Product for Insulin Self-Administration

DFP-05

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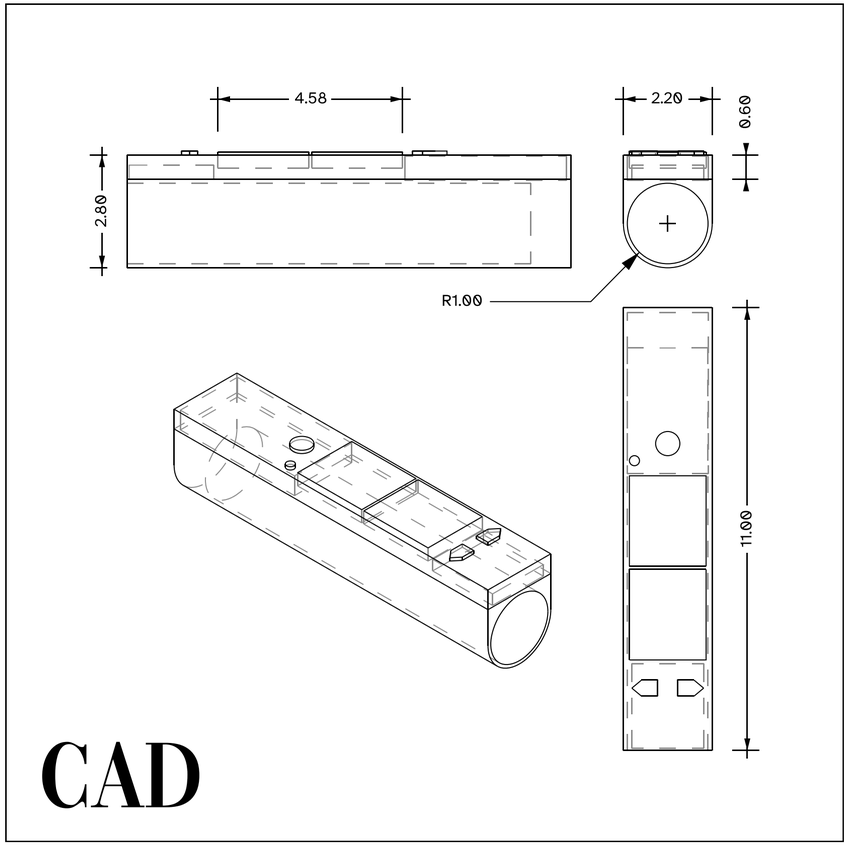
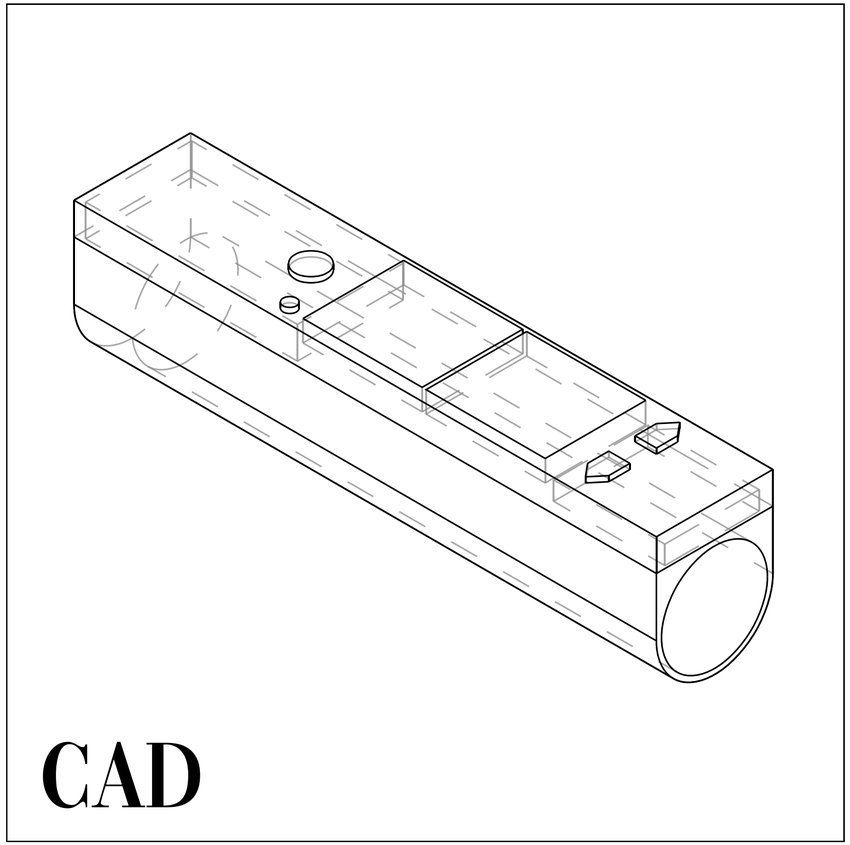
DESIGN



CAD



CAD

Need to change dimensioning to accommodate two microprocessors.

Storage of needles - should ideate

COMPONENTS

	Seeed Studio XIAO RP2040 v1.0	Ordered 2, One arrived
	Waveshare 0.85inch LCD Display Module, IPS Panel, 128×128 Resolution, SPI Interface, 65K colors	Ordered 2
	Tactile Push Button Switch	Have to source
	3.7V 400mAH (Lithium Polymer) Lipo Rechargeable Battery Model KP-502030	Ordered

MANUFACTURING PROCESSES

Mechanical Department - NC-CNC tools to make hollow aluminium body

3D Printing Plastic parts

PROTOTYPE AND DRY RUN

current location storing code

```
#include <LiquidCrystal_I2C.h>
#include <EEPROM.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define button D3
const int locationAddress = 0;

int count = 0;
String location;
unsigned long lastPressTime = 0;
bool savedDisplayed = false;

void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.clear();
  lcd.backlight();
  pinMode(button, INPUT_PULLUP);

  EEPROM.begin(512);
  EEPROM.get(locationAddress, count);
  if (count < 0 || count > 5) count = 0;

  updateLocation();

  lcd.setCursor(0, 0);
  lcd.print("Last Location:");
  lcd.setCursor(0, 1);
  lcd.print(location);
  delay(2000);
  lcd.clear();
}

void loop() {
  Serial.print("Current Index: ");
  Serial.println(count);

  if (digitalRead(button) == 0) {
    count = (count + 1) % 6;
    updateLocation();
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Location:");
    lcd.setCursor(0, 1);
    lcd.print(location);
    lastPressTime = millis();
    savedDisplayed = false;  // Reset saved message flag
    delay(500);
  }

  if (!savedDisplayed && millis() - lastPressTime > 7000) {
    EEPROM.put(locationAddress, count);
    EEPROM.commit();

    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Saved!");
    delay(1000);

    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Location:");
    lcd.setCursor(0, 1);
    lcd.print(location);

    savedDisplayed = true;  // Ensure "Saved!" is shown only once
  }
}

void updateLocation() {
  switch (count) {
    case 0: location = "Left Thigh"; break;
    case 1: location = "Right Thigh"; break;
    case 2: location = "Left Abdomen"; break;
    case 3: location = "Right Abdomen"; break;
    case 4: location = "Right Shoulder"; break;
    case 5: location = "Left Shoulder"; break;
  }
}
```

time storing code

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define buttonPin 3

unsigned long startTime = 0;
unsigned long prevTime = 0;
bool buttonPressed = false;

void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.backlight();
  pinMode(buttonPin, INPUT_PULLUP);

  startTime = millis();
}

void loop() {
  unsigned long elapsedTime = (millis() - startTime) / 1000;
  String currentTime = formatTime(elapsedTime);

  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Time: " + currentTime);
  lcd.setCursor(0, 1);
  lcd.print("Prev: " + formatTime(prevTime));

  if (digitalRead(buttonPin) == LOW && !buttonPressed) {
    delay(200);
    prevTime = elapsedTime;
    buttonPressed = true;

    while (digitalRead(buttonPin) == LOW);
  }

  if (digitalRead(buttonPin) == HIGH) {
    buttonPressed = false;
  }

  delay(1000);
}
```

```
String formatTime(unsigned long seconds) {
  int h = seconds / 3600;
  int m = (seconds % 3600) / 60;
  int s = seconds % 60;

  char buffer[9];
  sprintf(buffer, "%02d:%02d:%02d", h, m, s);
  return String(buffer);
}
```

"time storing" code

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define buttonPin 3

unsigned long startTime = 0;
unsigned long prevTime = 0;
bool buttonPressed = false;

void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.backlight();
  pinMode(buttonPin, INPUT_PULLUP);

  startTime = millis();
}

void loop() {
  unsigned long elapsedTime = (millis() - startTime) / 1000;
  String currentTime = formatTime(elapsedTime);

  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Time: " + currentTime);
  lcd.setCursor(0, 1);
  lcd.print("Prev: " + formatTime(prevTime));

  if (digitalRead(buttonPin) == LOW && !buttonPressed) {
    delay(200);
    prevTime = elapsedTime;
    buttonPressed = true;

    while (digitalRead(buttonPin) == LOW);
  }

  if (digitalRead(buttonPin) == HIGH) {
    buttonPressed = false;
  }

  delay(1000);
}

String formatTime(unsigned long seconds) {
  int h = seconds / 3600;
  int m = (seconds % 3600) / 60;
  int s = seconds % 60;

  char buffer[9];
  sprintf(buffer, "%02d:%02d:%02d", h, m, s);
  return String(buffer);
}
```

further improved

location storing code

will use it when we connect two buttons

```
#include <LiquidCrystal_I2C.h>
#include <EEPROM.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define scrollButton D3
#define selectButton D4

int count = 0;
String location;
const int locationAddress = 0;

void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.clear();
  lcd.backlight();
  pinMode(scrollButton, INPUT_PULLUP);
  pinMode(selectButton, INPUT_PULLUP);

  count = EEPROM.read(locationAddress);
  if (count < 0 || count > 5) count = 0;

  updateLocation();

  lcd.setCursor(0, 0);
  lcd.print("Last Location:");
  lcd.setCursor(0, 1);
  lcd.print(location);
  delay(2000);
  lcd.clear();
}

void loop() {
  Serial.print("Current Index: ");
  Serial.println(count);

  if (digitalRead(scrollButton) == 0) {
    count = (count + 1) % 6;
    updateLocation();
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Select:");
    lcd.setCursor(0, 1);
    lcd.print(location);
    delay(500);
  }
  if (digitalRead(selectButton) == 0) {
    EEPROM.write(locationAddress, count);
    EEPROM.commit();
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Saved:");
    lcd.setCursor(0, 1);
    lcd.print(location);
    delay(1000);
  }
}

void updateLocation() {
  switch (count) {
    case 0: location = "Left Thigh"; break;
    case 1: location = "Right Thigh"; break;
    case 2: location = "Left Abdomen"; break;
    case 3: location = "Right Abdomen"; break;
    case 4: location = "Right Shoulder"; break;
    case 5: location = "Left Shoulder"; break;
  }
}
```

further improved "location storing code" will use it when we connect two buttons

```
#include <LiquidCrystal_I2C.h>
#include <EEPROM.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);
#define scrollButton D3
#define selectButton D4

int count = 0;
String location;
const int locationAddress = 0;

void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.clear();
  lcd.backlight();
  pinMode(scrollButton, INPUT_PULLUP);
  pinMode(selectButton, INPUT_PULLUP);

  count = EEPROM.read(locationAddress);
  if (count < 0 || count > 5) count = 0;

  updateLocation();

  lcd.setCursor(0, 0);
  lcd.print("Last Location:");
  lcd.setCursor(0, 1);
  lcd.print(location);
  delay(2000);
  lcd.clear();
}

void loop() {
  Serial.print("Current Index: ");
  Serial.println(count);

  if (digitalRead(scrollButton) == 0) {
    count = (count + 1) % 6;
    updateLocation();
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Select:");
    lcd.setCursor(0, 1);
    lcd.print(location);
    delay(500);
  }
  if (digitalRead(selectButton) == 0) {
    EEPROM.write(locationAddress, count);
    EEPROM.commit();
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print("Saved:");
    lcd.setCursor(0, 1);
    lcd.print(location);
    delay(1000);
  }
}

void updateLocation() {
  switch (count) {
    case 0: location = "Left Thigh"; break;
    case 1: location = "Right Thigh"; break;
    case 2: location = "Left Abdomen"; break;
    case 3: location = "Right Abdomen"; break;
    case 4: location = "Right Shoulder"; break;
    case 5: location = "Left Shoulder"; break;
  }
}
```

Attended all online CBDE sessions

Thank You