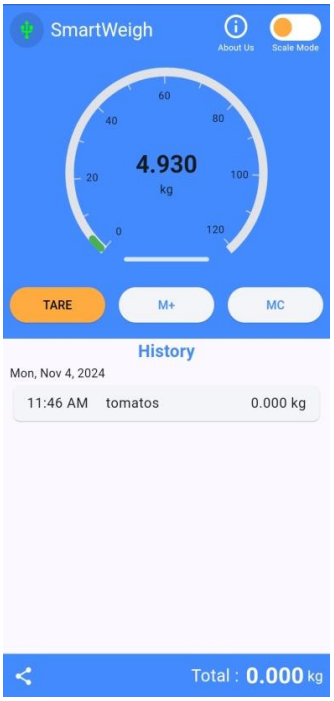
Pinky Scale

Introducing the World's Smallest Portable Scale Board, a compact tool designed for service personnel and users needing a portable solution for checking weigh-based machine functionality. Powered by an 8-pin 8-bit 8051 microcontroller, CH340N USB IC, and high-resolution HX710 ADC, this scale board works seamlessly with our custom Android app, delivering accurate weight measurements in a highly portable design.

Detailed Instructions

1. **Connect the Pinky Scale Device**
   Connect the Pinky Scale to your Android phone via OTG..
2. **Grant Permissions**
   When prompted, grant permission on your phone to complete the connection.
3. **Connection Confirmation**
   When successfully connected, the USB symbol on the device will turn from red to green, and the Pinky Scale will start transmitting data. The weight indicator will adjust in real-time based on the detected weight.

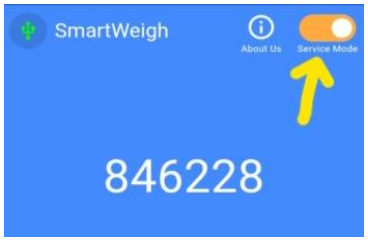
Key Functions



1. **TARE**
   The Tare button resets the scale to zero, useful for excluding the weight of containers or extra items.
2. **M+**
   The M+ button saves the current weight to the app's history, ideal for tracking multiple items. For example, after weighing tomatoes, press M+ and label it "Tomato." Repeat this process with other items, like "Potato." Saved weights and labels are visible in the history section, helping you manage inventory or record transactions.
3. **MC**
   The MC button clears all saved weights and item names in the app, allowing you to start fresh. You can add new entries again by pressing M+.

SERVICE MODE: Service Mode is designed specifically for calibrating the Pinky Scale to ensure precise weight measurements. This mode should only be used by authorized personnel when calibration is required.

Activating Service Mode



a. In the app, slide the **Scale button** to enter Service Mode. This will open the calibration interface.
b. In Service Mode, the raw ADC will be displayed on the screen.
c. To start calibration, tap the **"Smart Weigh"** title at the top of the screen five times. A dialog box with calibration options will then appear.

1. **Decimal Place:** In the dialog box, you can adjust the decimal places for weight precision. For example, if the weight is currently displayed as 2.00 and you want more precision, you can set the decimal to 3, displaying the weight as 2.000. This setting allows customization of decimal places according to your needs (e.g., 2.0, 2.00, 2.000, etc.).

2. **e-Value:** The E-Value, or scale division, is the smallest increment or change in weight that a scale can detect and display. It's a measure of the scale's resolution and determines how finely it can read and show weight changes. E-Value of 1 means the scale shows changes in single units (e.g., 1 gram, 1 pound), providing very precise measurements. Higher E-Value (like 5 or 10) means the scale reads in larger increments, rounding to the nearest multiple of that value (e.g., rounding to the nearest 5 grams if E-Value is 5).

Class-II (Load Cell)				Class-III (Load Cell)		
Rated g	**min g**	**e g**		**Rated g**	**min g**	**e g**
50	0.05	0.001		1	2	0.1
100	0.05	0.001		2	4	0.2
200	0.1	0.002		3	10	0.5
500	0.25	0.005		5	10	0.5
1000	0.5	0.1		10	20	1
Rated g	**min g**	**e g**		20	40	2
2	1	0.02		30	100	5
5	2.5	0.05		50	100	5
10	5	0.1		100	200	10
20	10	0.2		200	400	20
30	25	0.5		300	1000	50
50	25	0.5		500	1000	50
				1000	2000	100
				2000	4000	200
				3000	10000	500
				5000	10000	500

In the table you can refer, e-Value for the rated weight in respective class.

3. **Empty Weight Calibration:** In this step, the ADC value will appear in the Empty Weight area. This value may fluctuate slightly due to environmental factors like air circulation, for reliable calibration:

- Avoid placing the scale in areas with strong air currents or using fans nearby, as these can cause the ADC value to vary.
- Ensure the environment is stable and still during this process.
- Before proceeding, remove all weight from the scale, including any objects on it, to correctly set the "empty" or zero state of the scale.

4. Placing the Weight and Calibrating

To calibrate, place a known weight (e.g., 2 kg) on the scale. Here's how to proceed:

1. Entering Weight in Grams: Type "2000" in the app instead of "2" because the scale reads weight in grams. By entering 2000, you're indicating that the weight placed on the scale is 2000 grams (equivalent to 2 kg).
2. Precision Settings: Since you set the decimal place to 3 in Service Mode, the app will display weight values with three decimal places for precision. For example, if the scale measures 2456 grams, the app will show it as 2.456 kg (2 kg and 456 grams) based on the decimal setting.
3. Calibrating with Different Weights: You can repeat this process with various known weights (e.g., 5 kg, 10 kg, 100 kg) by placing the weight on the scale and entering its value in grams.

The app also allows you to switch units (kg, g, ton, mg), providing flexibility to display measurements in the units that best suit your needs. This calibration ensures that the scale gives accurate readings across different weights.

5. **Max Range Setting:** The Max Range sets the upper weight limit that the scale can measure. This determines the maximum weight the scale can register and display accurately. For instance, if you set the Max Range to 100, the scale will adjust readings within this limit, ensuring the display remains proportional as weight increases or decreases.

6. **Capacity Setting:** allows you to select the unit of measurement for displaying weight. Options include kg (Kilograms), g (Grams), ton (Tons), and mg (Milligrams), depending on your needs.

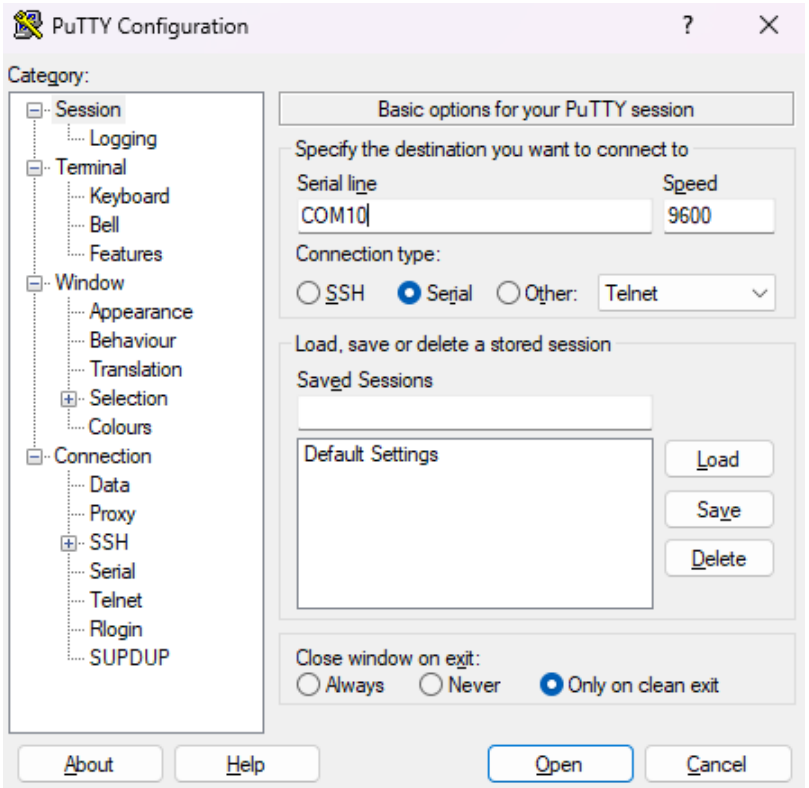
7. **Finish:** Once calibration is complete, return to the Home Screen and slide the Service Mode switch back to Scale Mode. The scale is now ready to provide accurate weight measurements based on your calibration.

Calibrating the Pinky Scale Using Serial Port

Although calibration is typically done through the Android app, you can also calibrate the Pinky Scale using a Windows PC with terminal applications like **PuTTY**. Using **PuTTY** or other similar applications, you can easily communicate with and calibrate your Pinky Scale on any terminal software that supports serial connections. I am Using here **PuTTY** , Here's how to do it:

1. **Requirements**
   - **Windows PC** (with USB or serial port to connect the Pinky Scale)
   - **PuTTY Application** (download and install from PuTTY official website)
   - **Pinky Scale device** (properly connected to your Windows PC via USB or serial interface).

2. **Configuring PuTTY to Connect to the Scale**
   - In the **PuTTY Configuration** window, select the appropriate **Connection Type**. For serial communication, choose **Serial**.
   - In the **Serial Line** field, enter the **COM port** number for the connected device (e.g., **COM3**, **COM4**, etc.). You can check your COM port number by going to **Device Manager** > **Ports (COM & LPT)**.
   - **Speed (Baud Rate)**: Set to **9600** (this is the standard baud rate for communication with the Pinky Scale).
   - **Click "Open"** to start the communication with the Pinky Scale. A terminal window will appear, and you should begin seeing data being received from the scale.



Accessing Calibration Mode

- Once the **COM port** is open and the communication is established, you will see the raw data being transmitted from the Pinky Scale to your terminal in PuTTY.
- You can now proceed with the **calibration process**, which follows the same logic as the Android app but uses specific commands in **PuTTY.**

1. **Enter Analog Mode ("A"):** To switch the Pinky Scale in **Weight Mode** to **Analog Mode** and view the **ADC (Analog to Digital Converter)** value, you need to type the following command
   - **A** (uppercase) and then **press Enter**.

2. **Enter Tare ("T"):** The **"T"** command is used for the **Tare** function, which allows you to reset the scale to zero. This is useful when you want to remove the weight of a container or any unwanted weight, ensuring that only the weight of the item placed on the scale is measured. Simply enter the **"T"** command and **press Enter** to tare the scale, and it will subtract the weight of the container or any previously placed object, resetting the scale to zero.
   - **T** (uppercase) and then **press Enter.**

3. **Return to Weight Mode ("W"):** The **"W"** command is used to **exit Analog Mode** and return to **Weight Mode**. In **Weight Mode**, the scale provides accurate weight readings. When you're in **Analog Mode**, you're viewing the ADC values (raw data), but once you switch back to **Weight Mode** using the **"W"** command, the scale will display the **final weight measurement** in the chosen unit (kg, g, etc.).
   - **W** (uppercase) and then **press Enter.**

4. **Enter: Login ("L"):** The **"L"** command is used to log into the scale's calibration mode. The default login command is **L2016**, where **2016** is the password. After entering this command, you will gain access to the calibration settings and be able to proceed with making adjustments to the scale**.**

Note : Without logging in, you won't have the necessary rights to calibrate the scale and won't able to access below given comments.

5. **Change Password ("U"):** The **"U"** command is used to change the password for accessing the calibration mode, but it can only be done after you've logged in successfully. To change the default password (2016) to a new one, you can use the following command:
   - **U2000** and then **press Enter**.
   - This will change the password from **2016** to **2000**, giving you a new login credential for future access. You can customize the password to any value of your choice as long as it's done after the initial login.

6. **Setting the error Value ("E"):** To adjust the **E-Value** through PuTTY, use the following command. For example, if you want to set the value to **5**, you would enter:
   - **E5** and then **press Enter**.
   - **E1** provides the most **accurate measurement**, which is ideal if you need precise readings.
   - **E5** (or any other value) allows you to **round** the measured weight to a certain degree of precision. This is useful when you don't need highly granular data, and it can simplify the display, especially for bulk measurements or applications where fine precision isn't required.
   - Using **E5** will make your weight readings more manageable by rounding them to values like **2450**, **2455**, or **2460** (instead of showing all possible decimals).

7. **Decimal Place ("P"):** The **"P"** command is used to set the **decimal position** on the scale, determining how many decimal places the weight measurement will display. For example, if you enter **P3** and press **Enter**, the scale will display weights with **3 decimal places** (e.g., 2.456 kg). Similarly, if you set **P2**, it will display weights with **2 decimal places** (e.g., 2.45 kg). This allows you to customize the level of precision for the weight readings based on your needs.
   - **P** (uppercase) and then **press Enter.**

8. **Empty Weight ("N"):** The **"N"** command is used to set the **empty weight** value, similar to the process you followed in the Android app. When you press the **"N"** command, the **ADC value** will fluctuate due to **air weight** and environmental factors. You need to wait until the ADC value stabilizes before proceeding. Once the value has stabilized.
   - **N** (uppercase) and then **press Enter.**

9. **Entering Known Weight ("K"):** After pressing **"K"**, enter the known weight value. For example, if you're placing a **2 kg weight** on the scale, type **K2000** (which represents 2000 grams) and press **Enter**. The scale will then register this known weight and use it for calibration, ensuring accurate weight measurements.

10. **Save Calibration ("S"):** The **"S"** command is used to **save** the calibration settings. After you've completed the calibration process (like setting the empty weight and entering a known weight).
    - **S** (uppercase) and then **press Enter.**
    - And save your changes. If you don't save the calibration, the settings will be lost, and the scale will return to its previous settings.