**Embedded Systems for a large sound-systems product company**

1.  **Case viewpoint: Project- Legacy Phaser**

Situation: Perseus Legacy Phaser is an audio signal processing algorithm which runs in a Digital Mixer. The Legacy Phaser algorithm was originally implemented in 'C' language and it took an average of 423 cycles on ADSP 21369 Digital Signal Processor. The requirement is to reduce the machine cycles below 300 by optimizing algorithm in Assembly Language.

Scope of work:

- Development of legacy Phaser & Reverb algorithm in assembly language for SHARC 21369 board
- Optimization to reduce 423 cycles to 280 cycles without changing the algorithm.
- Testing in a simulated environment & on an actual board

Tools & Technology:

- Analog Devices Sharc ADSP21369, VDSP++ 5.0
- C, Assembly Language

2.  **Case viewpoint: Project- Legacy Phaser – SDK Plug-in**

Situation: This SDK supports the development of plug-ins that is applicable to the products next generation mixing system. Perseus plug-in consists of three elements.

i) SHARC software (ii)Control software and (iii)GUI configuration software. The SDK assists the development of SHARC software and the Control software. The three step process in developing the Perseus plug-in includes the development of the SHARC program, definition of the parameters for editing and finally the design and the configuration system along with the evaluation of the plug-in running on SDK BOX with Windows PC.

Scope of work:

*   Development of Plug-in for Legacy Phaser
*   Testing on SDK 2.0.0

Tools & Technology:

*   Analog Devices Sharc ADSP21369, VDSP++ 5.0, SDK 2.0.0
*   Perseus SDK Box
*   C, Assembly Language

**3.** **Case viewpoint: Project- Legacy Dual Pitch**

Situation: Perseus Legacy Dual Pitch is an audio signal processing algorithm for changing the pitch of the incoming audio. This algorithm was originally developed in the Perseus SDK version and the customer wanted to upgrade this project to next version of Perseus. After the up gradation of SDK it was expected to optimize the Legacy Dual Pitch algorithm in developed in assembly language. Both the SDK update of project and optimization were done successfully.

Scope of work:

- Updating the Plug-in from SDK
- Optimization of SHARC Algorithm from 1200 cycles to 682 cycles
- Testing of SDK

Tools & Technology:

- Analog Devices Sharc ADSP21369, VDSP++ 5.0, SDK 2.0.1
- Perseus SDK Box
- C, Assembly Language

**4. Case viewpoint: Project- Legacy Reverb**

Situation: This Legacy Reverb signal processing Algorithm was developed by the customer with a Signal Flow Chart. Our embedded team converted the Signal Flow Chart using the C programming language. The developed SHARC software runs in an ADSP 21369 processor environment.

Scope of work:

- Development of 'C' Program from the Signal flowchart
- Testing on SHARC 21369 EZ-Kit

Tools & Technology:

- Analog Devices Sharc ADSP21369, VDSP++ 5.0
- C, Assembly Language

**5.  Case viewpoint: Project- Legacy Modulation**

Situation: Perseus Legacy Modulation has six types of modulation effects namely AutoPan, Chorus, DynaFlange, Flange, Symphonic & Tremoro. This algorithm was originally developed by the customer and they wanted the algorithm optimized. The SHARC assembly optimization was done to a high level of detail by our embedded team.

Scope of work:

- Optimization of Modulation Algorithm from 2000 cycles to 1200 cycles
- Development of  Plug-in using SDK
- Testing on SDK

Tools & Technology**:**

- Analog Devices Sharc ADSP21369, VDSP++ 5.0, SDK 2.0.2
- Perseus SDK Box
- C, Assembly Language, C++

## 6. Case viewpoint: Project- Acoustic measurement tool on i-Phone

Situation: Acoustic Measurement Tool (AMT) is iPhone-based tool for measuring room acoustic parameters like reverberation time etc. Potential end user of Acoustic Conditioning Panel (Cho-on Panel), hereafter "user", is to do simple and basic acoustic experiment/measurement so that user becomes familiar with acoustic properties and become acoustic conscious.

Scope of work:

- Development of Signal Generation software (Noise, Sweep)
- Implementation of DSP Algorithm for Reverberation Time Calculation
- Development iPhone GUI
- Testing on simulator& iPhone

Tools & Technology:

- iPhone Device 3G and 4
- XCode 3.2, Cocoa Touch, Audio Framework, Open GL
- Objective C, C++