Product for Insulin Self-Administration



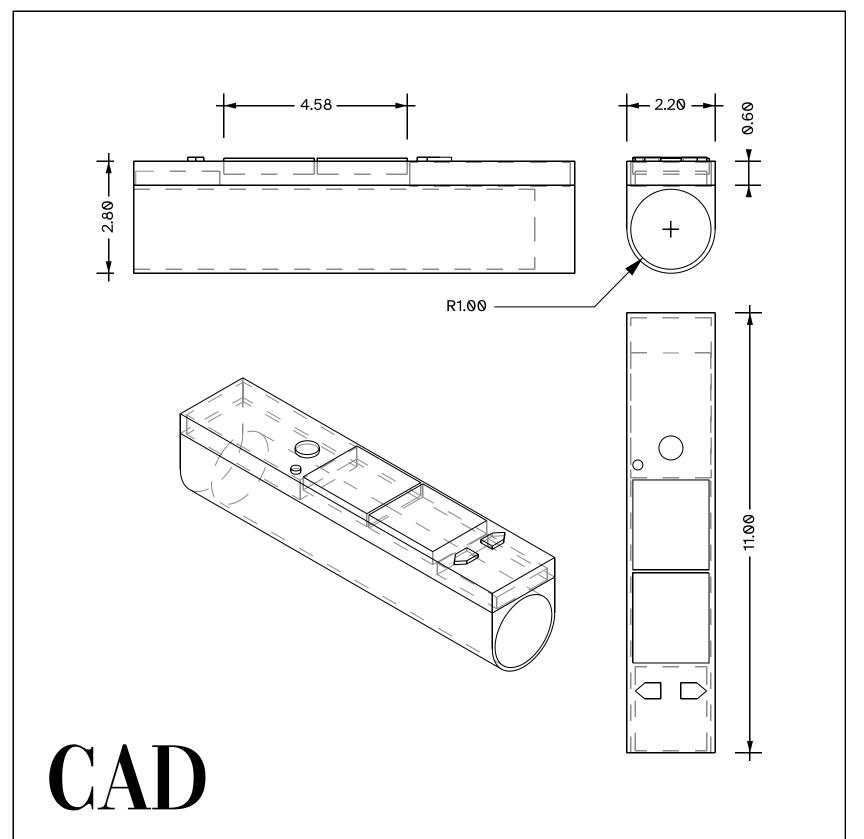


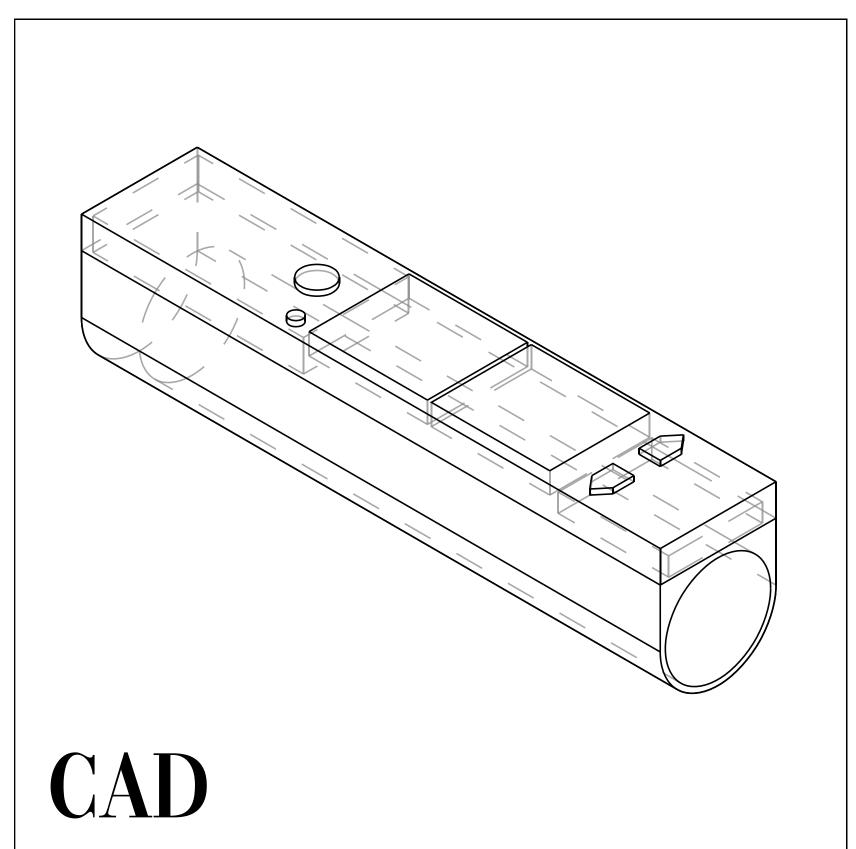
DFP-05

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DESIGN





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 \mid | 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
                                                                              char buffer[9];
unsigned long startTime = 0;
unsigned long prevTime = 0;
bool buttonPressed = false:
                                                                            "time storing" code
                                                                            #include <Wire.h>
void setup() {
  Serial.begin(9600);
   lcd.init();
   lcd.backlight();
   pinMode(buttonPin, INPUT_PULLUP);
                                                                           #define buttonPin 3
  startTime = millis();
void loop() {
  unsigned long elapsedTime = (millis() - startTime) / 1000;
                                                                            void setup() {
   String currentTime = formatTime(elapsedTime);
                                                                              lcd.init();
   lcd.clear();
                                                                              lcd.backlight();
   lcd.setCursor(0, 0);
   lcd.print("Time: " + currentTime);
   lcd.setCursor(0, 1);
   lcd.print("Prev: " + formatTime(prevTime));
   if (digitalRead(buttonPin) == LOW && !buttonPressed) {
                                                                            void loop() {
     delay(200);
     prevTime = elapsedTime;
     buttonPressed = true;
                                                                              lcd.clear();
     while (digitalRead(buttonPin) == LOW);
                                                                              lcd.setCursor(0, 1);
  if (digitalRead(buttonPin) == HIGH) {
     buttonPressed = false;
                                                                                delay(200);
   delay(1000);
```

```
String formatTime(unsigned long seconds) {
  int h = seconds / 3600:
  int m = (seconds \% 3600) / 60;
   int s = seconds \% 60:
   sprintf(buffer, "%02d:%02d:%02d", h, m, s);
  return String(buffer);
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
unsigned long startTime = 0;
unsigned long prevTime = 0;
bool buttonPressed = false;
  Serial.begin(9600);
   pinMode(buttonPin, INPUT_PULLUP);
  startTime = millis();
   unsigned long elapsedTime = (millis() - startTime) / 1000;
   String currentTime = formatTime(elapsedTime);
   lcd.setCursor(0, 0);
   lcd.print("Time: " + currentTime);
   lcd.print("Prev: " + formatTime(prevTime));
   if (digitalRead(buttonPin) == LOW && !buttonPressed) {
     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

buttons

location storing code

will use it when we connect two

```
#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 \mid | 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) {
                                                                                  updateLocation();
     EEPROM.write(locationAddress, count);
     EEPROM.commit();
                                                                                    lcd.setCursor(0, 0);
     lcd.clear();
                                                                                   lcd.print("Last Location:");
                                                                                   lcd.setCursor(0, 1);
     lcd.setCursor(0, 0);
                                                                                   lcd.print(location);
     lcd.print("Saved:");
                                                                                   delay(2000);
     lcd.setCursor(0, 1);
                                                                                   lcd.clear();
     lcd.print(location);
     delay(1000);
                                                                                 void loop() {
                                                                                   Serial.print("Current Index: ");
void updateLocation() {
                                                                                   Serial.println(count);
  switch (count) {
     case 0: location = "Left Thigh"; break;
                                                                                    if (digitalRead(scrollButton) == 0) {
     case 1: location = "Right Thigh"; break;
                                                                                      count = (count + 1) \% 6;
     case 2: location = "Left Abdomen"; break;
                                                                                      updateLocation();
     case 3: location = "Right Abdomen"; break;
                                                                                      lcd.clear();
     case 4: location = "Right Shoulder"; break;
                                                                                      lcd.setCursor(0, 0);
                                                                                      lcd.print("Select:");
     case 5: location = "Left Shoulder"; break;
                                                                                      lcd.setCursor(0, 1);
                                                                                      lcd.print(location);
further improved "location storing code" will use it when we connect two
                                                                                      delay(500);
#include <LiquidCrystal_I2C.h>
#include <EEPROM.h>
                                                                                    if (digitalRead(selectButton) == 0) {
                                                                                      EEPROM.write(locationAddress, count);
LiquidCrystal_I2C lcd(0x27, 16, 2);
                                                                                      EEPROM.commit();
#define scrollButton D3
                                                                                      lcd.clear();
#define selectButton D4
                                                                                      lcd.setCursor(0, 0);
                                                                                      lcd.print("Saved:");
int count = 0;
                                                                                      lcd.setCursor(0, 1);
String location;
                                                                                      lcd.print(location);
const int locationAddress = 0;
                                                                                      delay(1000);
void setup() {
  Serial.begin(9600);
  lcd.init();
                                                                                 void updateLocation() {
  lcd.clear();
                                                                                   switch (count) {
  lcd.backlight();
                                                                                      case 0: location = "Left Thigh"; break;
  pinMode(scrollButton, INPUT_PULLUP);
                                                                                      case 1: location = "Right Thigh"; break;
  pinMode(selectButton, INPUT_PULLUP);
                                                                                      case 2: location = "Left Abdomen"; break;
                                                                                      case 3: location = "Right Abdomen"; break;
  count = EEPROM.read(locationAddress);
                                                                                      case 4: location = "Right Shoulder"; break;
  if (count < 0 \parallel count > 5) count = 0;
                                                                                      case 5: location = "Left Shoulder"; break;
```

Attended all online CBDE sessions