ResCap Component Toolbox (Version 1.0)
An iOS APPLICATION DOCUMENTATION

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1. INTRODUCTION

The apple phone application written and implemented for the iOS platform is an electronics component toolbox named ‘ResCap’. The application consists of the following functionalities.

- Calculate the 4 and 5 band resistor color scheme.
- Calculate the 4 band capacitor color scheme.
- Parallel and series resistor calculation
- E12, E24, E48 and E96 resistor series table.

The application is intended mostly for educational purposes, entailing a minimalistic graphic user interface and fluid interaction with the user. This documentation is written as a guide to understanding the applications User Interface, complete functionality and source code.

2. FUNCTIONALITY DESCRIPTION

2.1 COLOUR BAND CALCULATOR VIEWS

The color band calculators (resistor and capacitor) are similar in scope. They incorporate a user interface Picker which is created with each segment representing a corresponding band section. When the user interacts with the picker, the current picker set color combination is stored, and the value that corresponds with that combination (in the resistor and series band color set) is passed back to the view.
Each view also incorporates a search button with which the user is able to search online for the current resistor (or capacitor) value displayed in the view.

The resistance and capacitance band calculator views differ only in the number of segments allotted to the picker, the multiplier pattern, tolerance pattern and the units of the final value. It uses a very similar (but not exact, due to fewer tolerance colors in the capacitor model) model to save the tolerance color values, but share the same numerical and multiplier color calculation technique. For this reason, a thorough analysis of one of the view controllers puts the user in the best position to use the other passive component color band calculators.

The MVC diagram below better explains the fluid interaction between the user and the color band calculator views. It shows how the user behavior is processed. Every interaction calls upon methods within the code to supply the user with the right component value for a given color band.

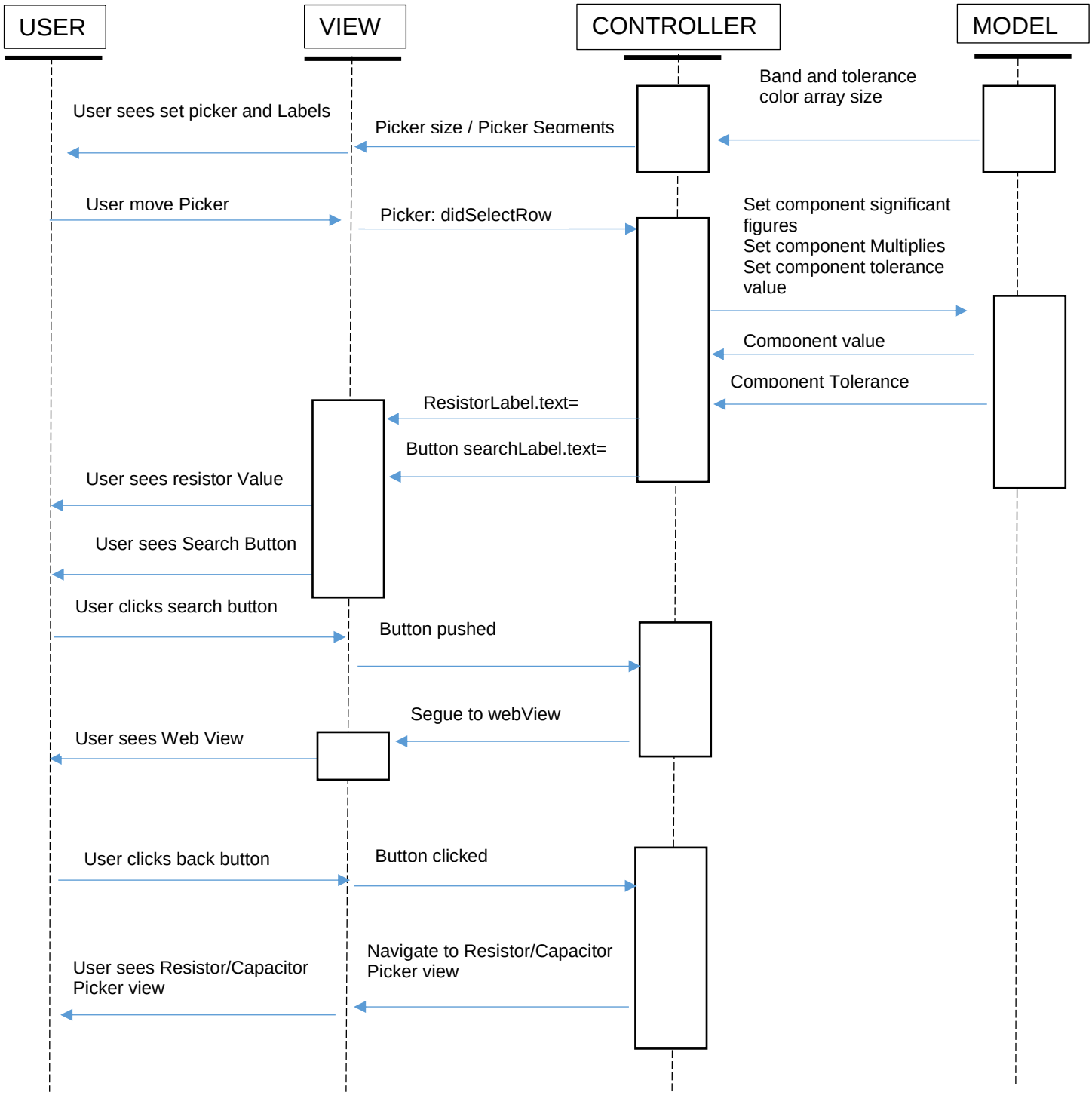

Diagram 1: showing MVC of Resistor/Capacitor band Calculator View

2.2 SERIES TABLE VIEWS

The series table view displays the complete list of resistor values present in the E series. A data model uses the E series formula, $y = 10^{1/N}$ to calculate the step size needed for an N series. The data model populates the appropriate arrays and sends them to the table view controller. The user then has access to the standard E series values for E12, E24, E48 and E96 resistor standard. The cells of the table, when engaged by the user, takes the user to a Details View, with the band color scheme of whatever E series value the user pushes.

The MVC diagram below details the operations of this table view.

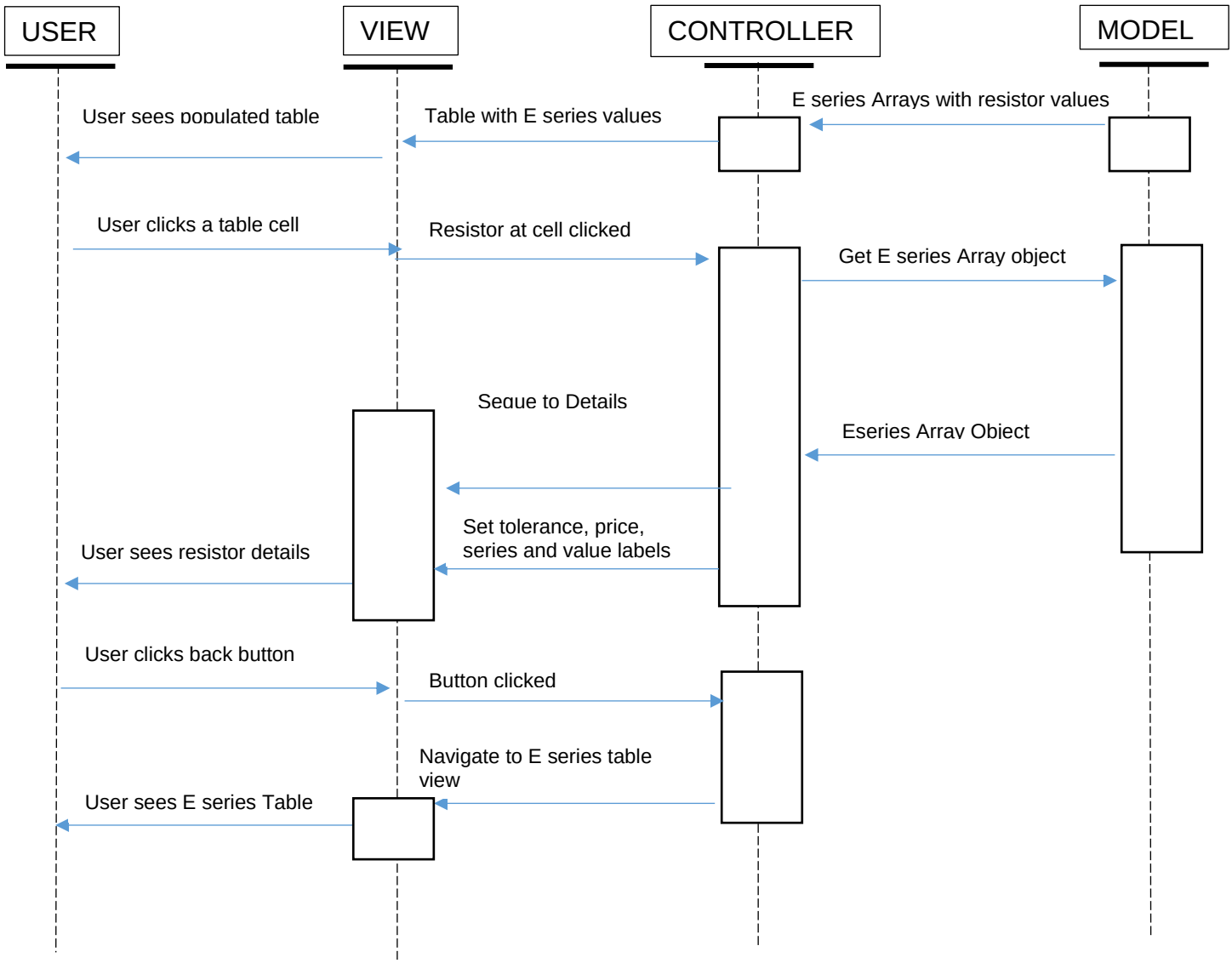

Diagram 2: showimg the MVC of the table view

2.3 SERIES AND PARALLEL RESISTOR CALCULATOR VIEW

The Series and Parallel resistor calculator function the application allows for the user to input resistor values in either series or parallel combinations via a text field. After the combinations have been added and calculated, the user has the choice to add both (series and parallel totals) results either in series with each other or in parallel with each other. When a null input is returned from the text field, a zero is added.

The MVC diagram below best explains the processes of the view.

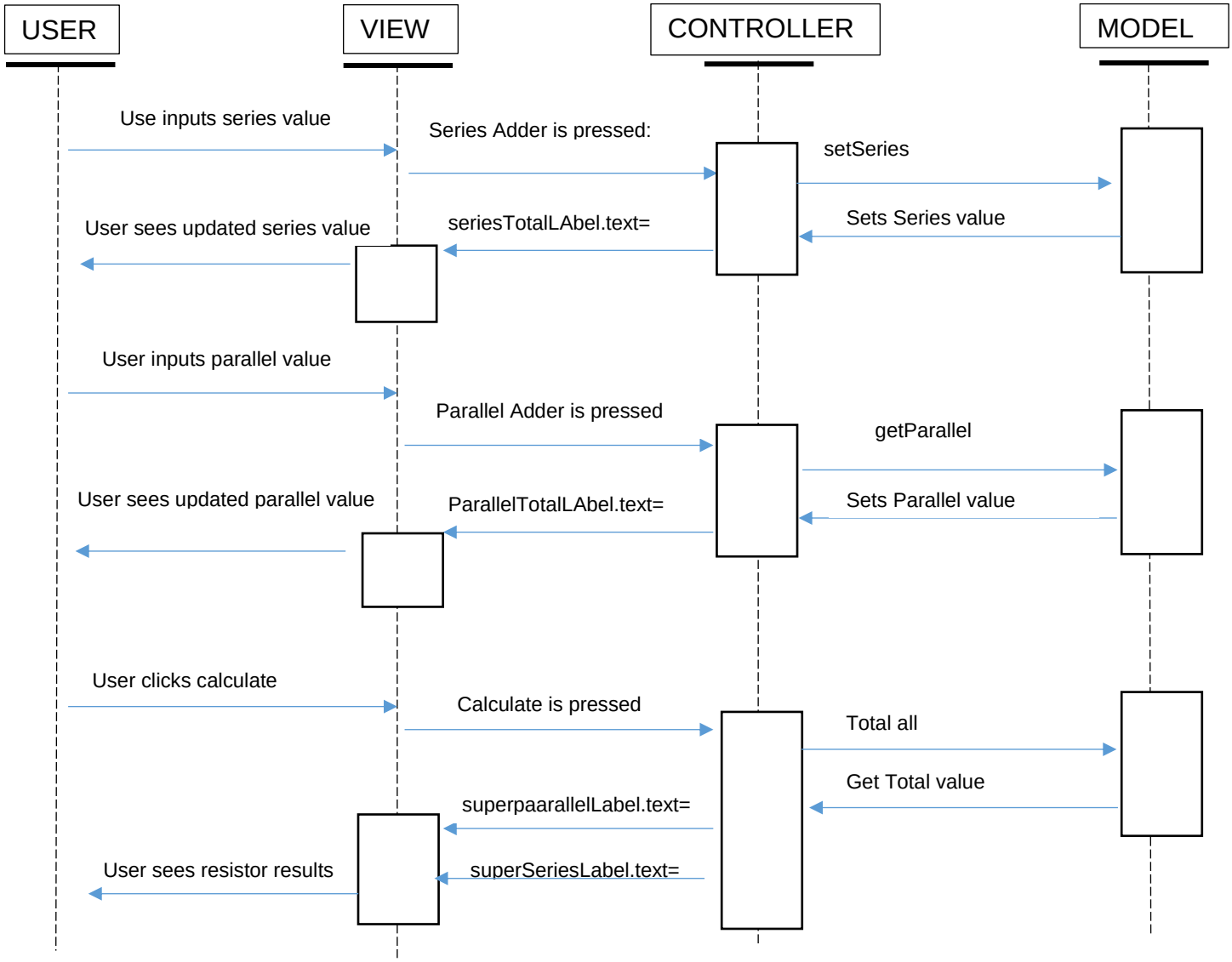

Diagram 3: showimg the MVC of the series/Parallel calculator view

3. USER INTERFACE

3.1 APPLICATION OVERVIEW

The application consists of 5 ta views that transition between 5 secondary views. Each of the views except for the Series/Parallel calculator have embedded in them a daughter view. The first 3 views (resistor and capacitor calculators) navigate to a web view, and the table view navigates to a resistor component details view.

3.2 4 BAND RESISTOR CALCULATOR

The 4 band resistor calculator user interface consists of a picker page, for setting the band colors to get the resistor values, and a transition page to a web view. The web page coded unto the web search is ebay.co.uk. As the picker transitions through the color bands, the resistor value updates automatically. The search button appears only after the picker has been activated.

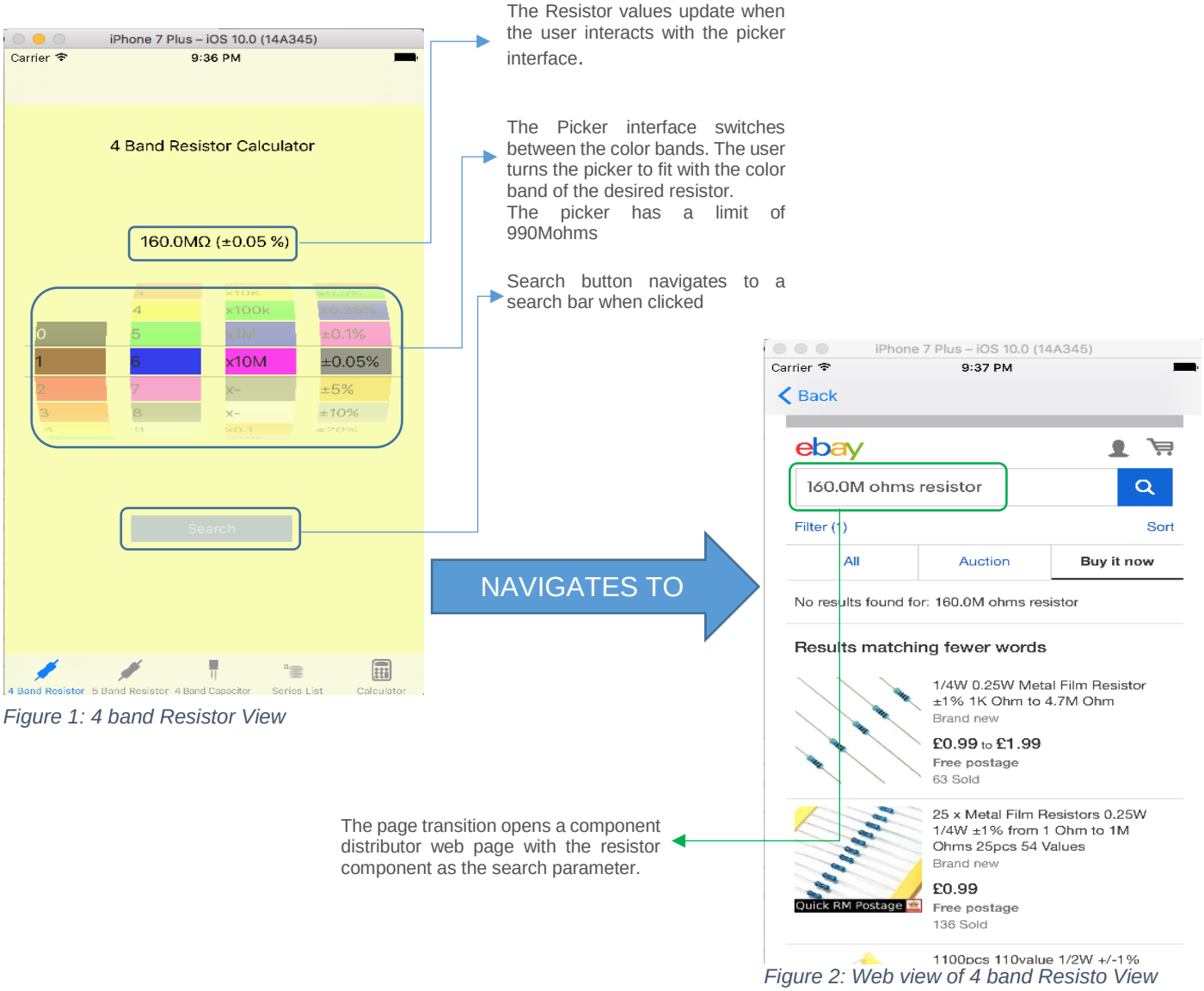

Figure 1: 4 band Resistor View

Figure 2: Web view of 4 band Resisto View

3.3 5 BAND RESISTOR CALCULATOR

The 5 band resistor calculator generally has the same user interface theme as the previous view. The difference here is the increase in bands in the picker. Once again the page navigates to a web view to search for the elements calculated.

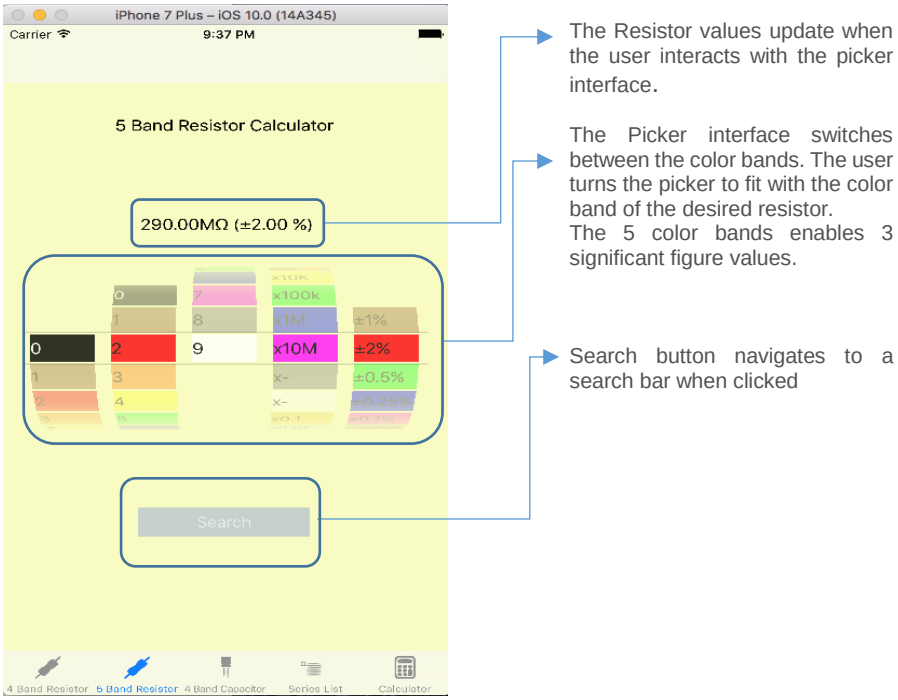

Figure 3: 5 band Resistor View

3.3 4 BAND CAPACITOR CALCULATOR

The capacitor band calculator also functions like the 4 band resistor calculator. However the picker section values differ in tolerance color set and values. The multiplier also functions from the Pico to the micro range. The search transition using the search button is also implemented here.

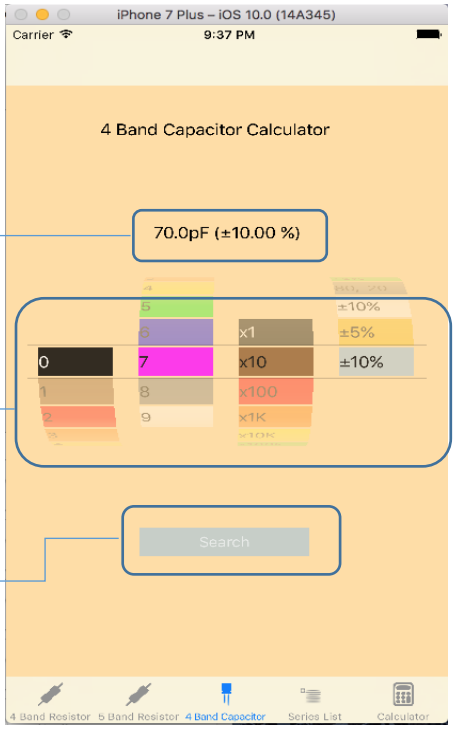

Figure 4: 4 band Capacitor View

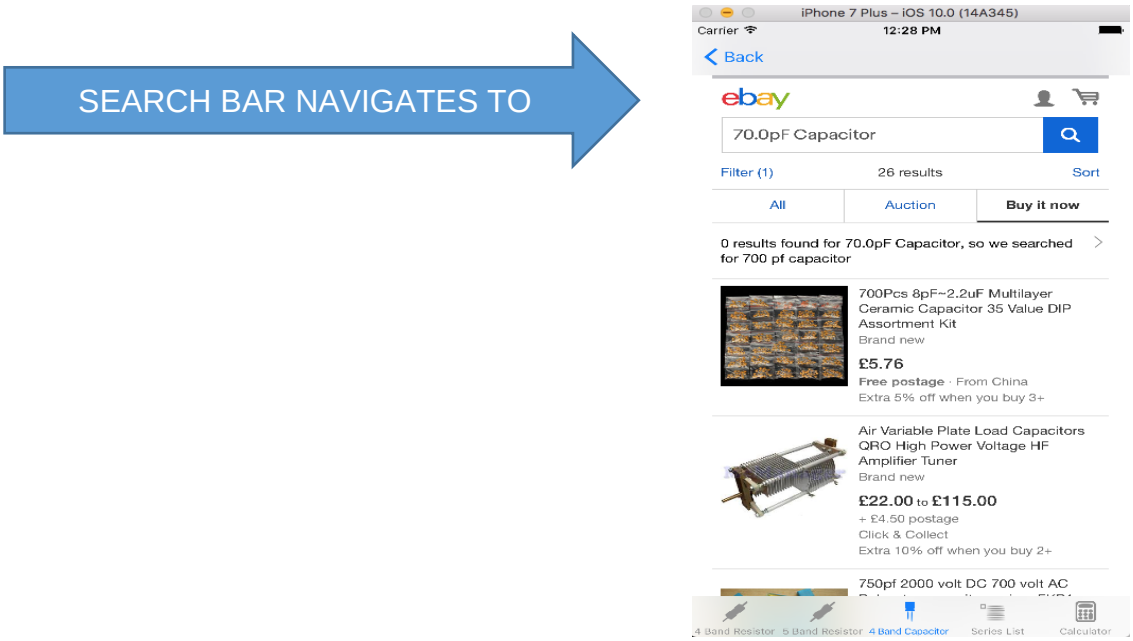

Figure 5: Web View of 4 band Capacitor

3.4 SERIES LIST

For the series list, the user interacts with a table view showing the E series resistor values for E12, E24, E48 and E96. The values are populated into the table cell and the user can click on one value in the cell and the view navigates to a details page for that resistor value (5 band resistor color, mock Order code, and mock price). The user can then navigate back to the table using the back button.

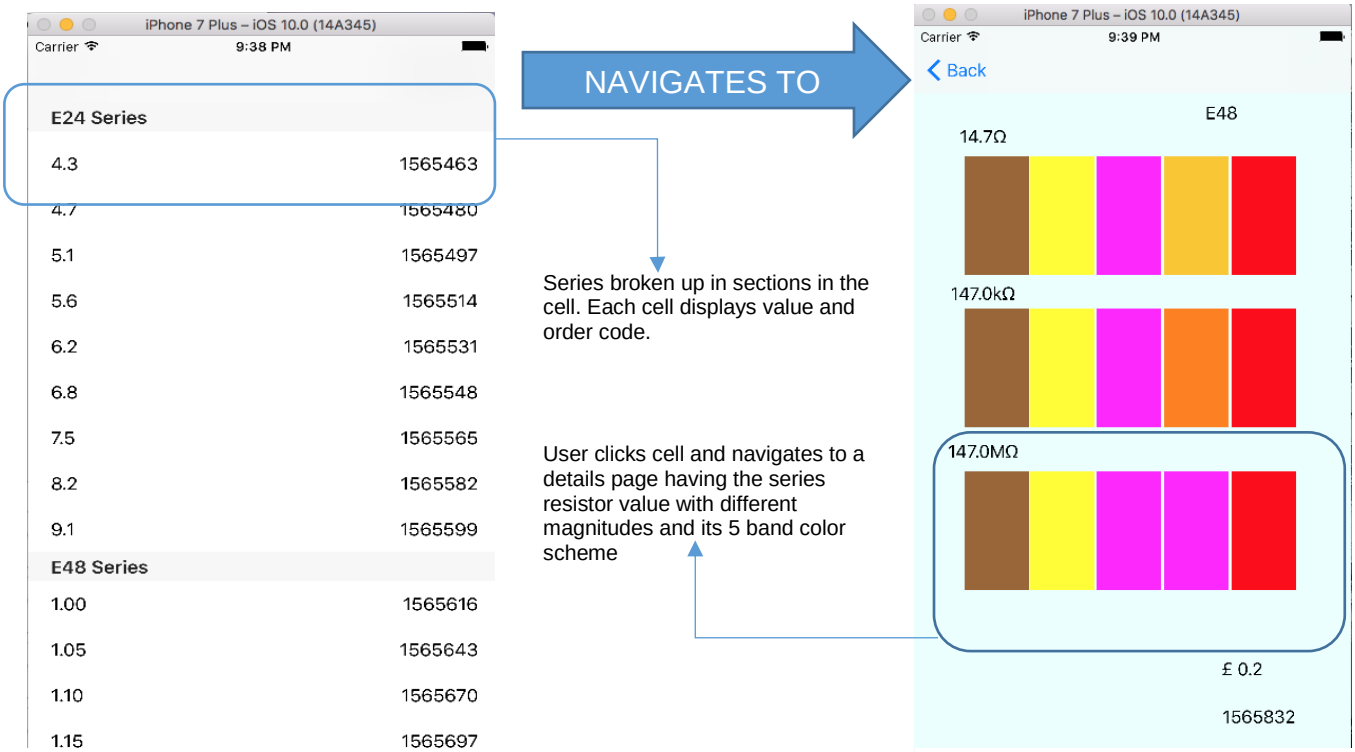

Figure 7: Table View

Figure 6: E series Details View

3.5 SERIES/PARALLEL CALCULATOR

The user is given two text fields to populate with input values. The values can be decimals or whole numbers. By pressing the plus key for a certain input, they add the resistor in series or in parallel with the previous input of that field. The inputs are added until the user is satisfied with the combinations. When the user is done, the user has the option of adding the total series and total parallel values either in series with each other or in parallel with each other. The user is given a decimal point keyboard to type in his values.

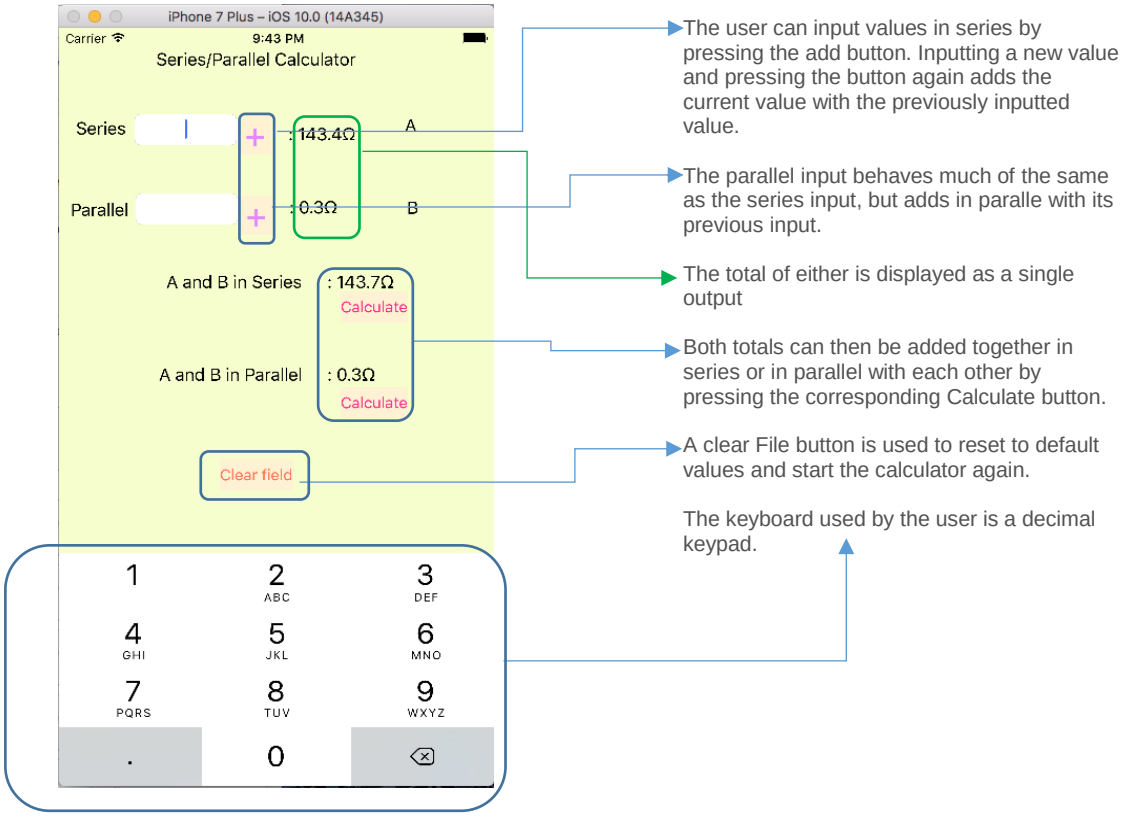

Figure 8: Series/Parallel Calculator View

4. ERRORS AND CONDITIONS FOR FURTHER DEVELOPMENT

4.1 WEB VIEW SETUP

A good note to further development of this application was a detection of a web search error that was encountered during production. The XCode platform was unable to run web view images until a setting was adjusted in the info section of the project. For some reason the web search was unable to until these steps were taken.

1) Go to the info section of your project
2) After “Supported interface Orientations”, press the add button that pops up
3) Navigate to “App transport Security settings” and add it
4) Expand this section and Under “Allow Arbitrary Loads” change the Boolean value to YES.

Following these steps fixed my issues with Xcode.

4.2 E SERIES RESISTOR VALUE DISPARITIES

To populate the resistor objects that correspond with all the E series values, each object was placed ina for loop and an instance appended to the array programmatically using the decade step size formula for each resistor ($y = 10^{1/N}$) for an N series (e.g. N is 12 for an E12). This method was implemented and successfully populated the array for each series. However, resistor manufacturer values don’t follow their own decade formula to the letter, causing disparity to the values. Enough of these disparities were rectified via hard coding but not all of them. (Most disparities with factory values occur in the E96 series section).

4.3 SERIES/PARALLEL CALCULATOR INPUT BUG

Whenever a user inputs a number with two decimal points in them, the number is truncated and all digits after the second decimal is dumped. For example, an input of “54.7.3” gives and output of “54.7”