Clarinox developed a wireless system to provide additional information to the carers of hearing aid users.

Clarinox Role

Clarinox was engaged to ensure information available in a child's hearing aid was presented in a clear, simple and convenient way to the child's carer. It was decided a mobile phone would be the most convenient device for the carer to use. The hearing aid used a proprietary ultra low power wireless protocol, so using this was a mandatory requirement. Given that off-the-shelf mobile devices did not use this proprietary protocol it was not possible to interface directly.

The solution was to construct an intermediate electronic device that acted as translator from the proprietary format into a standard format, this is shown as the "Gateway Button" in Figure 2. The standard protocol chosen was Bluetooth wireless protocol due to its high prevalence on mobile phone devices.

Clarinox provided the product development services to construct the gateway button. This included the necessary porting and integration services for the embedded hardware and software. For this device Clarinox used the Clarinox Bluetooth protocol stack.

In addition Clarinox implemented software to handle the inquiry and extraction of information from the hearing aid and the presentation of this information on a user interface for a standard mobile phone. Figure 1a shows an example of the type of user interface that could be used for adjusting volume.
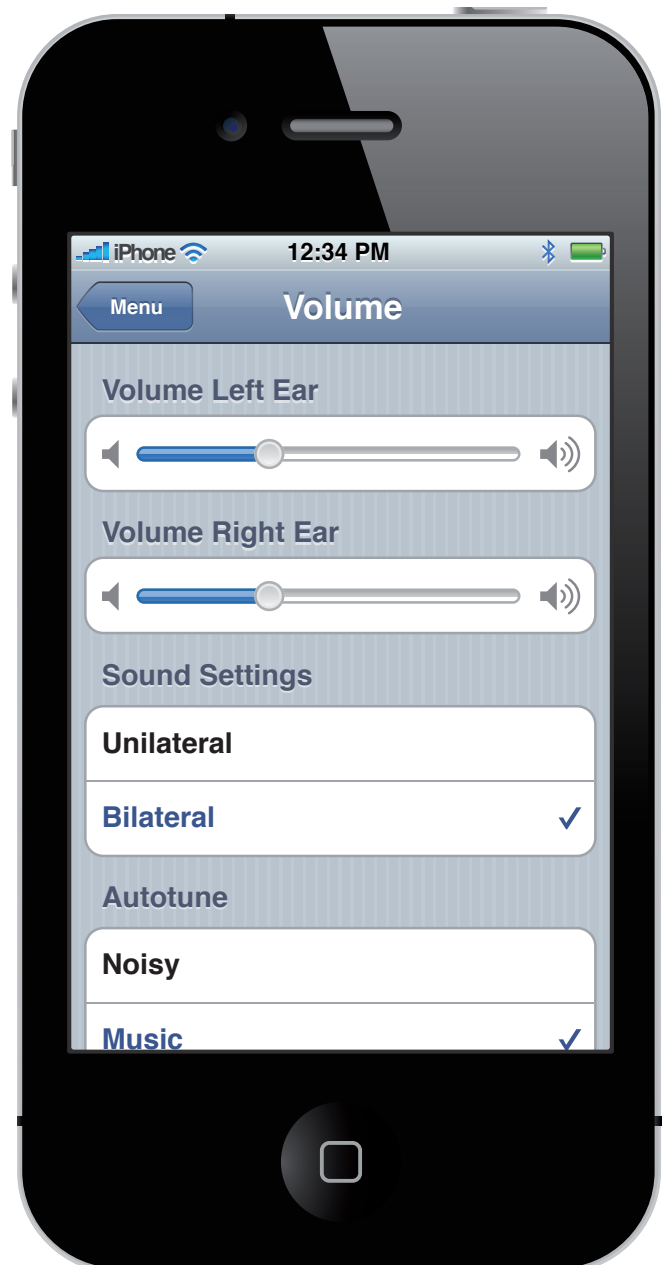
Figure 1a: Example user interface for adjusting volume and auto-tuning the hearing aids.

Outcome for Client

In this project Cochlear was testing the value of quick, easy access to diagnostic information to the carers of children with hearing impairment. The Clarinox modular approach to embedded development ensured that a test unit was achieved within half the time that would have been required by conventional approach. The gains were possible due to the in-built portability and reusability of the Clarinox middleware. The simple API ensured the application layer was quickly developed and the enhanced debugger ensured testing was completed on time and on budget.

Referring to the project, Cochlear said, *"The rapid development of a demonstration wireless system provided our business with new ways of looking at things and new opportunities for growth."*

Future Plans

The project provided a prototype unit to demonstrate and test the concept. Future plans involve investigation of other required functionality and alternative ways to reach the largest number of users.

Figure 2: Information flow diagram showing how an error that occurs on the headset is then diagnosed and displayed on the phone which in turn allows a carer to fix the problem.

..ıll iPhone 3G

12:34
Wednesday, 15 September

Error: Student 28 Hearing Device disconnected!

Close   OK

slide to unlock

Figure 1b (Above): Example error message when there is a fault in the system.

Student's Ear — *Ultra Low Power* — Gateway Button — *Bluetooth* — Teacher's Phone

Student's Ear — *Ultra Low Power* — Gateway Button — *Bluetooth* — Teacher's Phone