is a full spectrum technology services company from India. Over last 20 years Aftek has gained significant exposure to variety of technologies. Rich technological capabilities, focused investments in Research & Development and industry exposure enables us to reach beyond the basic IT services to design and deliver projects, products and implement end-to-end solutions to customers in variety of industries. Our service spectrum covers key services as Hardware Development, Firmware Development, Embedded Systems, Application Development, Application Maintenance and Testing Services.

Audio System Verification

- ✓ Audio testing and debugging using audio analysis tools such as Audacity, GoldWave and standard test tones
- ✓ Testing and debugging of discrete audio components e.g. analysis of microphone and speaker characteristics such as:
 - ◆ Speaker frequency response using signal generators or standard test tones
 - ◆ Speaker impedance
 - ◆ Microphone gain and directivity
 - ◆ Input-output characteristics
- ✓ Enclosure design review for microphone and speaker placement, separation, orientation and plane of focus

Audio codec and algorithm development

- ✓ Codec interface development for AC97, I²S and USB.
- ✓ Raw PCM signal processing
- ✓ Multi-pole filter development using techniques like FFT, DFT for elimination of unwanted noise.
- ✓ Audio codecs like MP3, MP2, AMR, AAC, MIDI, 3D audio
- ✓ Speech codecs such as G.711 (A-Law, μ -Law), GSM, G.726, G.729 AB, G.723.1
- ✓ Algorithm development for various echo cancellation techniques such as VAD (voice activity detection), silence detection, half/full duplex communication, acoustic echo cancellers, sample rate conversion, automatic gain control etc.

