# **UI Design Note – IV Flow Monitor Device**

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 **Author:** Leandro  
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## **Objective**

Design a simple, robust, and intuitive **user interface (UI)** for the battery-powered IV flow monitor, suitable for **medical and humanitarian environments**. The interface enables essential configuration and interaction without requiring complex menus or screens.

## **UI Concept**

The interface is based on **four tactile push-buttons**, placed logically for ease of use:

| **Button** | **Function** | **Symbol/Label** |
| --- | --- | --- |
| MODE | Toggle between drip set size and mL/h target selection | “MODE” |
| + | Increment selected value | “+” |
| – | Decrement selected value | “–” |
| MUTE | Mute active alarm | Loudspeaker icon with a cross (🔇 or symbol printed on silkscreen) |

## **Functionality**

### **1. MODE Button**

* Short press cycles between:  
  1. **Drip Chamber Set**: Allows choosing between 10, 15, 20, or 60 drops/mL.
  2. **Target Flow Rate**: Allows setting the target rate in **mL/h**.
* Cycles repeat (wrap-around).

### **2. + and – Buttons**

* Context-sensitive:  
  + In **Drip Chamber Mode**: increments or decrements through the list of drip sets.
  + In **Target mL/h Mode**: increases or decreases flow rate in defined steps (e.g. ±1 mL/h or ±5 mL/h if pressed long).
* Long-press acceleration is optional in firmware.

### **3. MUTE Button**

* Instantly silences an active alarm or buzzer.
* Optional: hold for 2 seconds to **reset the session** (TBD).
* Marked with a **loudspeaker crossed-out icon** on the PCB silkscreen for universal recognition.

## **Design Goals**

| **Criterion** | **Approach** |
| --- | --- |
| **Robustness** | Uses standard 6×6 mm tactile switches with 100k+ lifecycle, protected by pull-ups and optional debounce caps |
| **Glove compatibility** | Large enough spacing, click feedback, recessed area optional |
| **Low complexity** | No rotary encoders, no touch sensors; minimal firmware state machine |
| **Universal symbols** | MUTE button symbol replaces text; language-independent |

## **Hardware Implementation Notes**

* Each button connected to a dedicated GPIO pin.
* Pulled up to VDD with **10 kΩ** resistors.
* One side of each button tied to **GND**.
* Optional: place **100 nF capacitors** to GND on GPIO for hardware debounce.
* Debouncing and long-press detection handled in firmware.

## **Firmware Logic Overview (State Machine)**

plaintext

CopyEdit

[Idle]

↓ MODE

[Drip Set Select]

↑/↓ ± = 10/15/20/60

↓ MODE

[Target Rate Select]

↑/↓ ± = increment mL/h

↓ MODE → [Idle]

[MUTE] — active anytime → Silence alarm

## **Future Considerations**

* Add **LED indicators** or minimal LCD display to show selected mode/values.
* Add **press+hold actions** (e.g. reset session or enter sleep mode).
* Mount buttons flush with enclosure to prevent accidental presses.