Phase 1:

Integration of SD Card Reader with ESP32 for MP3 Playback.

In this phase, the project focuses on setting up the basic hardware infrastructure for audio playback. The primary components include:

1. **ESP32 Microcontroller:** The ESP32 serves as the central processing unit, responsible for controlling the overall system
2. **SD Card Reader**: An SD card reader is attached to the ESP32 to provide external storage for audio files. This allows for a large library of audio files to be stored and accessed easily.
3. **Audio Amplifier (MAX98357A):** An audio amplifier is connected to the ESP32 to drive the speakers and produce audible sound output.
4. **Battery:** A light weight battery is used to provide power to each and every component of the module.

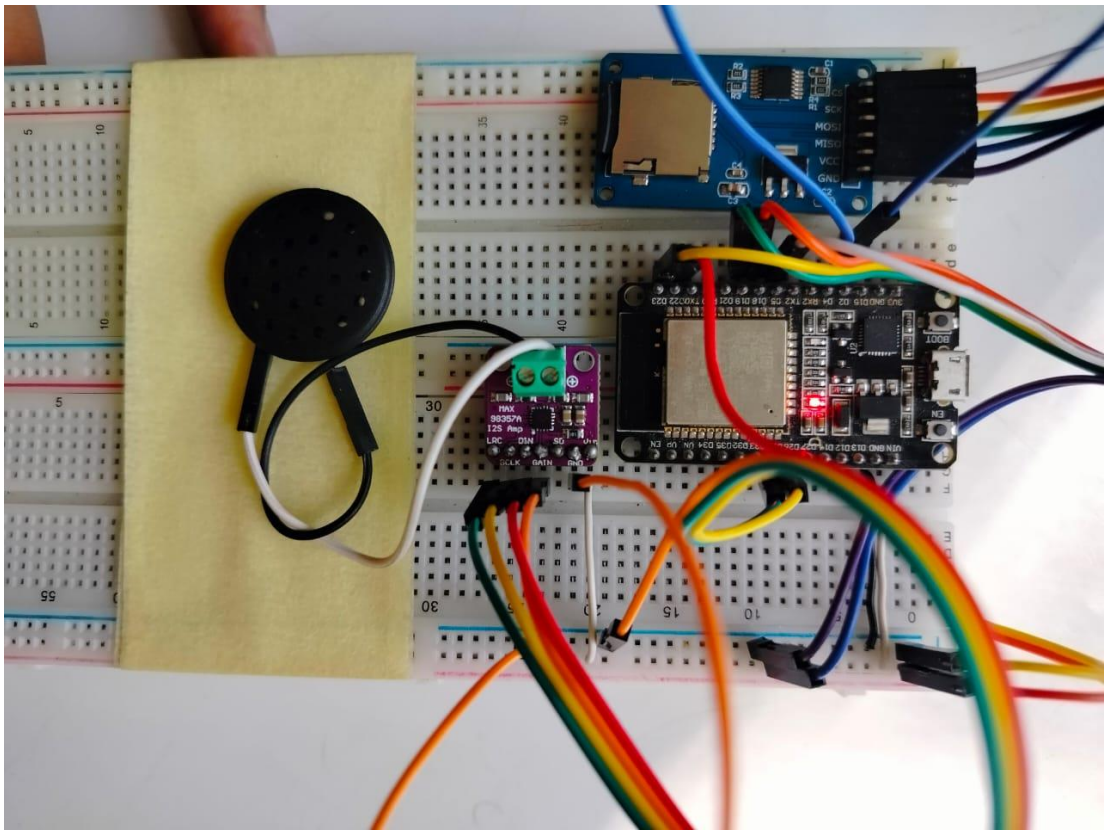

Figure 1 Hardware Circuit

The rationale behind each component attachment is as follows:

ESP32 Microcontroller: Chosen for its versatility, low power consumption, and ample processing power, the ESP32 is an ideal choice for embedded systems projects.

SD Card Reader: By utilizing an SD card reader, we enable the system to store a vast library of audio files, enhancing flexibility and scalability.

Audio Amplifier: The audio amplifier is necessary to drive the speakers and produce audible sound output from the digital audio signals processed by the ESP32.

Battery: Initially, 55 mAh Battery is utilized for prototyping and observed the backup time to be 6 hours for continuously running. Later it can be Improved up to 24 hours or more.

Phase 2:

Integration with AWS Cloud Service for Remote File Access

Building upon the foundation established in Phase 1, Phase 2 expands the system's capabilities by integrating it with AWS for cloud-based file management. The key components and functionalities added in this phase are as follows:

1. AWS Cloud Services (AWS S3): The system is connected to AWS cloud storage services, such as Amazon S3, to enable remote file access and management.

2. HTTP Communication Protocol: HTTP communication is implemented between the ESP32 and AWS for secure and efficient data transfer.

3. Push Buttons: Push buttons are incorporated into the system design to allow user interaction, enabling actions such as downloading files from AWS and initiating playback.

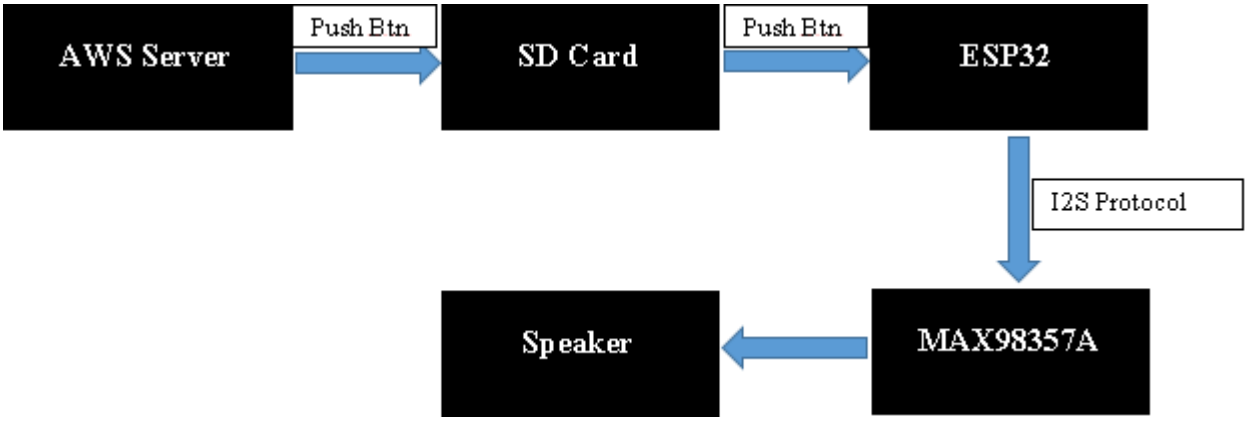

Figure 2 Procedural Block

The rationale behind each addition is as follows:

AWS Cloud Services: Integration with AWS S3 facilitates seamless remote file access, allowing users to store and retrieve audio files from anywhere with an internet connection.

HTTP Communication Protocol: HTTP provides a standardized and widely supported protocol for communication between embedded systems and cloud services, ensuring compatibility and reliability.

Push Buttons: By adding push buttons, we enhance user interaction and control over the system, enabling intuitive actions such as downloading files from the cloud and initiating playback.

Phase 3:

Development of Mobile Application for Cloud File Upload

In the final phase, the project extends its functionality by developing mobile applications for audio recording and cloud file upload. The key components and functionalities introduced in this phase are:

1. **Cross-Platform Mobile Applications:** Native Android and iOS applications are developed to enable audio recording on mobile devices.
2. **AWS SDK Integration:** The mobile applications integrate with AWS SDKs to facilitate seamless upload of recorded audio files to AWS cloud storage
3. **PCB Designing:** PCB is designed for the overall circuit to get compact and smooth Voice book.

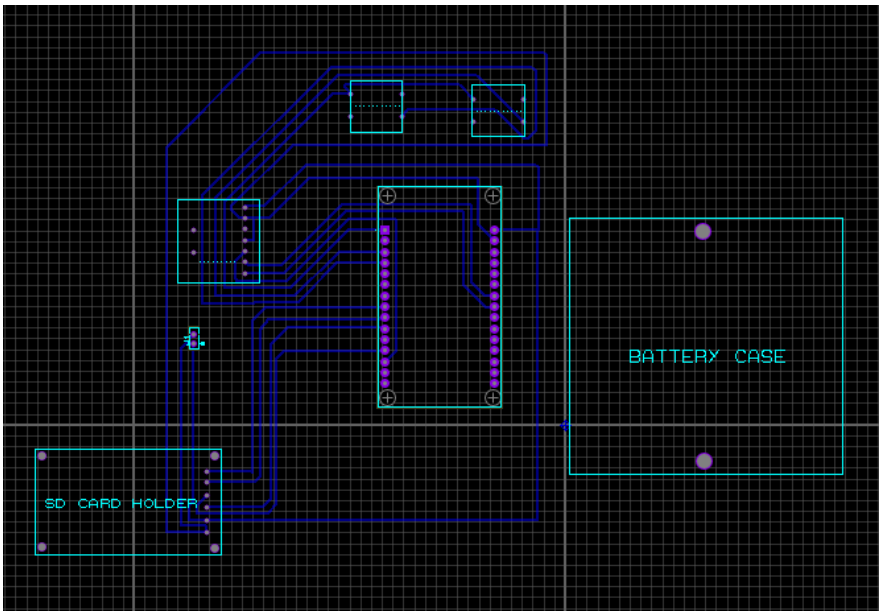

Figure 3 PCB Layout

The rationale behind each component addition is as follows:

Cross-Platform Mobile Applications: By developing mobile applications for Android and iOS platforms, we enhance user convenience and accessibility, allowing users to record audio on their preferred devices.

AWS SDK Integration: Integration with AWS SDKs streamlines the process of uploading recorded audio files to AWS cloud storage, ensuring secure and efficient data transfer.

PCB Designing: Printed Circuit Board is designed to enable SNR to be as low as possible. Its other function is to get an idea of how the product will look like when producing commercially.

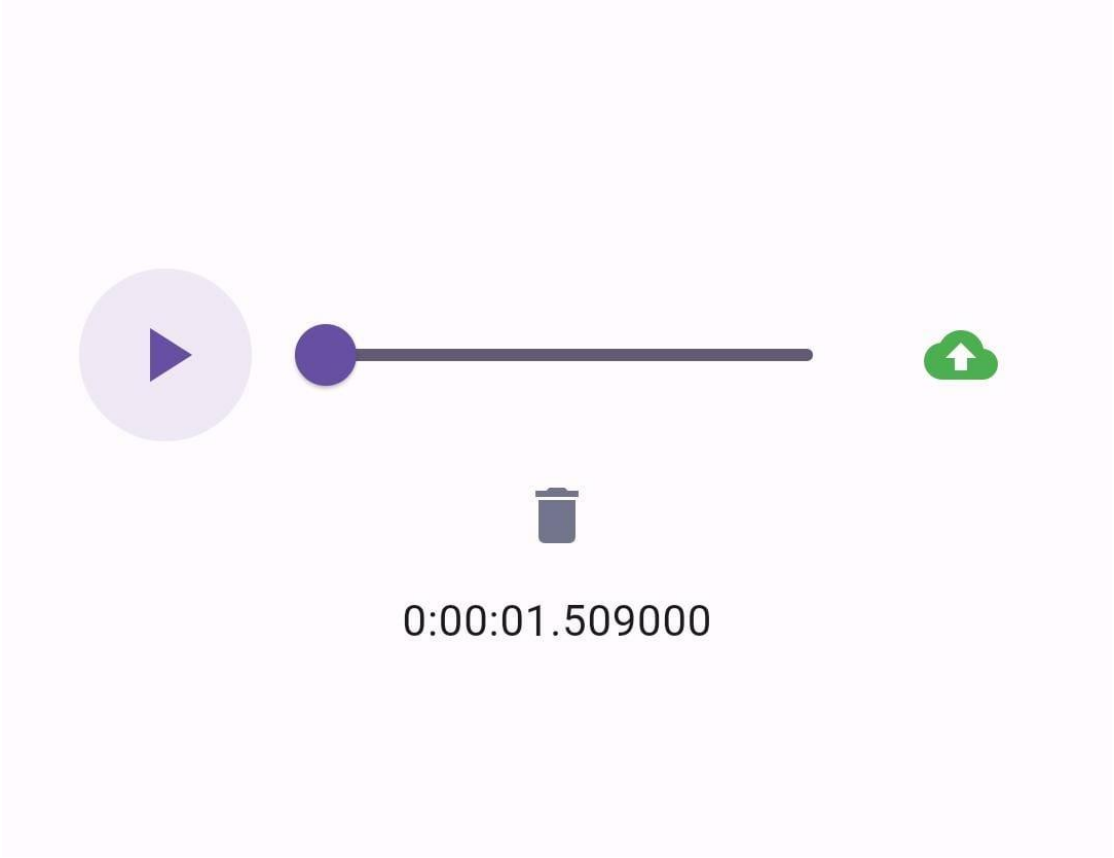

Figure 4 A Simple App for Recording and Sending an MP3 file

In summary, each phase of the project involves the deliberate selection and integration of hardware components and software functionalities to achieve specific objectives, ultimately culminating in the development of a comprehensive audio management system capable of remote file access, playback, and recording.

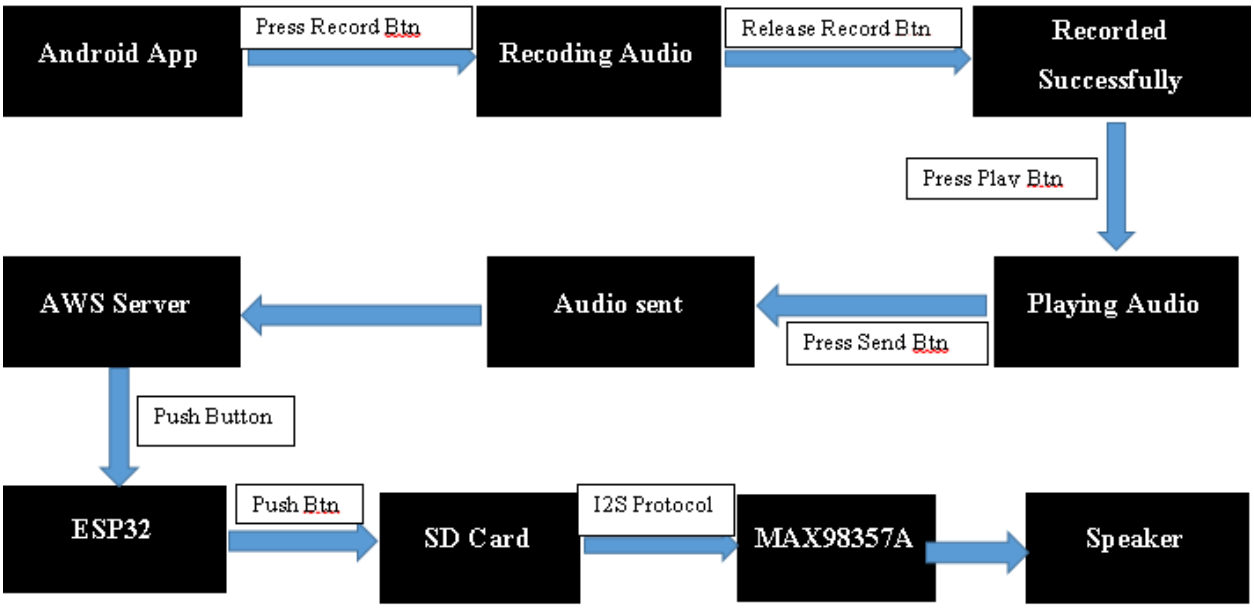

Figure 5 Complete Project Flow Diagram

This is overall procedural block that basically guides how the project is working. The testing video of the project is attached with the guide. We have achieved these milestones so far, one of few limitations include battery backup time which is not upto our expectations but still it goes for 6 hours straight. The gerber file along with the proteus file of the PCB is attached.