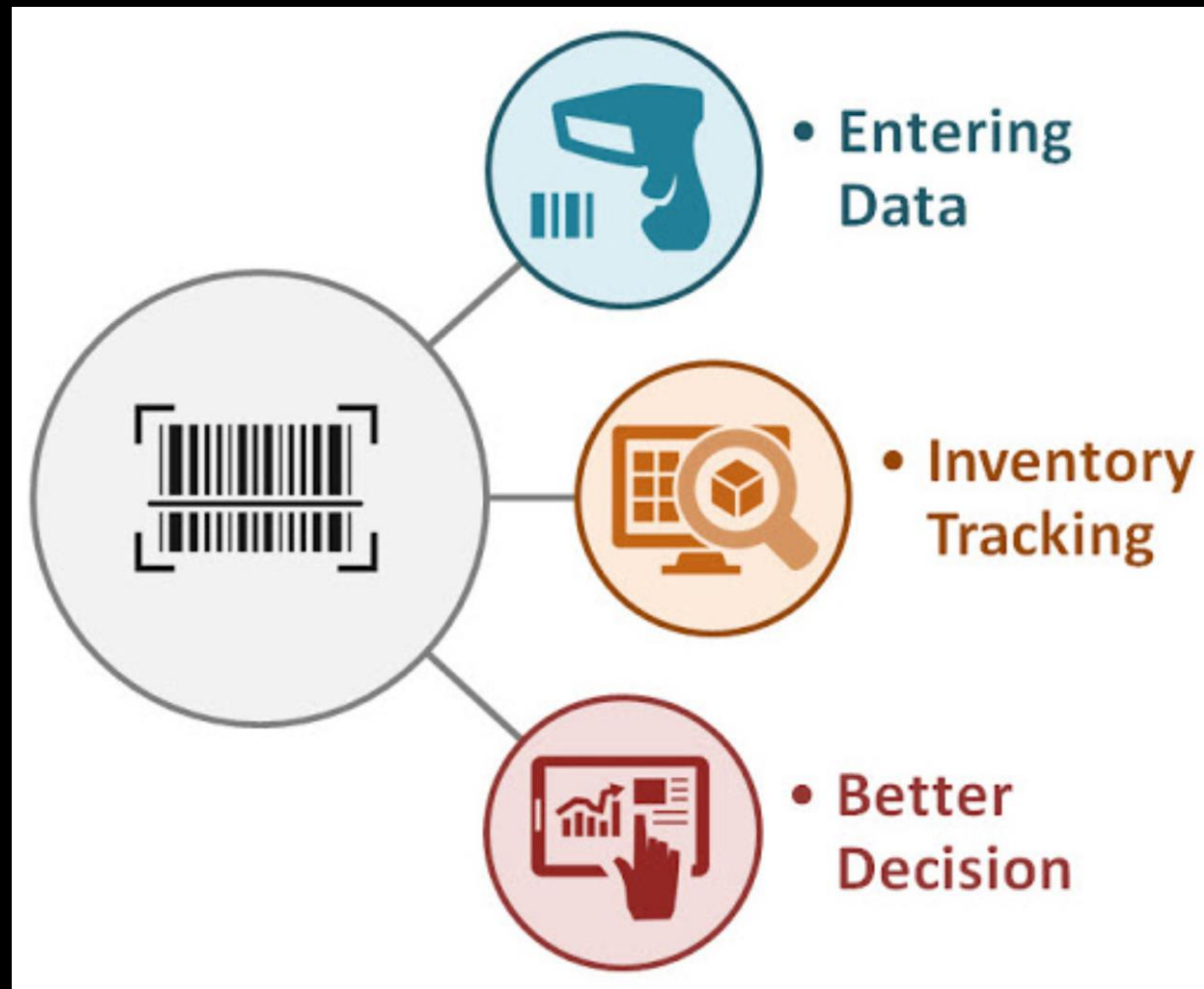


Gaspar Dantas
Sonu Thummar
Justin Rehg
Lody Morillo

Group 24

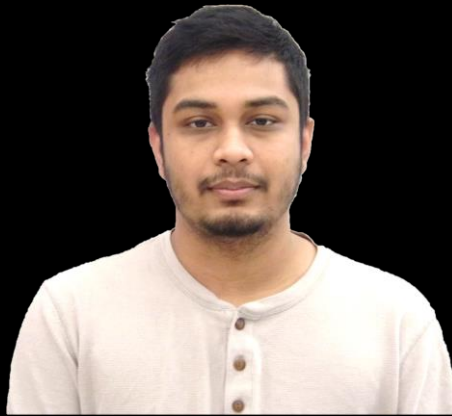


Automated Inventory Tracking System



UCF

Meet the SW Team



Sonu Thummar
CpE - SW



Gaspar Dantas
CpE - SW





- Reduce waste within households
- Allow users to manage day-to-day shopping
- Visibility of active products in the inventory
- Reducing cost of grocery purchases
- Minimizing time expenditure creating grocery lists

Why AITS?



- User friendly interface
- Reusability across platforms
- Bluetooth connection for SW – HW communication
- Lightweight HW Design

Project Goals

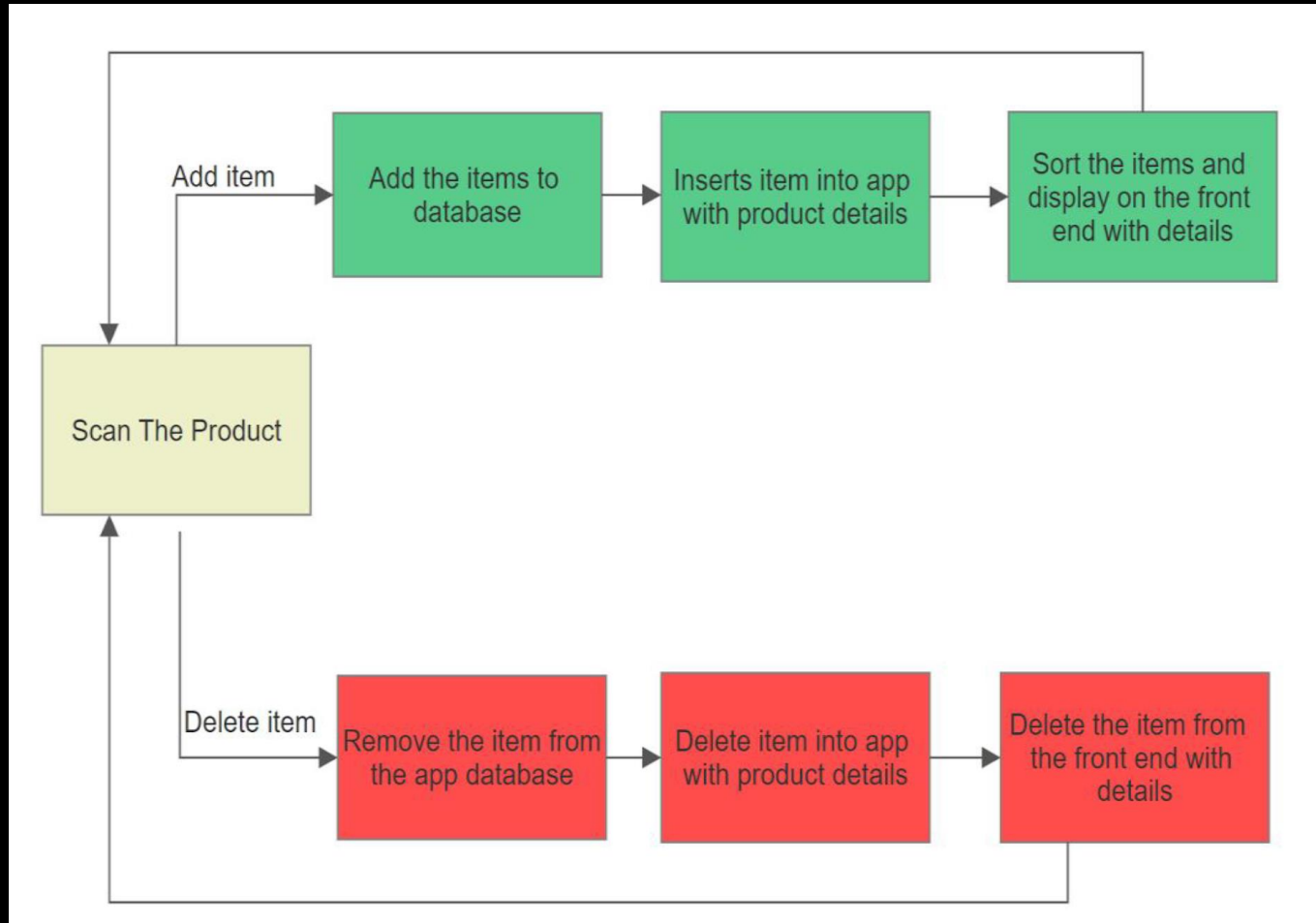




Index	Requirement
1	The software should be able to store items from the inventory in a database
2	The software should have an API service to retrieve product details.
3	The software should be able to insert records directly from the scan and allow users to add inventory items.
4	The software should be able to delete the data
5	The software should allow the user to add/remove expiration dates through datetime pickers
6	The application should be reusable across different platforms
7	Push Alert Notification

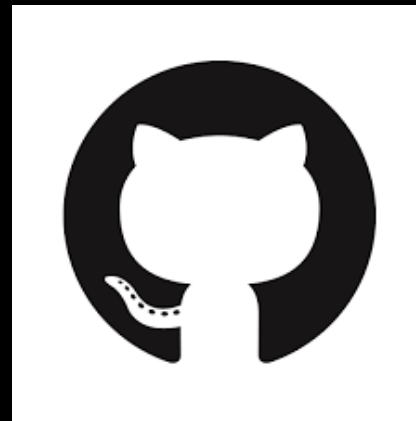
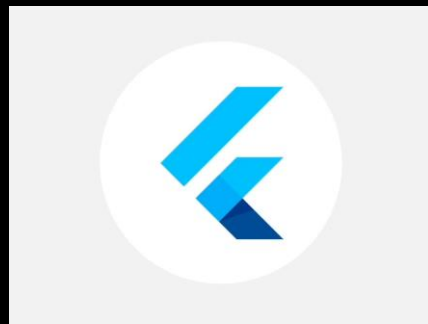
SW Requirements





General Workflow





Technologies





- Platform independent
- Custom, animated UI support
- Ability to simulate/test on different devices while maintaining scalability
- Extensive Camera Modules
- Widget based development
- Similar performance to native apps

Flutter



UCF

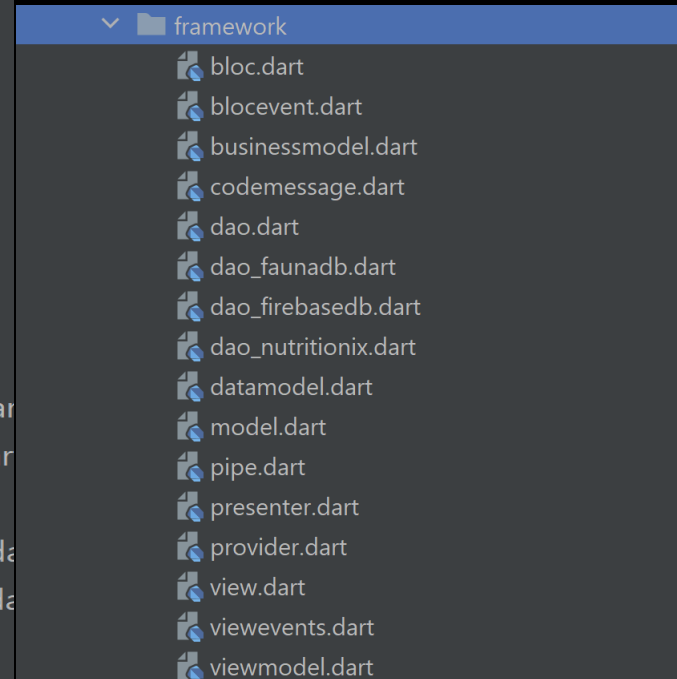
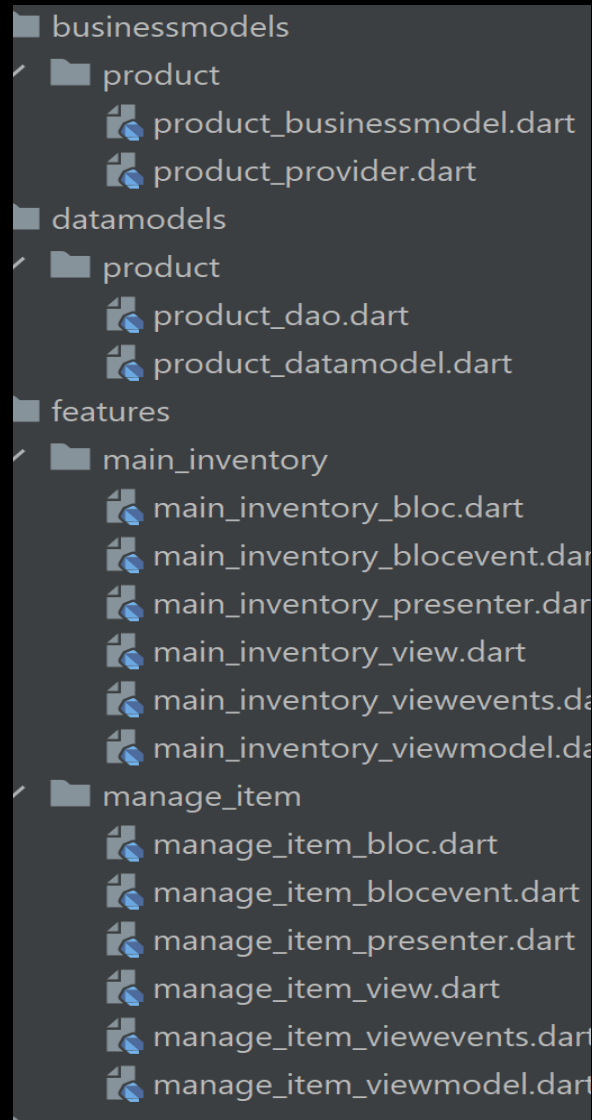


- Clean Code
- Generic Programming
- Easy to debug
- Business logic oriented

Framework



Software Architecture





- User Table – Email
- Product Table – Description, Measure, UPC
- Inventory Table ID → Expiration Date, Amount, Product ID
- Firebase DB

Database



accounts demoaitsmidterm@gmail.com

inventory 24b0cdb8-8ad0-4b33-9d94-6681875cf1a7

[+ Add document](#) [+ Start collection](#)

24b0cdb8-8ad0-4b33-9d94-6681875cf1 [+ Add field](#)

expirationDate: "07/21/2021"
productId: "2f1658b3-0895-4501-9c33-a3ff283b2a76"
qty: 1

products 2f1658b3-0895-4501-9c33-a3ff283b2a76

[+ Add document](#) [+ Start collection](#)

2f1658b3-0895-4501-9c33-a3ff283b2a [+ Add field](#)

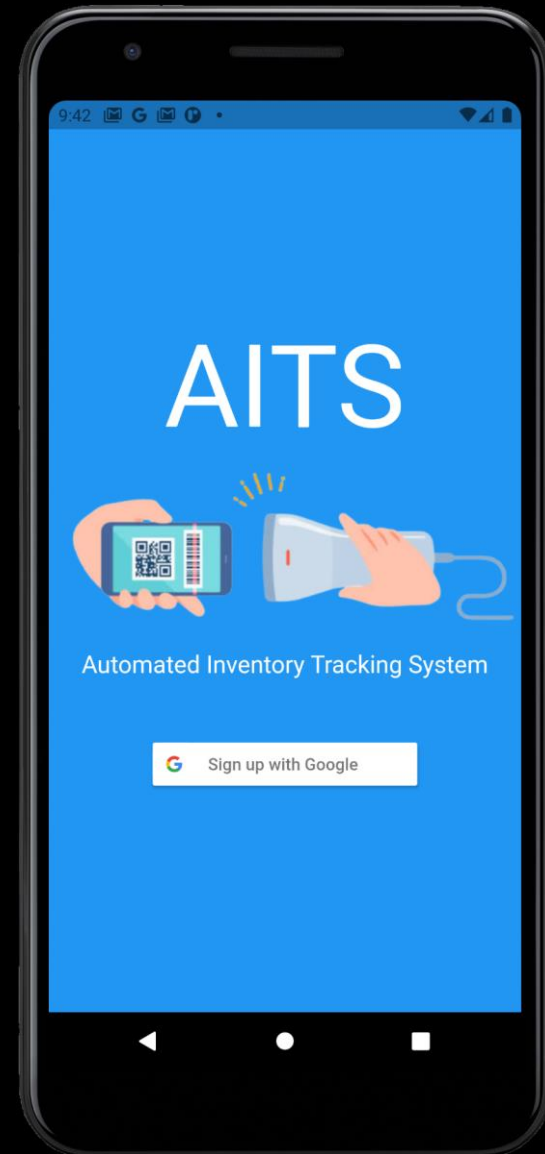
description: "My product "
measure: "5 Bottles "
upcNumber: ""

Database



User Interface

Login Screen





Social Authentication

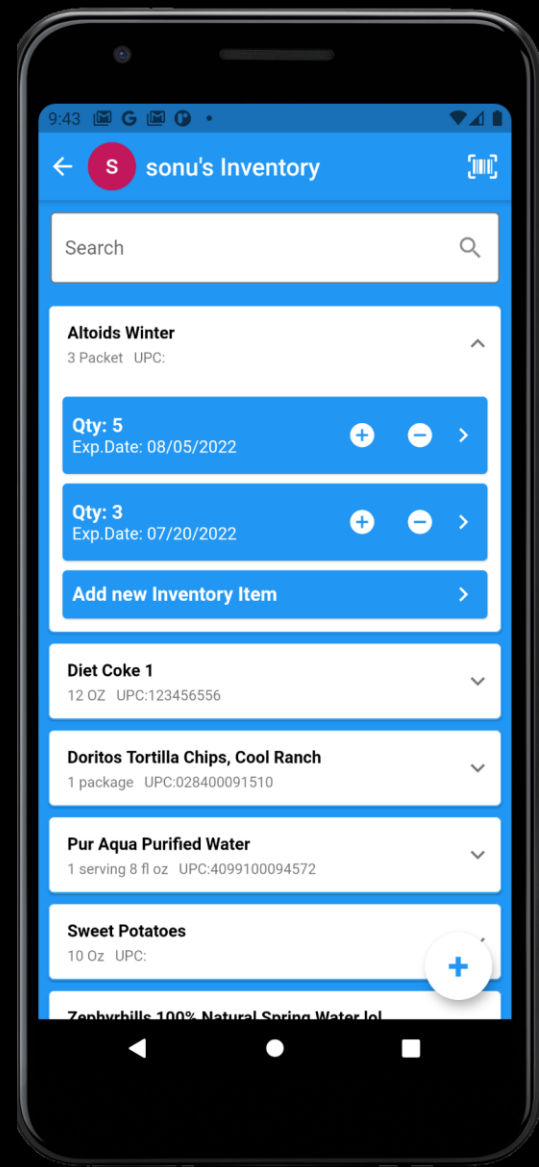
- Benefit of utilizing Firebase
- Ability to silently sign in
- Numerous sign in validation options





Main inventory

Main View





Add Item

Add Item

A smartphone mockup displaying a mobile application interface for adding a new item. The screen has a blue background and a white header bar with a back arrow and the text 'New Item'. Below the header are four white input fields: 'UPC Number' with a magnifying glass icon, 'Description', 'Measure', and 'Expiration Date'. The bottom of the phone shows the standard Android navigation bar with back, home, and recent apps buttons.

9:45

← New Item

UPC Number

Description

Measure

Expiration Date





API

API v1.1 Quickstart - UPC Scanning

Submit a UPC, and we return back nutrition data. Over 220,000 UPCs currently supported! In this example, we used UPC **49000036756** (2 Liter Bottle of Cherry Coke)

GET Request:

```
https://api.nutritionix.com/v1_1/item?upc=49000036756&appId=[YOURID]&appKey=[YOURKEY]
```

Response:

```
{
  "item_id": "51c3d78797c3e6d8d3b546cf",
  "item_name": "Cola, Cherry",
  "brand_id": "51db3801176fe9790a89ae0b",
  "brand_name": "Coke",
  "item_description": "Cherry",
  "updated_at": "2013-07-09T00:00:46.000Z",
  "nf_ingredient_statement": "Carbonated Water, High Fructose Corn Syrup and/or Sucrose, Caramel Color, Phosphoric Acid, Natural Flavors, Caffeine.",
  "nf_calories": 100,
  "nf_calories_from_fat": 0,
  "nf_total_fat": 0,
  "nf_saturated_fat": null,
  "nf_cholesterol": null,
  "nf_sodium": 25,
  "nf_total_carbohydrate": 28,
  "nf_dietary_fiber": null,
  "nf_sugars": 28,
  "nf_protein": 0,
  "nf_vitamin_a_dv": 0,
  "nf_vitamin_c_dv": 0,
  "nf_calcium_dv": 0,
  "nf_iron_dv": 0,
  "nf_servings_per_container": 6,
  "nf_serving_size_qty": 8,
  "nf_serving_size_unit": "fl oz",
}
```





- Scanner captures UPC
 - Searches within active products and filters
 - User can add or delete the quantity
 - If none, prompts user ability to add
 - Extracts product details from Nutritionix

SW – HW Integration



UCF



Status	Requirement
Pass	The software should be able to store items from the inventory in a database
Pass	The software should have an API service to retrieve product details.
Pass	The software should be able to insert records directly from the scan and allow users to add inventory items.
Pass	The software should be able to delete the data
Pass	The software should allow the user to add/remove expiration dates through datetime pickers
Pass	The application should be reusable across different platforms
Fail	Push Alert Notification

Testing Requirements



Meet the HW Team

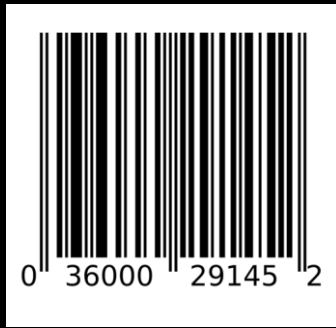


Justin Rehg
CpE - HW



Lody Morillo
EE - HW





UPC



QR

1 Dimensional	2 Dimensional
<ul style="list-style-type: none">• Represented by lines in sequence, these lines represent numbers.• Most scanners can read 1D barcodes• Most products use a 1D barcode	<ul style="list-style-type: none">• Can be represented in many different ways• Requires a specific scanner that can capture and process the image.

Barcodes



Feature	Description
Dimensions	Length: 2.7 inches Height: 6.3 inches Width: 3.5 inches
Internal CPU	32-bit
Scanning Modes	Manual Continuous
Connection Mode	Wired USB 2.0 Wireless USB 2.4 GHz
Price	\$28.40

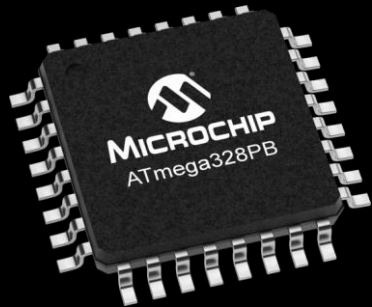


Tera Barcode Scanner





ATMega328PB Specifications	
Speed	16MHz
Storage	32KB
Low Supply-Voltage Range	1.8V to 5.5V
I/O pins	32
USCI	UART I2C Synchronous SPI
Operating Temp (°C)	-40 to 105
Price	\$1.92 each

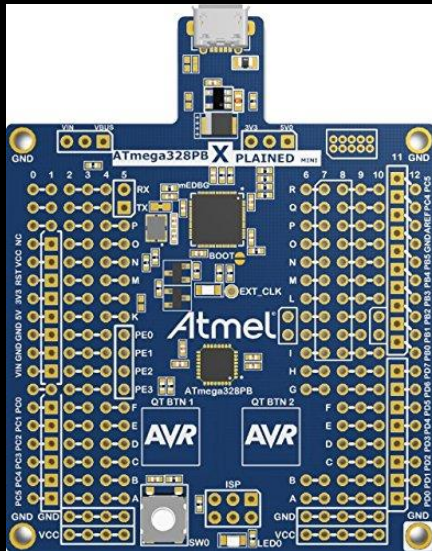


ATMega328PB



Xplained Mini Specifications

- On-board debugger with full source-level debugging support in Atmel Studio
 - Auto-ID for board identification in Atmel Studio
 - Access to all signals on target MCU
 - One green status LED
 - One push button
 - MicroUSB connection



ATMega328PB Xplained Mini



UCF



- Change in framework.
 - From Native to Flutter
 - After finding out Native would not work for our needs.
- PCB Design mistake
 - We had a missing/incorrect component
 - Had to redesign the schematic
- Issue with coding the MCU/PCB
 - Struggled to get certain aspects of the code to work on the ATmega
 - Was unable to flash the code onto the PCB

Challenges



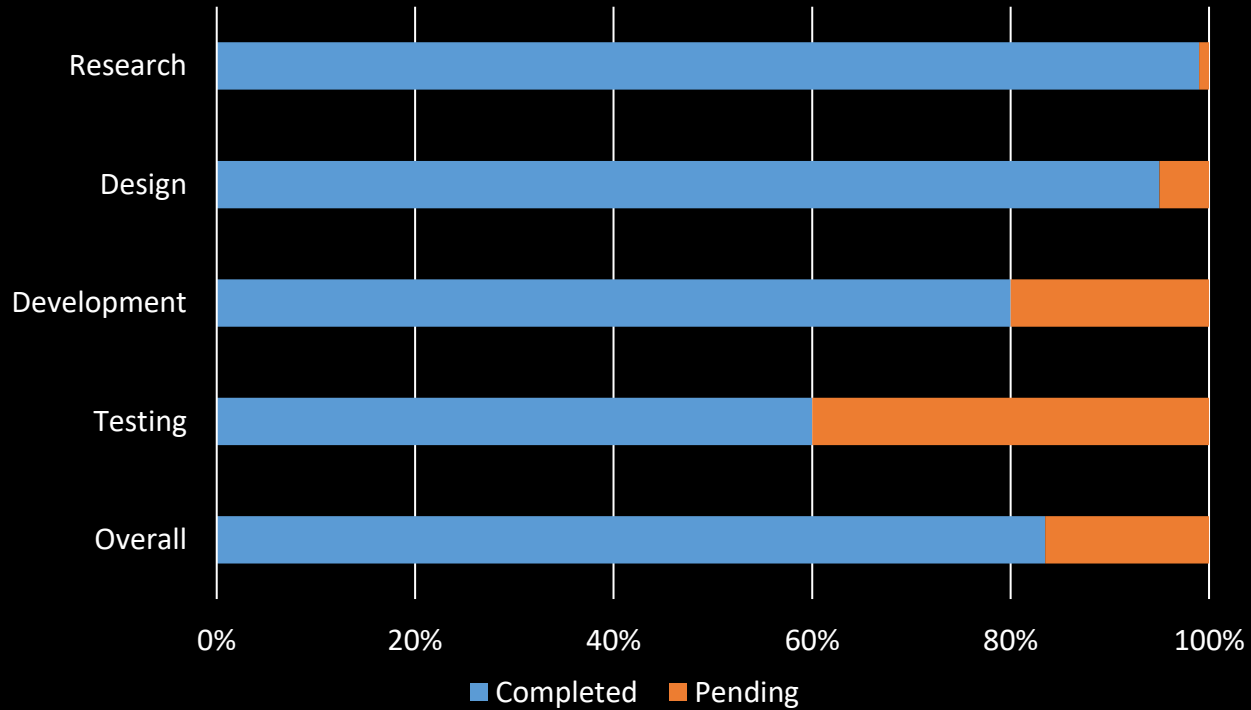


Component	Price
Projected Budget	\$400
Tera Scanner	\$28.40
ATMega328PB (x2)	\$2.44
HC-05 Bluetooth Module(x2)	\$15.98
Xplained Mini	\$8.88
AVR 51 ISP USB Module	\$8.99
Incorrect Components	\$108.17
Components	\$121.68
Current Total	\$294.54

Budget



Hardware Progress



HW Current Progress



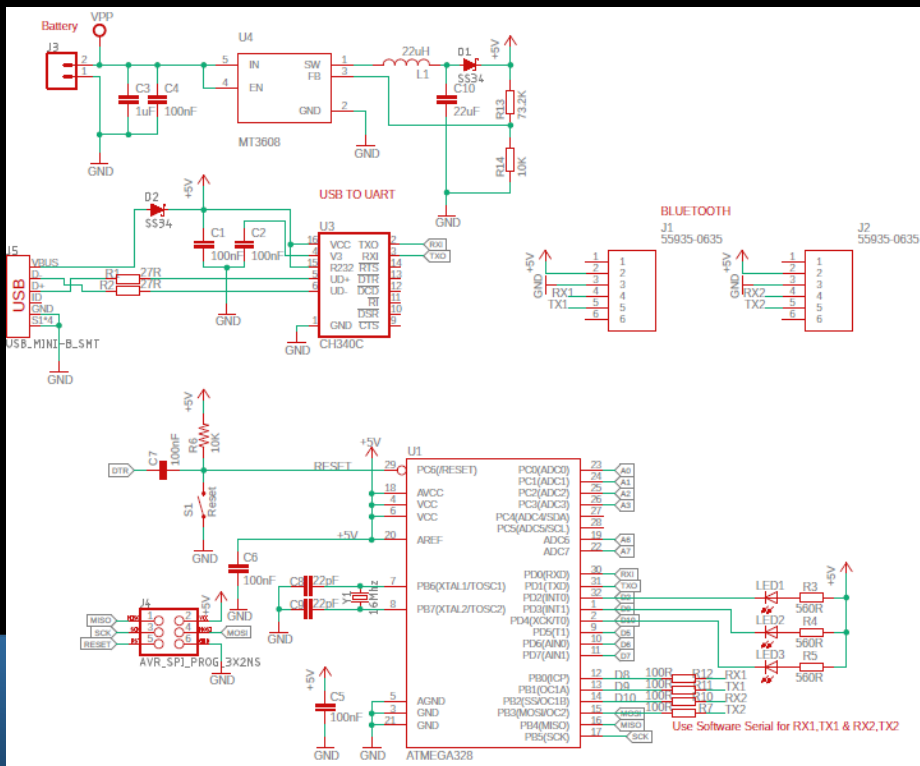
Alternative Physical version of the Automated Inventory Tracker (AIT)



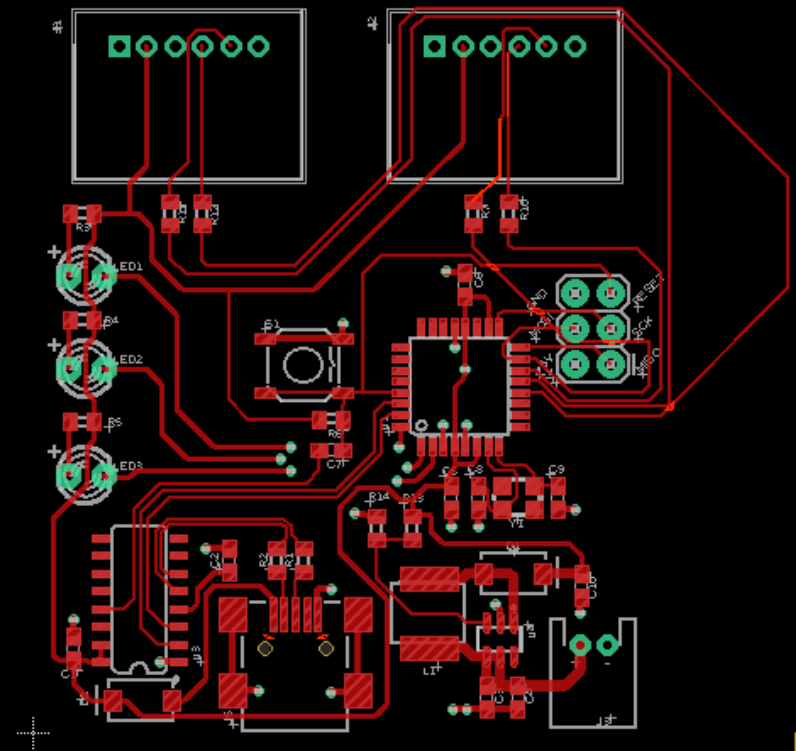


PCB Schematic File and Board File

- Schematic File



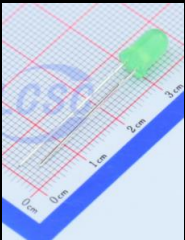
- Board File



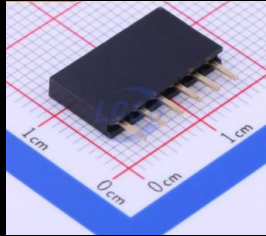


PCB Soldered Components

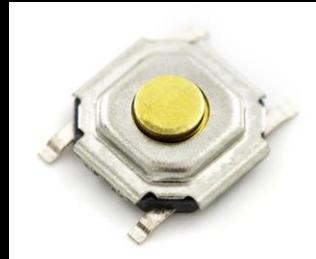
- 5mm Light Emitting Diodes



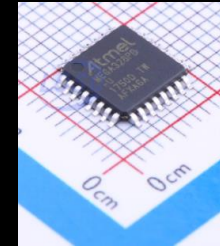
- 6 Pin Male Header & Female Header



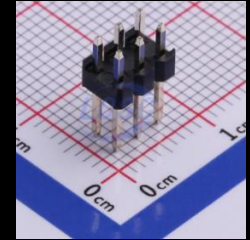
- Push Button



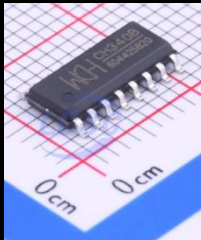
- Microchip Tech ATMEGA328PB-AU



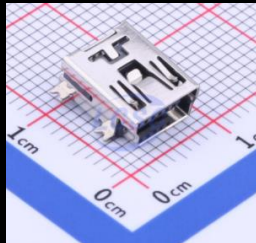
- 6 Pin Male Header & Female Header



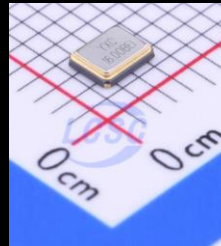
- USB 2.0 Transceiver



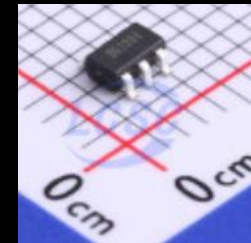
- Mini USB-b Connector



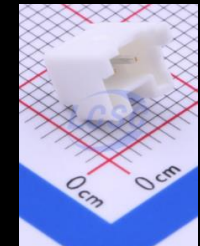
- Crystals



- DC-DC Converters



- 2 Male Pins





Items Paired with the Inventory Tracker Board

Wireless Scanner:



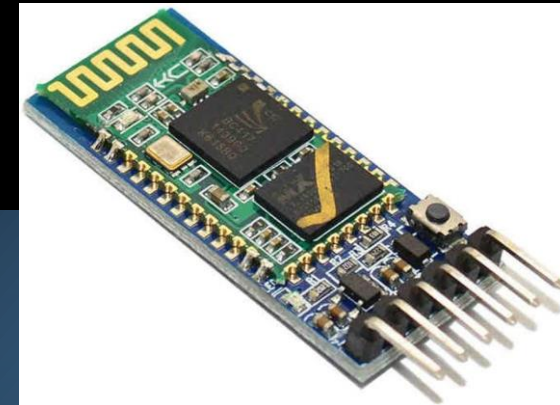
Mini USB-b Male to USB-a Female connection:



Female/Male wires:



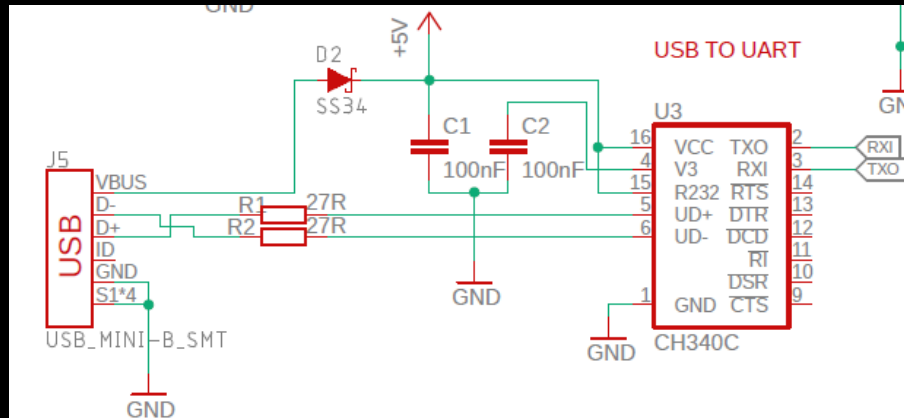
Bluetooth Module:





Schematic Breakdown

- Mini USB-b Connector
- Mini USB-b 2.0 Transceiver 3.3V

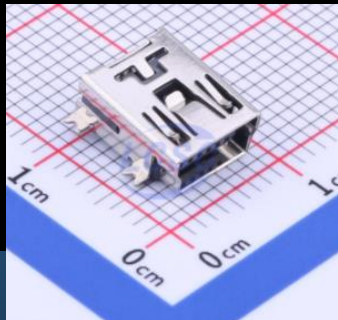


Hardware Implementation

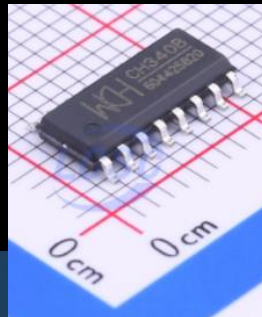
- Mini USB-B to USB-A connector extension is used for the wireless USB-A connected handheld scanner
- Wireless Scanner will scan the barcode on the grocery store item



(Wireless Scanner)



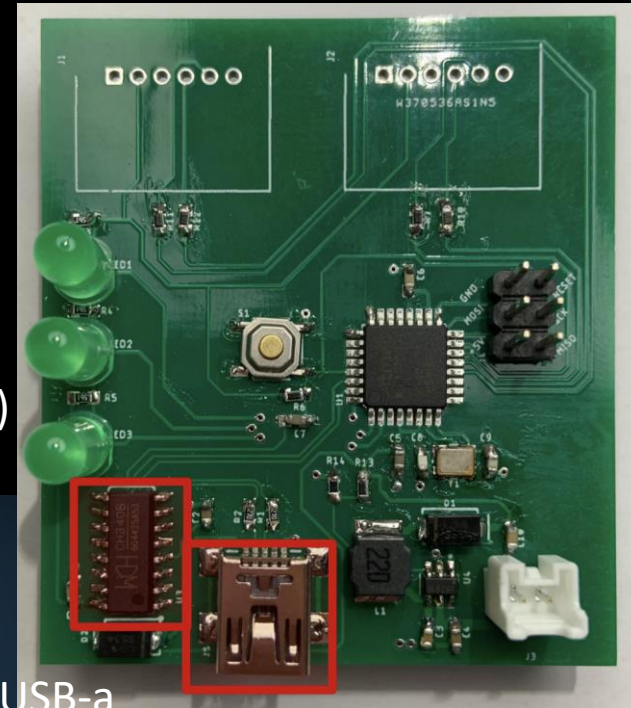
(Mini USB-b Connector)



(USB 2.0 Transceiver)



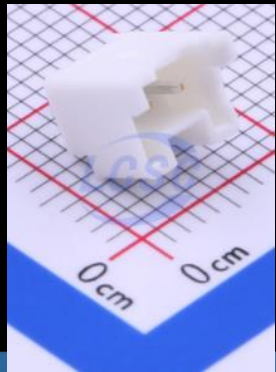
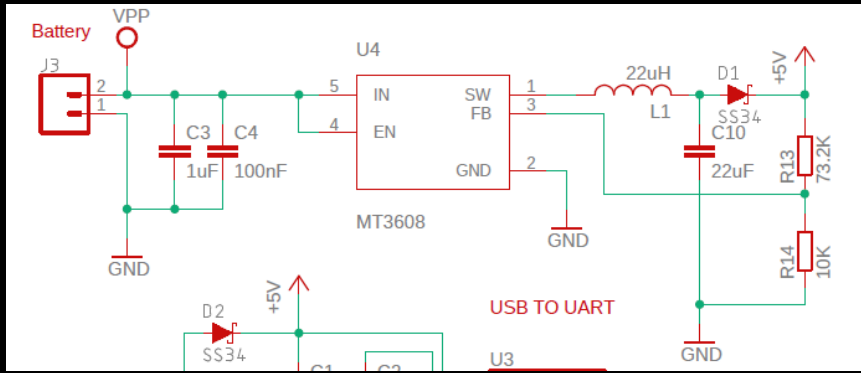
(Mini USB-b Male To USB-a Female Connector)



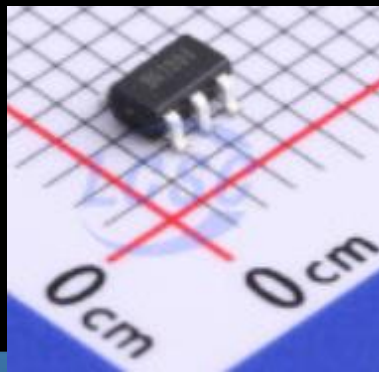


Schematic Breakdown

- 2 1 Header PA 0.079"(2.00mm) Male Pin



(2 Male Pin)



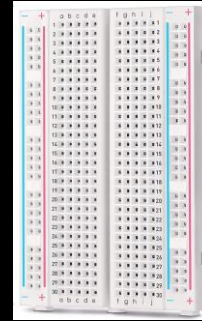
(DC-DC Converters)



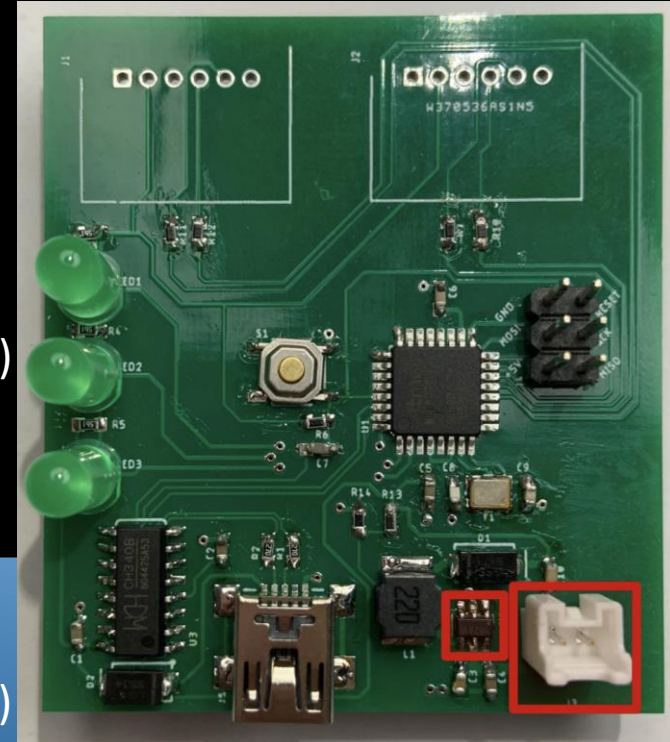
(Female/Male wires)

Hardware Implementation

- The Male pin is the power port for the PCB
- Female/male wires used to connect power port to bread board, to then apply power to the bread board



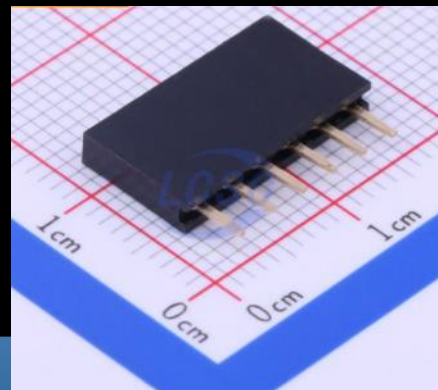
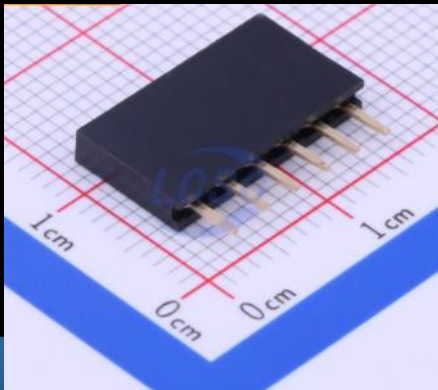
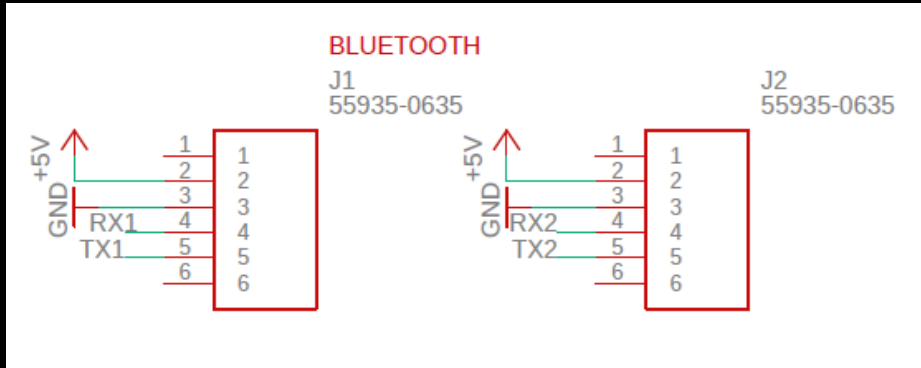
(Bread Board)





Schematic Breakdown

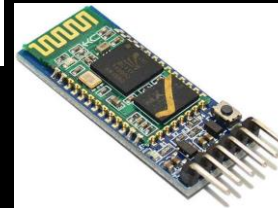
- 2.54mm Pin Header & Female Header



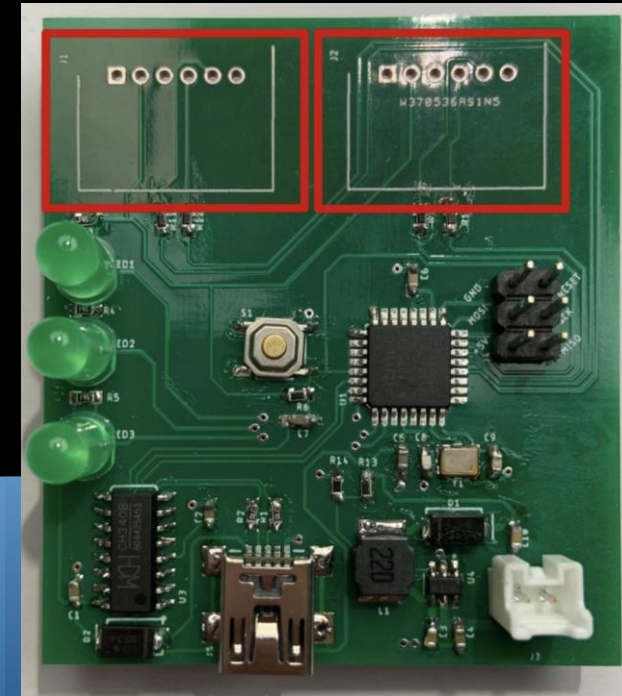
(6 Pin Male Header & Female Header)

Hardware Implementation

- 6 pin Bluetooth module will be inserted inside the 6-pin female header
- Bluetooth Module will send barcode information to the smart phone application



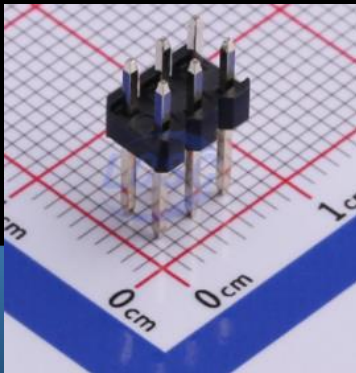
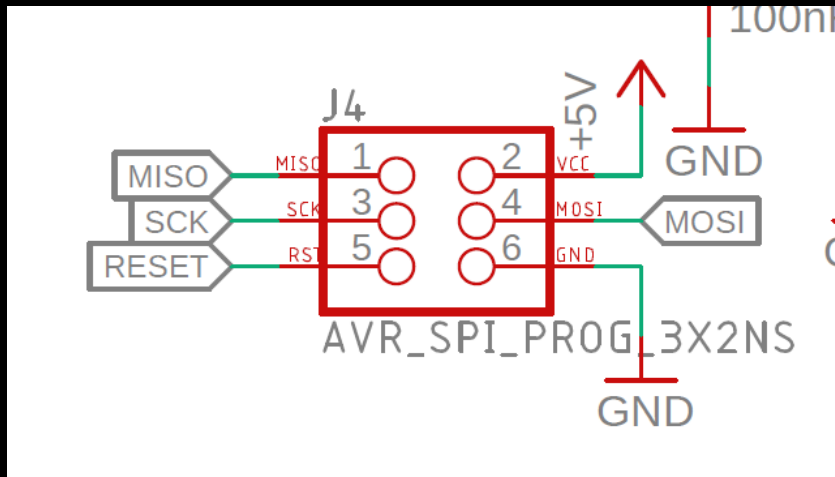
(Bluetooth Module)





Schematic Breakdown

- 6-Pin Header & Female Header



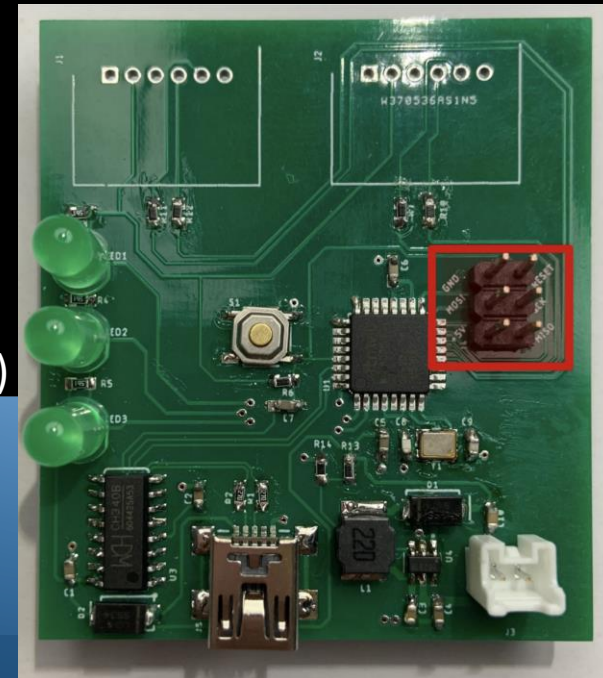
(6 Pin Male Header & Female Header)

Hardware Implementation

- Ground
- Serial Clock
- Master In Slave Out
- Master Out Slave In
- Reset
- +5 Volts
- Connected using Female/male wires

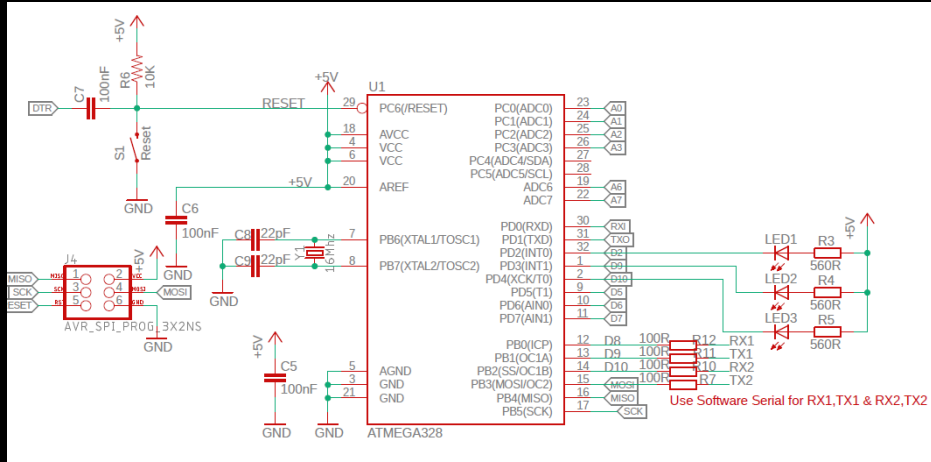


(Female/Male wires)



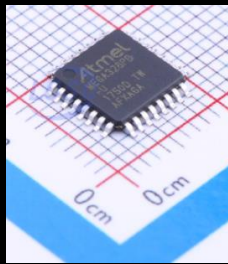
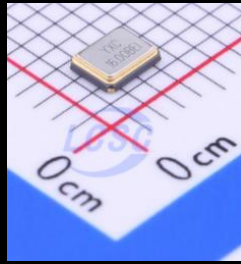
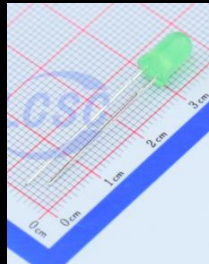


Schematic Breakdown



Hardware Implementation

- Microcontroller takes in barcode code and sends out signal to the Bluetooth
- Microcontroller interprets data from the barcode scanner
- 3 LED lights, each used to indicate board is on, an item has been scanned in, and an item has been scanned out
- Push Button turns On/Off the PCB board



(5mm LED) (Push Button) (Crystals) (Microchip Tech ATMEGA328PB-AU)

