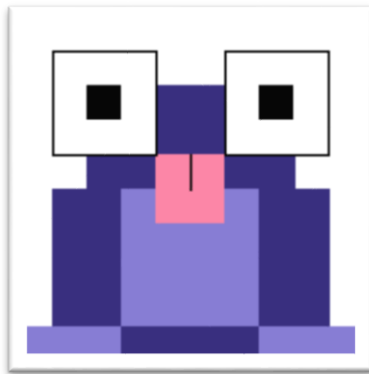


Ribbit

A Cost-Effective iOS Hearing Aid App



User Manual v1.3

Computer Science Department

Texas Christian University

May 2, 2016

Revision Signatures

By signing the following, the team member is stating that he has read the entire document and has verified that the information contained within this document is accurate, relevant to the project, and void of errors.

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Revision History

Version	General Description of Changes	Date Completed
V1.0	Initial Draft	4/19/16
V1.1	Updated title, standardized fonts, and fixed formatting	4/20/16
V1.2	Updated screenshots and references	5/1/16
V1.3	Updated QR Code Descriptions	5/2/16

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1 Introduction

1.1 Purpose

This document is intended to provide a detailed user manual of the Ribbit iOS application, as well as the prescription creation process. This manual will first cover a list of required hardware and software for the application to work. It will then discuss the steps needed to use the application and the prescription website.

1.2 Project Overview

The objective of this project is to create an iOS application that functions similarly to a physical hearing aid device, but at a fraction of the cost. The application will work within the federal regulations concerning the usage of hearing aids. The aim of the application is to correct the user's perception of sound by changing the sound to fit their inability to hear certain frequencies.

1.3 Overview Of Document

- Section 2: This section covers the required components for the application to work.
- Section 3: This section covers the Ribbit iOS Application.
- Section 4: This section covers the QR Code Generation Website.

2 System Components

2.1 System Components

Ribbit is composed of two parts: an **iOS Application** and the **QR Code Generation Website**. To access the QR code generation website, the user must open a compatible web browser and navigate to the following URL: <http://tcuhearing-ribbitcu.rhcloud.com/>.

2.2 Ribbit iOS Application

The main component of the project is the iOS application. This is what the user will interact with on a regular basis. It is divided into four distinct parts: a home page, a table containing all prescriptions that have been read in, a camera view to read in additional QR code prescriptions, and a view to read what the prescription entails. More detail will be given to each part of the application in the following sections.

2.3 QR Code Prescription Generation Website

The QR code generation website is available to anyone through the above URL. This allows the user to create a QR code for their audiology prescription. More detail will be given in the following sections.

3 Ribbit iOS Application

3.1 Initial Setup

Before you may begin using the **Ribbit iOS Application**, you must first create a **Touch ID** passkey. Also, before you can set up Touch ID, you must set up a **Passcode**.

3.1.1 Setting Up Passcodes

Follow these steps to create a passcode for your device. If you already have a passcode on your device, you may skip this section.

1) Navigate to **Settings** → **Touch ID & Passcode**.



2) Tap **Turn Passcode On**.



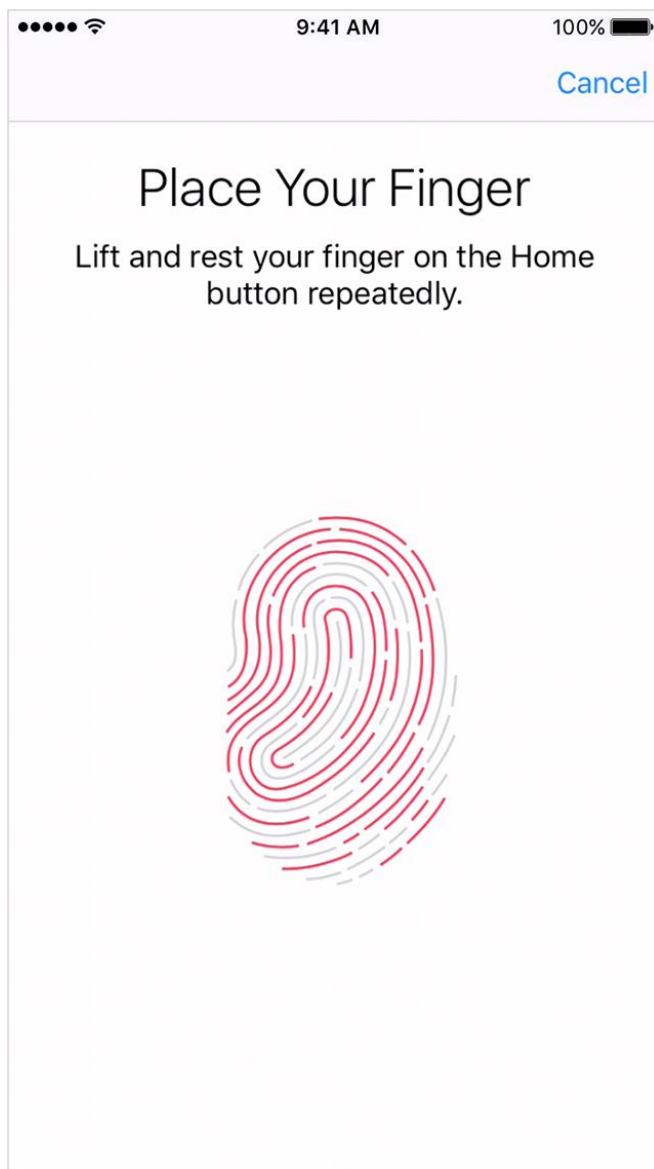
3) Enter a **six-digit** passcode, or tap **Passcode Options** to switch to a four-digit numeric code, a custom numeric code, or a custom alphanumeric code.

4) Enter your passcode again to confirm it and activate it.

3.1.2 Setting Up Touch ID

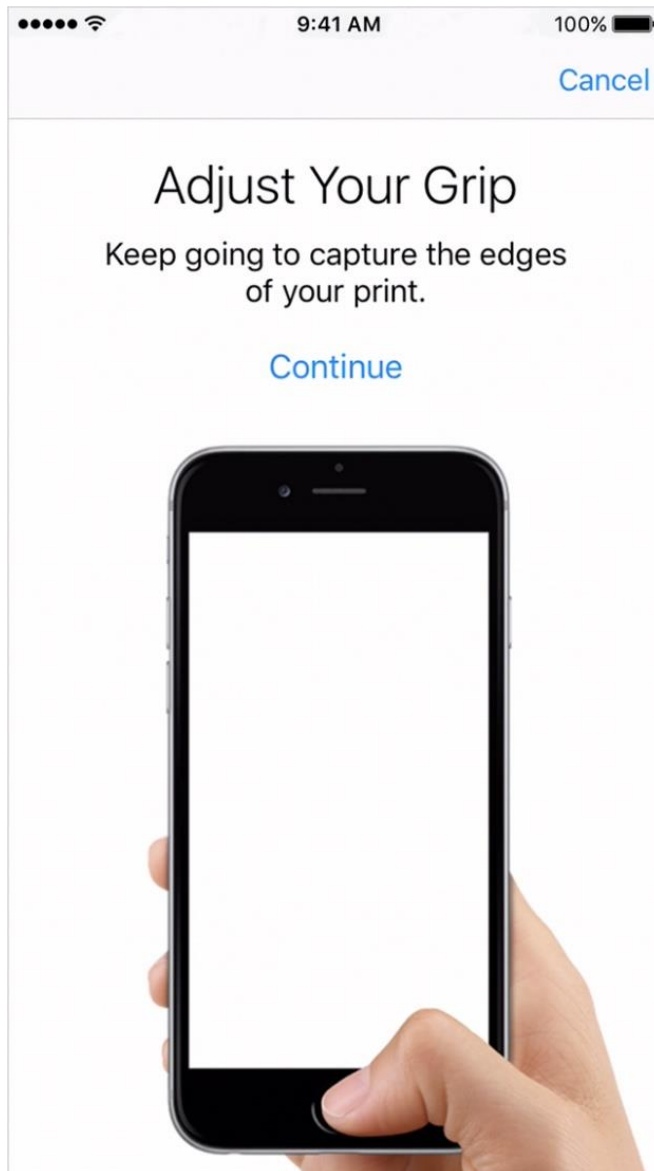
Follow these steps to set up Touch ID on your device. If you already have Touch ID enabled on your device, you may skip this section.

- 1) Make sure that the Home button and your finger is clean and dry.
- 2) Tap **Settings** → **Touch ID & Passcode**, then enter your passcode.
- 3) Tap **Add a Fingerprint** and hold your device as you normally would when touching the Home button
- 4) Touch your finger to the Home button—but don't press. Hold it there until you feel a quick vibration, or until asked to lift your finger.



5) Continue to lift and rest your finger slowly, making small adjustments to the position of your finger each time.

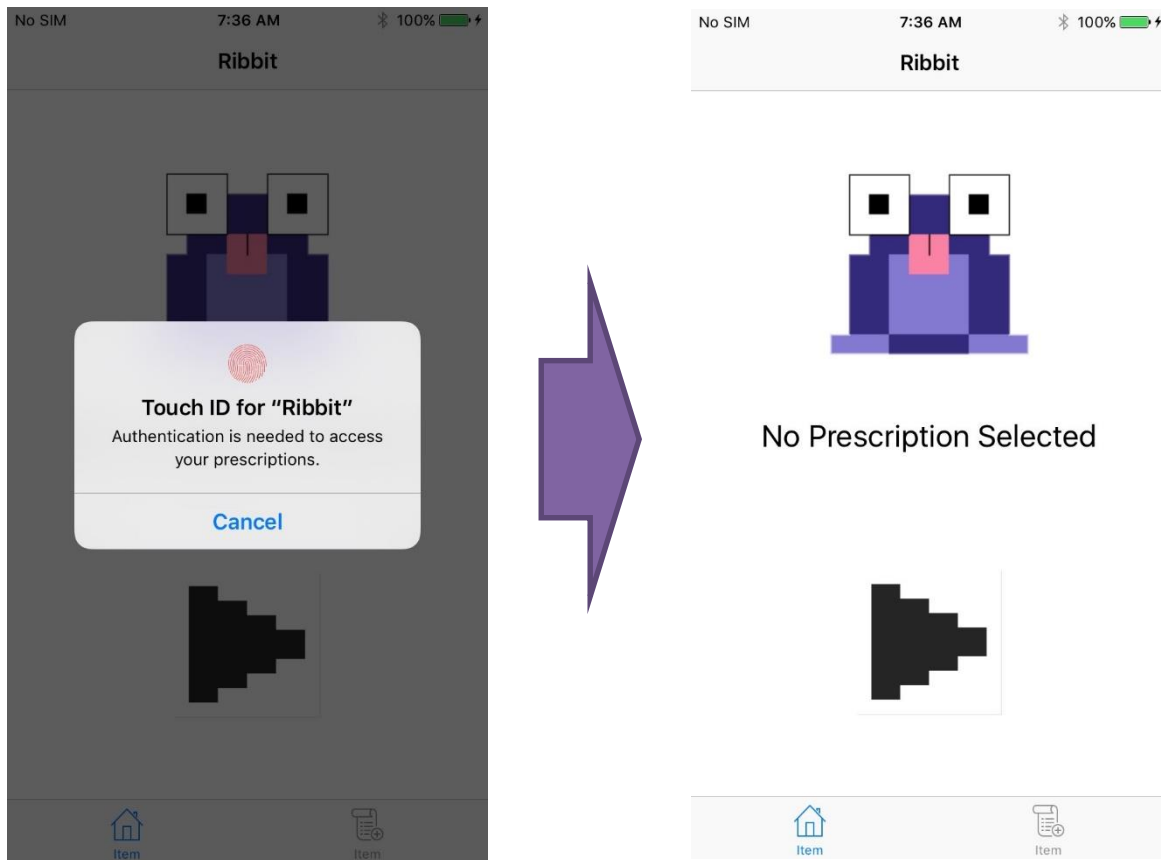
6) The next screen asks you to adjust your grip. Hold your device as you normally would when unlocking it, and touch the Home button with the outer edges of your fingertip, instead of the center portion you first scanned.



You have now enrolled in Touch ID and can now use the **Ribbit iOS Application**. We will now go into more detail of the application and how you can use it.

3.2 Home Page

When you launch the **Ribbit iOS Application**, you will be greeted by this screen.



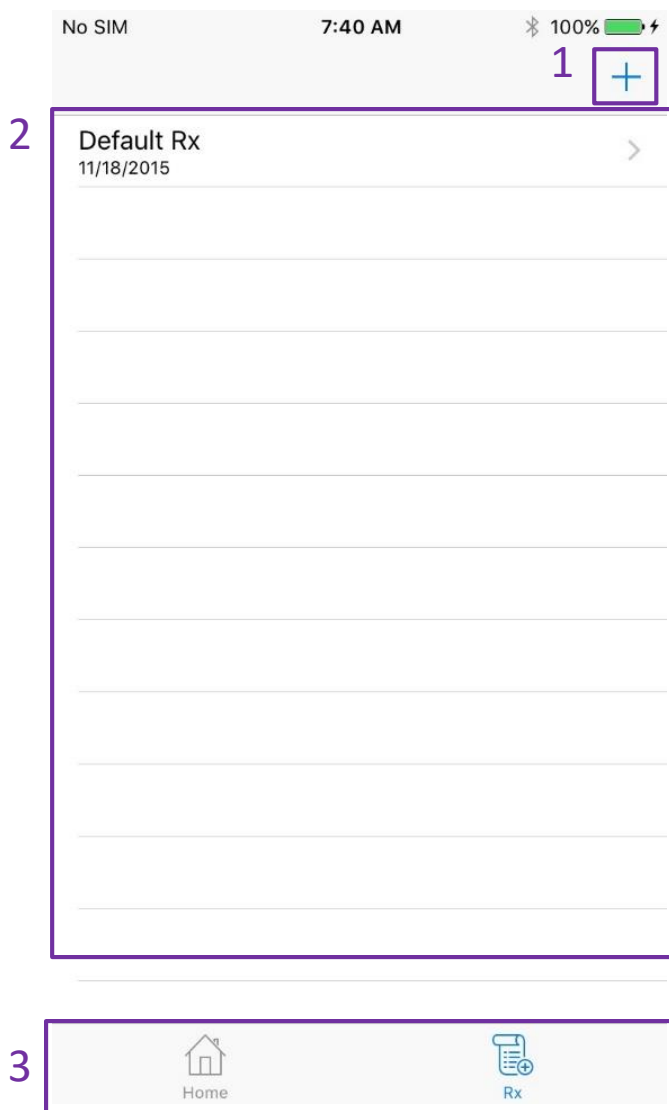
To continue using the application, you must enter your Touch ID finger passkey. The process for enrolling in **Touch ID** is listed above. Once you have done so, you now have access to the application.

****NOTE: Hitting cancel will force close the application.****

Once you have authenticated, you will now have access to the application. The large **Play** button is what is used to control the sound processing, the label underneath the logo is there to tell you which prescription is currently active. On the bottom of the application, you will see two buttons. The right button, **Rx**, will take you to a table containing all of your prescriptions. The other button, **Home**, will take you back to this screen regardless of where you are in the application.



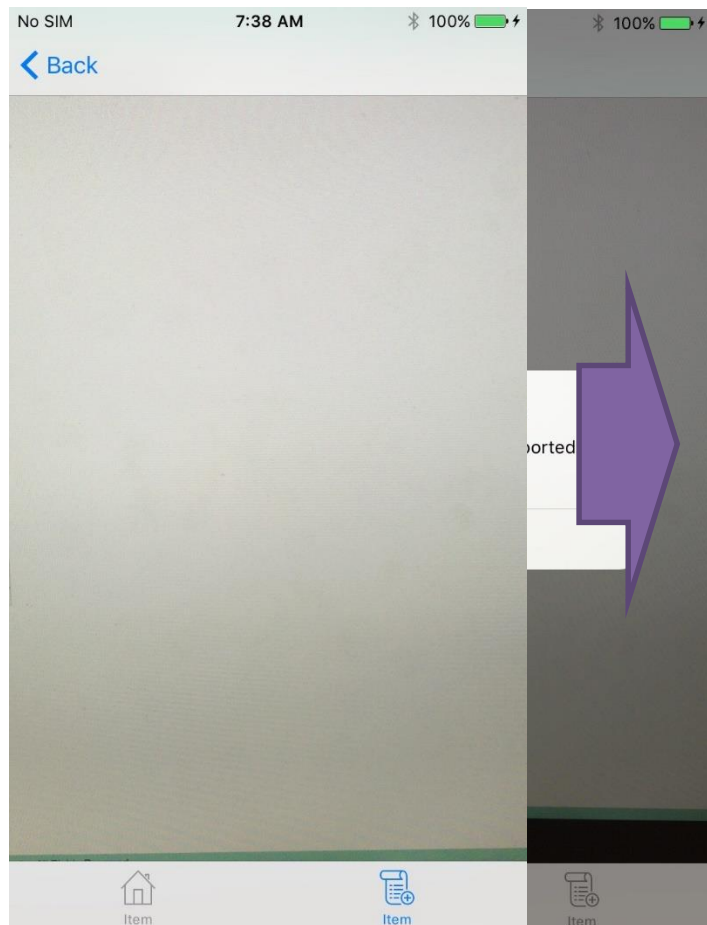
3.3 Prescription Table



This is the **Prescription Table**. It contains the list of all the prescriptions currently loaded on the device. This allows you to hot swap prescriptions, as well as to remove the old prescriptions easily. This page also allows you to add new prescriptions. The page is broken into the following sections:

- 1) This button will allow you to add more prescriptions to the application. It take you to the QR Code Reader, which is explained in section **3.4**.
- 2) This is the list of the loaded prescriptions. Selecting any of the prescriptions in the list will bring up another view listing the information inside of the prescription, as well as allow you to set that prescription as active, which is explained in section **3.5**.
- 3) These are the navigation buttons, the same ones that are on the Home Page. These buttons will take you to either the Home Page, by clicking **Home**, or to this page, the Prescription Table, by clicking **Rx**.

3.4 QR Code Reader



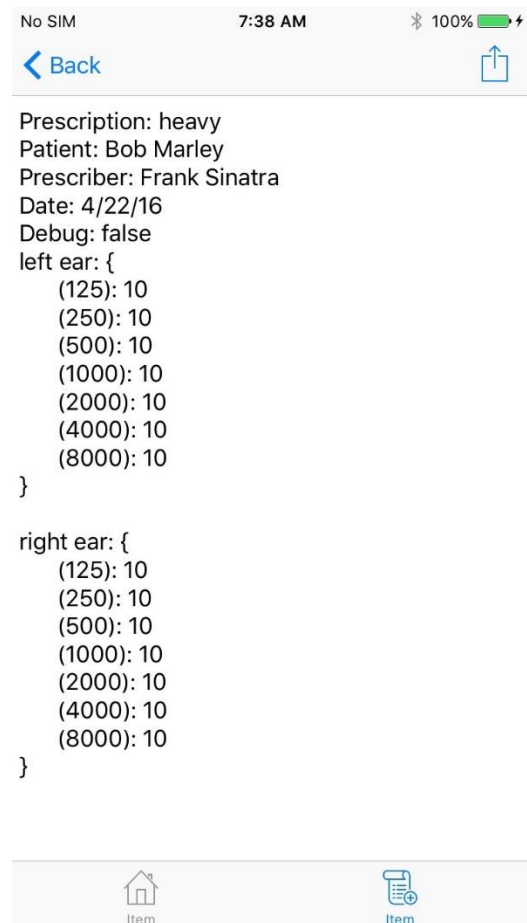
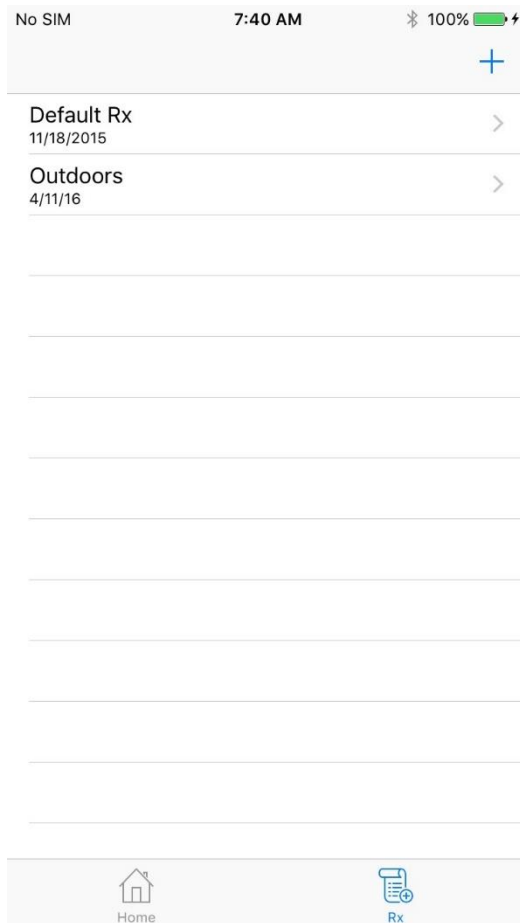
This is the **QR Code Reader**. This will allow you to load additional prescriptions into the application. The first time you open this page, the application will request **Access to Your Camera**. To continue, please press **OK**.

To load in a new prescription, simply move the camera over a QR Code and the application will load it into the **Prescription Table**. **Note:** Only QR codes created using the **Ribbit QR Code Generation Website** (section 4) can be loaded by the application. **All others will show an “Invalid QR Code” error.**

Once the application has loaded the prescription, it will inform the user that the desired prescription has been imported. Simply hit **Dismiss**, and the **Back** button in the top left corner to return to the **Prescription Table**.

NOTE: The QR Code reader will only read in new prescriptions, not duplicates.

3.5 Prescription Viewer



This is the **Prescription Viewer**. It will allow you to see what is involved with your prescription as well as set a given prescription as active.

NOTE: Whenever the **QR Code Reader** sends a new prescription to the **Prescription Table**, it is **NOT** set as active, so you must manually set it as active.

To set a prescription as active, simply press the button in the top right and it will be set as active.

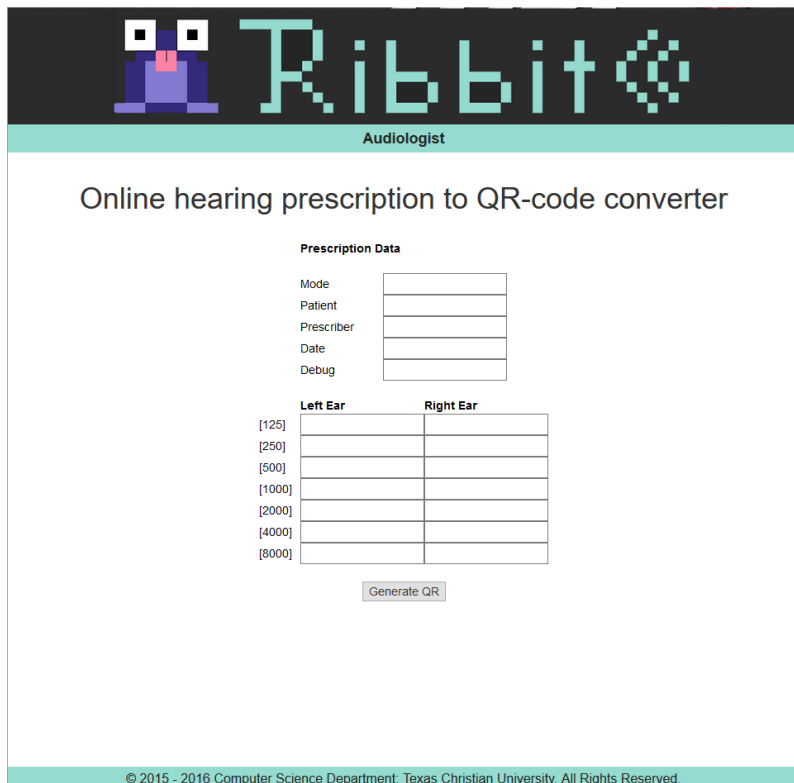
Once a prescription has been set as the active prescription, the **Home Page** will change to tell you what prescription is active.



The currently active prescription →

heavy

4 Ribbit QR Code Generation Website



Online hearing prescription to QR-code converter

Prescription Data

Mode

Patient

Prescriber

Date

Debug

	Left Ear	Right Ear
[125]	<input type="text"/>	<input type="text"/>
[250]	<input type="text"/>	<input type="text"/>
[500]	<input type="text"/>	<input type="text"/>
[1000]	<input type="text"/>	<input type="text"/>
[2000]	<input type="text"/>	<input type="text"/>
[4000]	<input type="text"/>	<input type="text"/>
[8000]	<input type="text"/>	<input type="text"/>

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When your Audiologist reaches the URL, you will be greeted with this page. This page allows for the creation of the QR Code based prescription that is required by the **Ribbit iOS Application** to import new prescriptions.

NOTE: This is the **only** site that can make **Ribbit** specific QR Codes.

4.1 Data Input

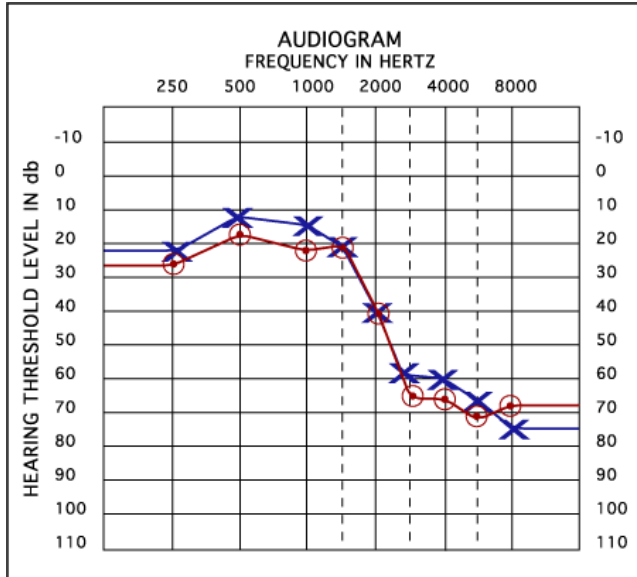
4.1.1 Prescription Data

This section contains the general information for the prescription. It is subdivided into the following sections:

- **Mode:** This is the mode that the prescription is intended to be used for, such as indoors or outdoors.
- **Patient:** This is the name of the patient that the prescription is intended for.
- **Prescriber:** This is the name of the prescriber; only an Audiologist can assign the prescription and subsequently the QR code.
- **Date:** This is the date that the prescription was created.
- **Debug:** This is used for development purposes to flag whether the prescription is to be used as a gain reference prescription.

4.1.2 Decibel Levels

This section is where your Audiologist can input the thresholds for each decibel level on the patient's audiogram. Your Audiologist can enter the prescription as given in the example (figure 4.1).



	Left Ear	Right Ear
[125]	21	28
[250]	21	28
[500]	12	18
[1000]	15	21
[2000]	40	40
[4000]	60	65
[8000]	75	68

(figure 4.1)

Each frequency on the X axis corresponds to a given decibel on the Y axis. This X axis corresponds to the

same row on our website. You can simply copy the hearing threshold for that frequency to the corresponding row on the website.

4.2 QR Code Generation

Once you have filled in the fields on the QR Code generation website, just click on the **Generate QR Code** button. This creates the QR Code on the browser and places it on the screen to be used at your leisure.



(figure 4.2)

This is an example QR Code that is created when the user clicks the **Generate QR Code** button. You can then save it for later or directly load it into the **Ribbit iOS Application**.

Glossary of Terms

Amplitude - the power of the air vibration that can be perceived as volume

Audiogram - graphical hearing diagnosis produced by audiologist

Audiologist: a health care professional specializing in identifying, diagnosing, treating and monitoring disorders of the ear

Clipping - a situation in which the peaks and/or troughs of the sound wave are cut off

DSP - Digital Signal Processor; a microprocessor specially designed to handle continuous analog signal

Decibels - a unit of measurement used to represent a signal's amplitude

FFT - Fast Fourier Transform; an algorithm used to transform a signal from the time domain into the frequency domain

Frequency - equivalent to the inverse of the period, frequency is a rate. Frequency is generally measured in Hz (hertz)

iOS - the operating system for Apple's mobile device product line

QR code - a data encoding mechanism in which bits are transformed into camera-recognizable (camera friendly) visual representation

Sound Profile (prescription profile, user profile) - a system that manages user's preferences and hearing prescriptions

Touch ID - a security mechanism on iPhones to maintain exclusive access based on a user's fingerprint

References

Use a passcode with your iPhone, iPad, or iPod touch. (2016, March 21). Retrieved April 19, 2016, from <https://support.apple.com/en-us/HT204060>

Use Touch ID on iPhone and iPad. (2016, January 26). Retrieved April 19, 2016, from <https://support.apple.com/en-us/HT201371>