



## Client engagement:

- Sustained relationship for past 3+ years
- Team ramp up from 2 to 30 engineers
- Spans application/firmware development, testing and customer support



## Business impact for client:

The client leveraged Aftek's experience in client domain. Aftek completely aligned and at times improvised on client's processes thus resulting in seamless working of the distant teams.

Some other benefits were:

- Faster development and turnaround time in serving client's customer spread across the globe due to the time difference especially for Far East clients
- Dedicated and highly experienced team with expertise in Bluetooth domain
- Complete removal of overheads on recruitment and management of teams in India
- Increase in number of clients served by client
- Higher ROI for client due to the lower costs of development in India

## The Client

The client is one of the world's largest fabless semiconductor companies, with 2007 revenue of \$3.78 billion, and holds over 2,600 U.S and 1,200 foreign patents, more than 7,450 additional pending patent applications, and one of the broadest intellectual property portfolios addressing both wired and wireless transmission of voice, video, data and multimedia.

The client provides industry's broadest portfolio of state-of-the-art, system-on-a-chip and software solutions to manufacturers of computing and networking equipment, digital entertainment and broadband access products and mobile devices.

Aftek is working with the Bluetooth Audio division of client. The major product of this division is design and development of Bluetooth chipsets used in handsfree devices. These headsets are used along with mobile handsets and other Bluetooth enabled audio sources. The clientele for the chipsets includes heavyweights like **Motorola, LG, Samsung, Logitech** etc

Aftek has contributed in **development, testing and customization of firmware and application software** on the chipsets to provide **complete headset solution**.

## Business Situation

To retain their industry leadership and expand their customer base, client wanted to enhance the features and functionality of their existing systems and develop new systems on their new generation chipsets. They needed to reduce the cost of ownership of these systems for their client and extend customer support 24X7. One of the major issues faced by the client was supporting its own clients situated in countries like South Korea and Japan. Due to the time difference and no overlapping working hours, it was becoming difficult to support even huge customers like Samsung in South Korea. The client needed a team in overlapping time zones and quick flying time to overcome this problem. To meet their strategic initiatives, they leveraged the technology and management expertise of Aftek to outsource the application development and support for their BT enabled systems.

## The Challenges

Due to an earlier unpleasant experience with another vendor, the client was very apprehensive. Especially about protecting their IP and on different scale productivity and efficiency of outsourcing.

The ramp up time for the team was very short since Aftek took over the project midway from the previous vendor and we were facing hard deadlines.

The client has three generation chipsets and multiple application variants for each chipset which were delivered to various customers geographically spread apart. Building a scalable offshore team to cater these development, testing and customer support activities in a short span of time was a challenge.

At the start of the engagement the Aftek team was provided with restricted source access up to upper layer stack and hence resolving customer issues and suggesting resolutions by OTA traces and logs was another challenge that we overcame.



## The Contribution

Aftek acted as an extension of client's development, testing and customer support teams. Starting with providing bug fixes we graduated to **complete ownership of 2 chipset product lines.**

Some of the new applications/developed enhancements done:

- Complete design, development and testing of stereo and mono headset application for 3 chipset families
- Development of customized application which supports **simultaneous bidirectional audio communication.** This is used by **gaming applications**
- Application to enable simultaneous use of multiple headsets to listen to streaming music which routes it from audio source to multiple headsets over Bluetooth
- Implementation of white-papers released by Bluetooth SIG
- Development of complex algorithms to reduce **audio latency** and **echo cancellation**
- Development and integration of new **codecs** to support various compressions like **SBC** and **MP3**

### Key contribution in headset system testing:

Aftek has been carrying out testing for **15+ Mono/Stereo headset applications** based on three generation chipsets to execute **5000+ test cases per cycle.**

- Sanity, functional, performance testing
- Interoperability testing with almost **40 phones** for each project
- **Audio Quality** measurements
- Developed **automation testing environment**
- Designing test cases, enhancing/creating test plan
- Defect reporting/tracking after manual as well automated testing
- **1200+ scripts** to cover **23 profiles** and **7 protocols** for Windows based stack

### Key contribution in customer support:

We have been supporting a wide range of programs for multiple customers.

- Handling **20** different programs for **10** different customers like **Samsung, GN Netcom, Plantronics, Logitech** etc
- Requirement analysis and implementation of **MMI customization**
- Handling of customer reported queries/issues with a **turnaround time of less than 24 hours**
- Handling **Product release management** by triggering and releasing customer builds, creating and maintaining the release notes
- Development of various manufacturing tools. **Universal gang programming tools** and tools to facilitate **automated application configuration**
- User manual creation
- Customer support for web based downloads

### Technology:

- Mono HS/ Ultimate headset
- AVRCP, A2DP, HFP
- HCI, LM, BB
- SBC Audio Codec at 44.1 KHz
- MP3 codec integration
- USB 2.0, I2S, SPI, and UART interfaces
- Noise and latency reduction algorithms
- PTS, BQB qualification support

### Tools used:

- BT Sniffer (FTS, Merlin)
- Jeeni JTAG debugger
- Anritsu BT Tester for RF power
- M-Audio for audio quality
- Spectrum Analyzer
- BTE Insight

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