

EE/CprE/SE 491 WEEKLY REPORT 4

February 20 - February 26

Group number: 9

Project title: Arinc429 Portable Receiver APP and Firmware

Client &/Advisor: Colin Cox & Daji Qiao, Mathew Wymore

Team Members: Eduardo Contreras, Riley Millam, Nicholas Morgan, Jared Staskal, Nate Trotter

- **Weekly Summary** *This week we had no meeting with our client so we instead met online on Thursday to work on our project. We worked on updating our system requirements and our system sketch in accordance with the feedback we received from our client last week. We plan on reviewing these changes in the upcoming week.*

- **Past week accomplishments**
 - Researching Bluetooth Low Energy (BLE) - All
 - Researched on the use of BLE services and characteristics
 - Think about how to organize the information we send over BLE
 - Getting familiar with the Hardware from the client - All
 - Now that we've received the hardware we have started to test things with it to get more comfortable thinking about developing with it.
 - Reworked our System Requirements
 - Based on the feedback from our client last week we updated our system requirements to more closely fit the expectations of our client
 - Reworked our System Sketch
 - Based on the updated requirements and the information from our client we updated our system sketch to be more complete and more correct.

- **Pending issues**
 - Need table that describes the Arinc429 data type of decoded labels
 - System sketch needs in depth descriptions of the different pieces

○ **Individual contributions**

| <u>NAME</u> | <u>Individual Contributions</u> <i>(Quick list of contributions. This should be short.)</i> | <u>Hours this week</u> | <u>HOURS cumulative</u> |
|--------------------|--|-------------------------------|--------------------------------|
| Eduardo Contreras | <ul style="list-style-type: none"> ● Researched the specifics of transmitting data over BLE ● Researched BLE API documentation ● Helped update project system sketch | 6 | 24 |
| Riley Millam | <ul style="list-style-type: none"> ● Has been in charge of communication with the client and advisors. ● Studied BLE protocol, as well as ESP32 programming ● Experimented with hardware | 7 | 27 |
| Nicholas Morgan | <ul style="list-style-type: none"> ● Went over BLE modules and protocols ● Planning to start a datasheet for BLE ● Studied data sheets given by the client describing the technologies to be used in the project. | 8 | 28 |
| Jared Staskal | <ul style="list-style-type: none"> ● Added requirement to the System Requirements document ● Reworked the system sketch to better reflect the requirements | 7 | 27 |
| Nate Trotter | <ul style="list-style-type: none"> ● Studied data sheets given by the client describing the technologies to be used in the project. ● Familiarized with new hardware | 8 | 28 |

○ **Plans for the upcoming week**

Further flesh out the system sketch with descriptions of the different pieces of the Flutter application. Now that we've spent time researching communicating over BLE and how to plan that out we need to start planning that by creating our BLE API documentation.

Firmware

| Functional Requirements | |
|-------------------------|--|
| Number | Requirement |
| 1 | ESP32S3 to read in data from Holt 429 receiver |
| 2 | ESP32S3 to decode labels using the Flutter App |
| 3 | ESP32S3 to send data over Bluetooth Low Energy |
| 4 | ESP32S3 to connect to Smartphone |
| 5 | ESP32S3 to receive labels over Bluetooth Low Energy |
| 6 | ESP32S3 rejects incorrectly formatted words (incorrect parity, etc.) |
| 7 | Send multiple labels over BLE |

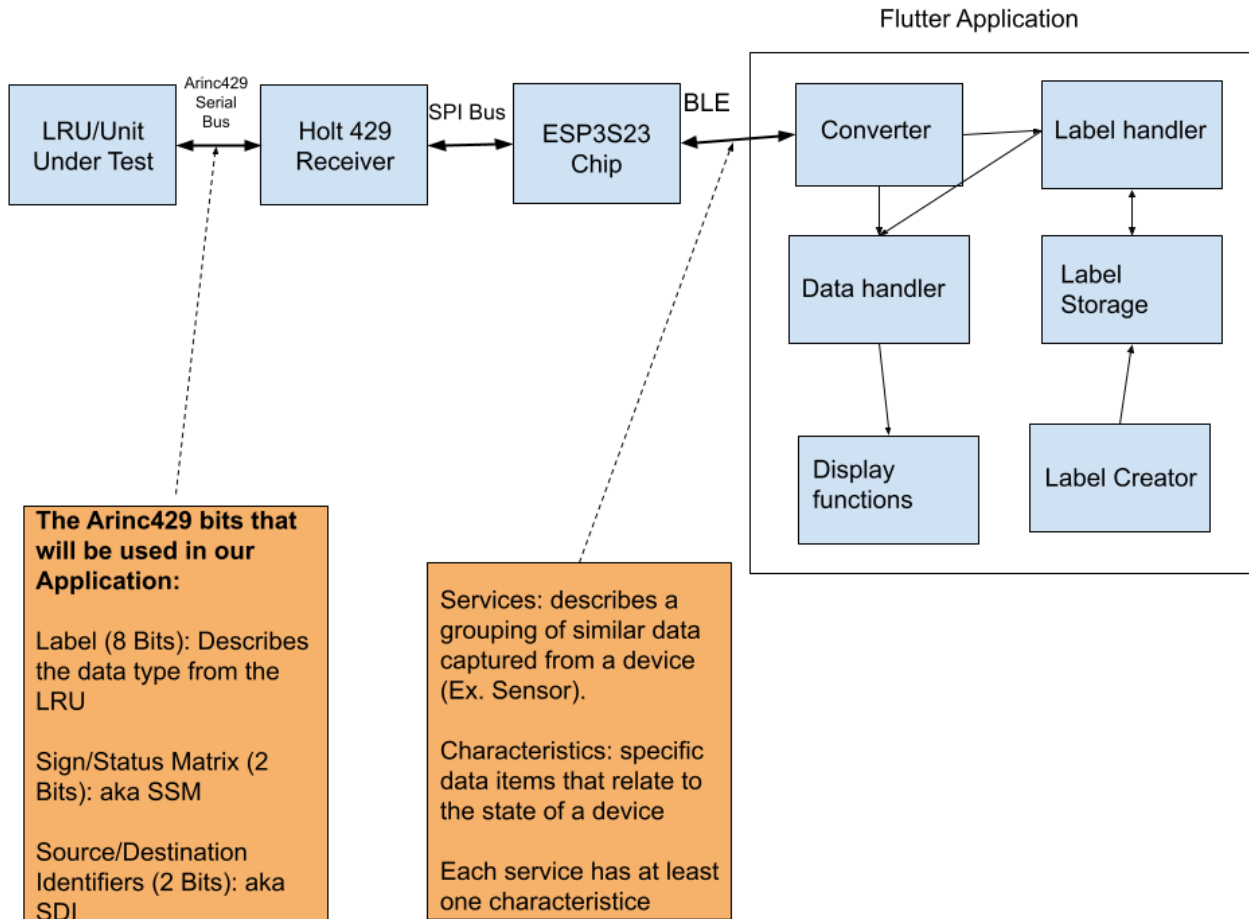
| Non-Functional Requirements | |
|-----------------------------|--|
| Number | Requirement |
| 1 | Ability to quickly and easily update firmware |
| 2 | Easy to understand and use |
| 3 | Send labels quickly (numbers tbd) |
| 4 | Receive labels quickly (numbers tbd) |
| 5 | Decode labels quickly (numbers tbd) |
| 6 | Flutter App is able to decode and receive multiple incoming labels at a time |

Flutter Application

| Functional Requirements | |
|-------------------------|---|
| Number | Requirement |
| 1 | Communicate with the chip over Bluetooth Low energy |
| 2 | Read Arinc labels from the BLE |
| 3 | Decode the Arinc labels |
| 4 | Send Arinc labels over BLE |
| 5 | Receive multiple incoming labels at a time |
| 6 | Handle errors with the data(incorrect parity, etc.) |
| 7 | Display rate of information received |
| 8 | Define and store new labels |
| 9 | Display SDI(Source Direction Indicator) |
| 10 | Display SSM(Sign/Status Matrix) |
| 11 | Listen for multiple labels being sent over BLE |
| 12 | Display the data bits according to their meaning(defined by the labels) |

| Non-Functional Requirements | |
|-----------------------------|--|
| Number | Requirement |
| 1 | Reliably connect to the chip (numbers tbd) |
| 2 | Easy to understand and use |
| 3 | Send labels quickly (numbers tbd) |
| 4 | Receive labels quickly (numbers tbd) |
| 5 | Decode labels quickly (numbers tbd) |
| 6 | Needs to be available for android and iOS |
| 7 | Needs to be maintained to be compatible with future OS updates |
| 8 | Be palatable to look at |

System Sketch



Use-Case Diagram

