Bluetooth Conference Calling

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ELECTRICAL & COMPUTER ENGINEERING

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Introduction

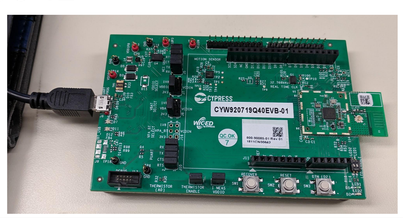
Conference calling is very widely used. However, most conference calling applications require multiple host devices such as computers and mobile phones. We intended to design a system using one host device (a PC) with multiple Bluetooth headsets to achieve a conference call.

Goals

- One host device connected to all the headsets used for the conference
- At least 2 simultaneous Bluetooth audio connections
- Each headset has 2-way communication with the host

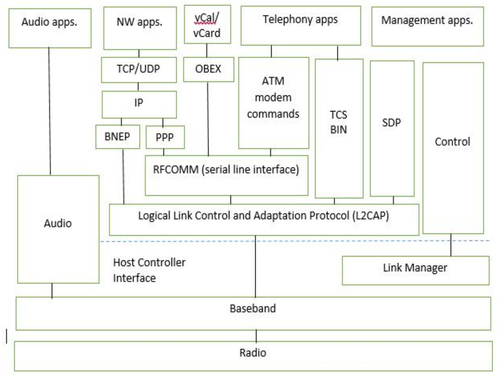
Platforms

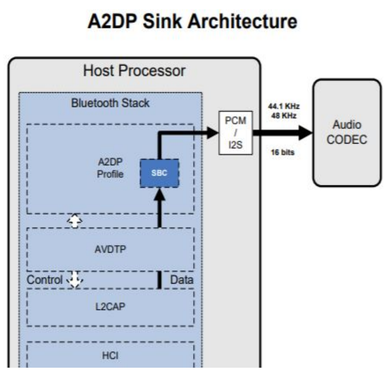
- Cypress CYW-20719B1 development board with Bluetooth 5.0 chip
- WICED Studio
- Qt 5.12



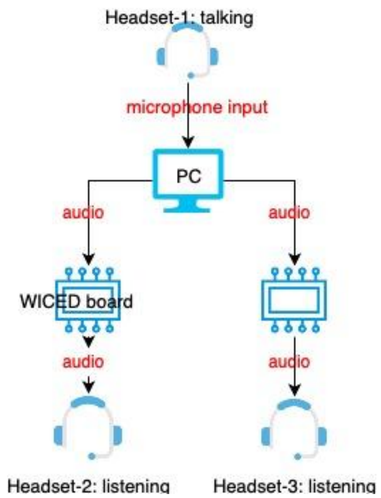
Development

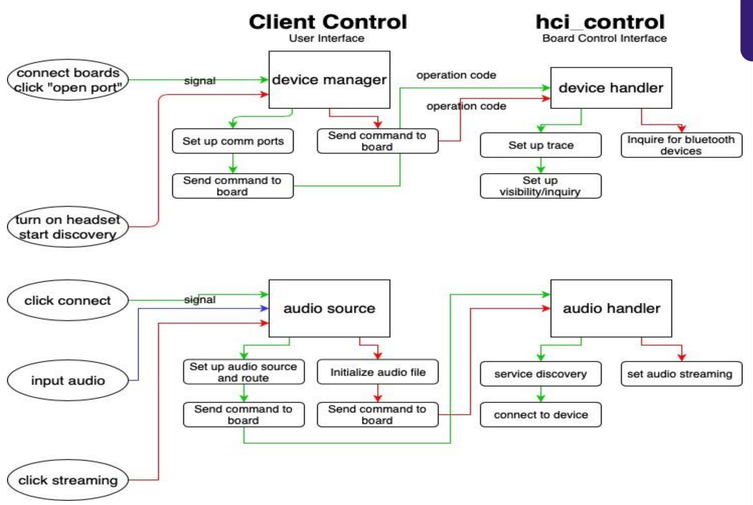
- **Initial plan:** pure software approach
  Modify Bluetooth stack to connect to multiple headsets



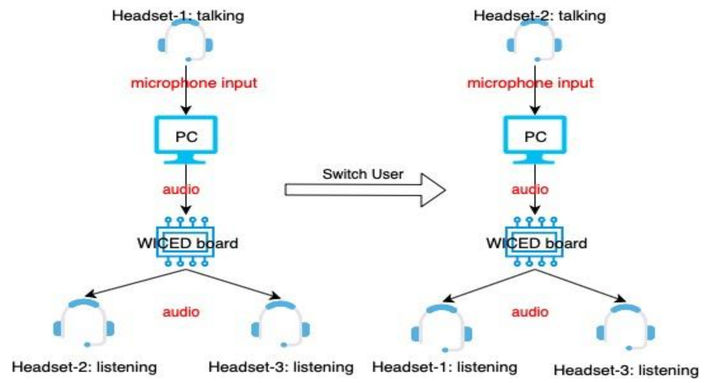


- **Final approach:** one connection per chip, multiple boards





- **Adjusted plan:** 2 connections/bluetooth chip
  Utilize Bluetooth 5.0 feature



Discussion

- Bluetooth 5.0 supports the adjusted plan, but features are not by board software yet
- Product design is a process of constant adjustments
- Future Work:
  - Use buffer to allow real-time audio streaming
  - Devices switching between speaking and listening
  - Synchronous audio streaming between headsets

Results

- Understanding of Bluetooth audio protocols and their limits
- Control Bluetooth chip from a customized client app
- Play sound files from the computer → board → headset
- Code pieces needed to control multiple chips
- Record voice from headset on host device

Conclusion

The goal was to see if it is possible to have multiple Bluetooth devices connect to one computer/phone communicate with two-way audio. We approached this problem by designing an application that controls multiple Bluetooth chips to manage more than one audio connection. Multiple connection conference calling via Bluetooth is technology limited at this time, but we have identified what achieving it requires.

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