

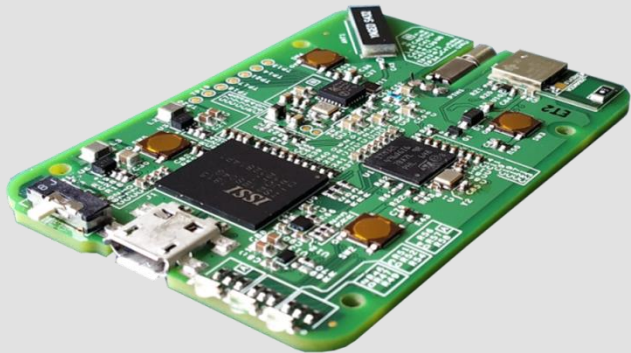


GadgEon

Engineering Smartness

WEARABLE MULTI RADIO DATA ACQUISITION MODULE

Wearable Multi Radio Data Acquisition Module



A leading Magic products company, dedicated to the innovation of world class magic illusions for the discerning performer wanted to develop a wearable electronic device and iOS App which assists the world's leading magicians with breath defying feats of magic and mentalism

Results / Outcomes

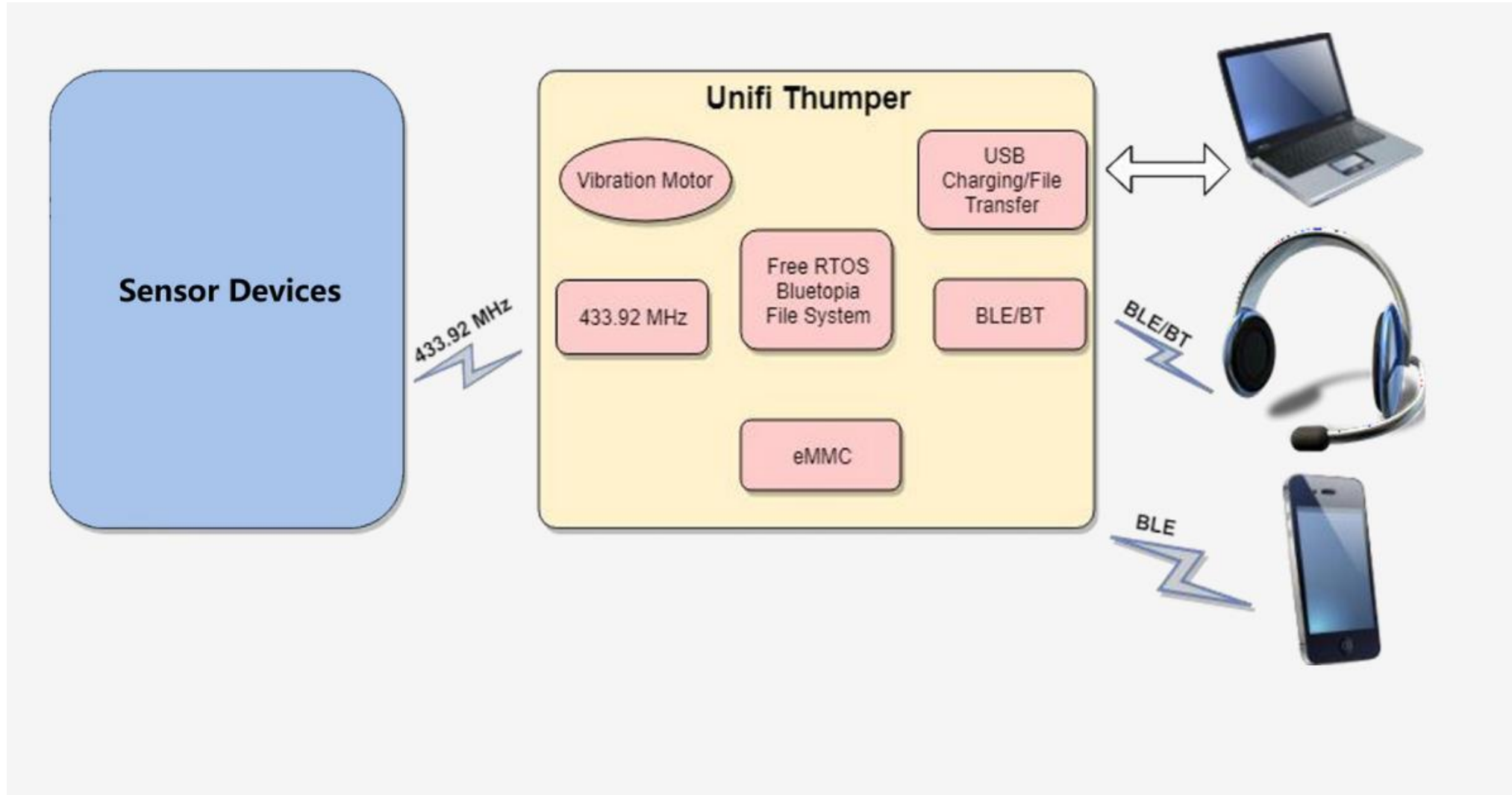
- Rechargeable & replaceable Li-po powered vibrating miniature central hub for multiple Unifi Tx devices
- Easy Configuration of Thumper device & event detection using iOS Mobile & Watch App
- USB Mass-storage device & firmware upgrade via Bluetooth



System Implementation Details

SI No	Category	Description
1	Technology Used	BLE/BT 4.1, 433.92MHz Sub GHz RF, eMMC 5.1, Li-po battery, iOS.
2	Interfaces availed	Micro USB, BLE/BT, Four User configurable buttons, Power slide switch, 3 RGB status LEDs, Low power battery indication
3	Design Challenges	<ul style="list-style-type: none">• Form factor constraints - 42x60x8mm• Having two radio interfaces (433MHz and BLE/BT) with on-board PCB antenna in this form-factor
4	Hardware design(Schematics)	<ul style="list-style-type: none">• Part selection to minimal footprint as possible to accumulate all interfaces in required PCB dimensions.• Design done in view of passing radio certifications with proper EMC guidelines.• Tool: Cadence OrCAD Capture CIS
5	PCB design(Layout)	<ul style="list-style-type: none">• Complex PCB design of very small form-factor of 42X60mm.• Intra and Inter Length matching and spacing for all critical high speed interfaces.• Critical placement & routing of radio signals (433.92MHz, BT) to ensure optimum performance.• 6L 1.6mm PCB with BGA fanout micro Via Structure• Tool: Cadence Allegro PCB Designer
6	Fab and Assembly House co-ordination	<ul style="list-style-type: none">• DFM and DFA• Preparing low cost CBoM's with low cost alternatives identified for high cost parts.• Life time check for components in BoM.
7	Board bring-up and Testing	<ul style="list-style-type: none">• Initial bring-up of the board followed by detailed Electrical interface verification.• Testing on iOS platform.
8	Firmware Application development	<ul style="list-style-type: none">• Integration of Bluetopia stack for BLE/BT Dual module• 433 MHZ RF integration in GPIO mode in custom protocol format• STBCFG01JR Fuel Gauge driver development and integration• eMMC 5.1 driver development and integration• Sophisticated state machine development for multiple event handling and status updation• Remote firmware upgrade support• FreeRTOS integration• Pairing and audio playback to a BT Classic ear piece.

▶ Thumper Pro – System Architecture



THANK YOU



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