EDUCATIONAL MEDICAL SIMULATION DEVICE

SimClever
Ingenious medical simulation

Simulation Stethoscope

User Manual

Digital Auscultation Simulation Device – Simulation of Heart, Lung, and Bowel Sounds for Medical and Nursing Education

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1. Product Overview

1.1 Intended Use

The **SimClever Simulation Stethoscope** is a digital audio simulation device designed for use in medical and healthcare education. It realistically simulates heart, lung, and bowel sounds. It is wirelessly controlled via the **mobile application** or the **Control Module desktop application**.

⚠ CRITICAL WARNING

This device is **not intended for medical diagnosis, treatment, or clinical assessment**. It is for **educational, simulation, and demonstration purposes only**. Use on real patients is strictly prohibited. It does not provide direct consultation for any medical condition and is not a substitute for professional medical care.

1.2 Areas of Use

- ✔ Simulation laboratories in medical and nursing schools
- ✔ Integration with standardized patient simulators
- ✔ Auscultation training and demonstration
- ✔ Patient simulation manikins

1.3 Key Features

- ✔ Wireless control via Bluetooth Low Energy (BLE)
- ✔ Region-based sound triggering through RFID card support
- ✔ 4 different sound regions: Heart, Right Lung, Left Lung, Bowel
- ✔ Independent sound and rate (BPM) settings for each region
- ✔ Easy management via the mobile application and Control Module desktop application
- ✔ Quick configuration through preset scenarios and *"On the Fly"* mode
- ✔ Wireless audio file transfer and firmware updates
- ✔ Built-in rechargeable battery with battery-level monitoring

2. Safety Warnings

Usage Warnings

⚠ CRITICAL WARNING

- ✘ **The SimClever Simulation Stethoscope is a simulation device.** It is not designed for use on real patients.
- ✘ This device is **not suitable as a medical diagnostic or treatment tool**.
- ✘ Keep the device out of reach of infants and small children.

Ear-tip and Sound Warnings

⚡ WARNING

- ☎ Be gentle when placing the stethoscope in your ears and avoid forcing the ear tips.
- ☎ Avoid excessively high volume levels and give your ears rest periods after prolonged use.

Charging and Battery Safety

⚡ WARNING

- ☎ Avoid using an adapter rated above **5 V / 1 A** to charge the device.
- ☎ The SimClever Simulation Stethoscope is fully charged in approximately **2 hours**. Overcharging can shorten battery life.
- ☎ In the event of a short circuit at the charging port, the device automatically enters **protection mode**.

Physical Protection and Environmental Conditions

i NOTE

- ➥ The optimum operating temperature is between **21–50 °C**.
- ➥ Do not expose the device to water or other liquids.

3. Device Components

3.1 Device Parts

Part	Description
Stethoscope Body	Main housing containing all electronic components
Ear Tips (Olives)	Ear pieces where the sounds are heard
Tubing	Acoustic tubing that connects the ear pieces to the body
Indicator Light	Indicator showing device status (in the hole on the right side)
Power Switch	Switch that turns the device on and off
USB Type-C Charging Port	USB port used for charging the device
RFID Reader Area	Area where simulation cards are read

Rear label of the device: shows the model name, serial number (S/N), manufacturer information, and input voltage.

3.2 Listening Regions

Region	Description
Heart *(Heart Sound)*	Region where heart sounds are simulated
Left Lung *(Left Lung)*	Region where left lung sounds are simulated
Right Lung *(Right Lung)*	Region where right lung sounds are simulated
Bowel *(Bowel Sound)*	Region where bowel sounds are simulated

4. Technical Specifications

4.1 Wireless Communication

Protocol	Bluetooth Low Energy (BLE) 4.2 / 5.0
Range	10 – 30 meters (open area)

4.2 Audio and Battery

Audio Format	WAV
Battery	Rechargeable lithium polymer
Charging Time	Approximately 2 hours (with 5 V / 1 A adapter)

5. Setup and Startup

5.1 Powering on the Device

- Turn on the power switch.
- Observe that the indicator light turns on.
- If the battery is low, the light blinks rapidly and the device shuts off; in this case, **charge it**.

5.2 Mobile Application Connection

You can wirelessly manage the stethoscope using the **SimClever – Connect** mobile application.

↓ DOWNLOAD THE APP

Scan the QR code to download the **SimClever – Connect** application to your mobile device.

The QR code automatically directs you to the appropriate store for your operating system:

- *Google Play Store* for **Android** devices
- *App Store* for **iOS** devices

Step 1 — Add Stethoscope Screen

When you switch to the **Stethoscope** tab in the application, the *"No Stethoscopes Found"* screen appears because no device has been added yet. Tap the blue **[Add Stethoscope]** button at the bottom right to add a new device.

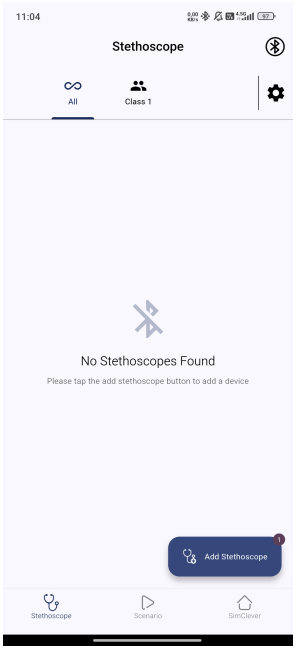

Figure 1: Stethoscope main screen – Add Stethoscope button.

Step 2 — Bluetooth Scan and Registration

When you tap **[Add Stethoscope]**, the Bluetooth scan screen opens. Tap **[Tap to start scanning]** to begin the scan. Find the device starting with **"RTCOUND"** in the list and tap the **[+]** button on the right to register the device.

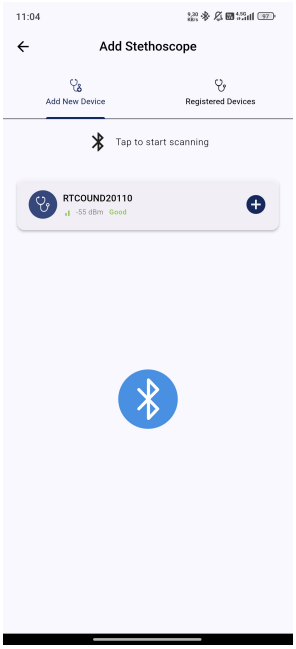

Figure 2: Bluetooth scan – the device starting with RTCOUND is listed and added with the + button.

5.3 Desktop (Control Module) Connection

- Log in to the Control Module application.
- Right-click the **stethoscope icon** in the interface.
- Select the stethoscope by the **serial number** (**S/N**) printed on the device.
- In your computer's Bluetooth settings, select the stethoscope as the audio output device.

6. Operating Instructions

6.1 Configuring Sound Settings

After the stethoscope is successfully added, the card of the connected device appears on the main screen.

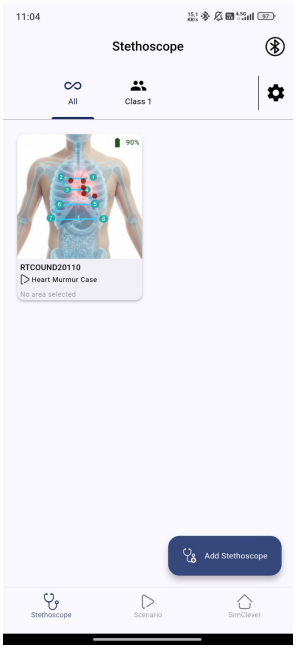

Figure 3: Added stethoscope card – battery level (%90) and active case info (Heart Murmur Case).

Step 1 — Region and Sound Selection

Tap the stethoscope card to open the region settings screen. For each region (**Heart**, **Left Lung**, **Right Lung**, **Bowel**), select the **sound type** from the dropdown menu and set the **BPM (rate)** value in the numeric field.

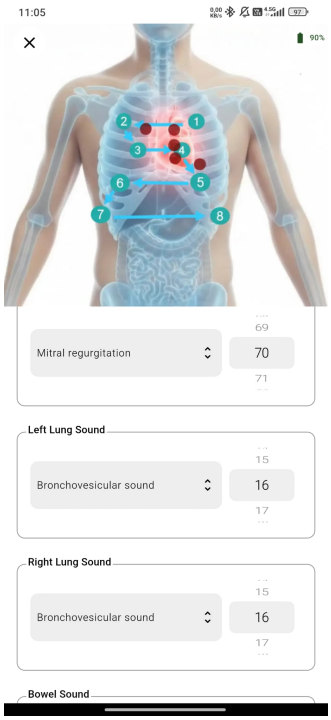

Figure 4: Region selection and sound/BPM settings (Heart, Left Lung, Right Lung, Bowel).

Step 2 — Sending Settings to the Device

After configuring all regions, press the blue **[Send]** button at the bottom of the screen to transmit the settings to the device. From this point on, the stethoscope operates according to the configuration you have chosen.

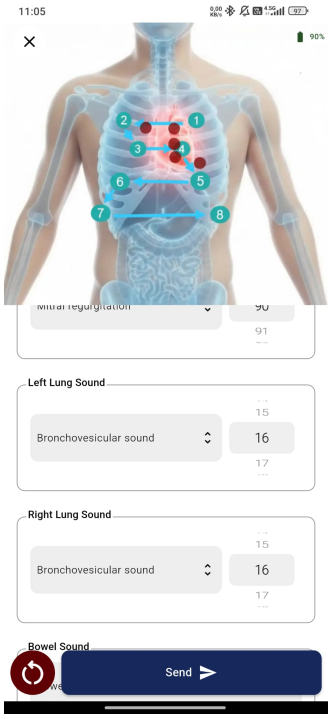

Figure 5: Sending settings to the device using the Send button.

6.2 Using Scenarios

You can select preset clinical cases from the **Scenario** tab. Once selected, all regions are automatically configured to match the case.

Step 1 — Selecting from the Scenario List

When the **Scenario** tab opens, a list of categorized clinical cases is displayed (e.g. *S3-S4 Gallop Rhythm*, *Pulmonary Edema*, *PDA with Gallop Rhythm*). Each card shows the patient's age, sex, and clinical category (Cardiology, Pulmonology, Pediatrics, etc.).

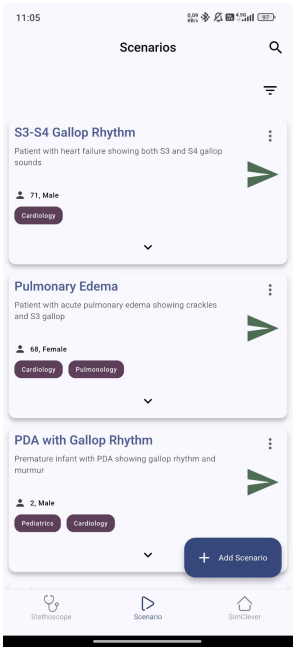

Figure 6: Scenario tab – list of preset clinical cases.

Step 2 — Reviewing Scenario Details

Tap the arrow icon below the card to expand the scenario details. The details view lists the preset sound types and BPM values for the Heart, Left Lung, Right Lung, and Bowel regions.

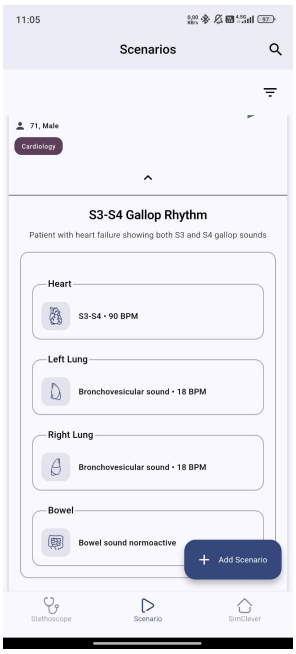

Figure 7: Scenario details – preset sound and BPM values for Heart, Lungs, and Bowel.

Step 3 — Applying the Scenario

Press the green *play* arrow button to apply the scenario to the device. The region-based sound view of the applied scenario is automatically updated on the main screen.

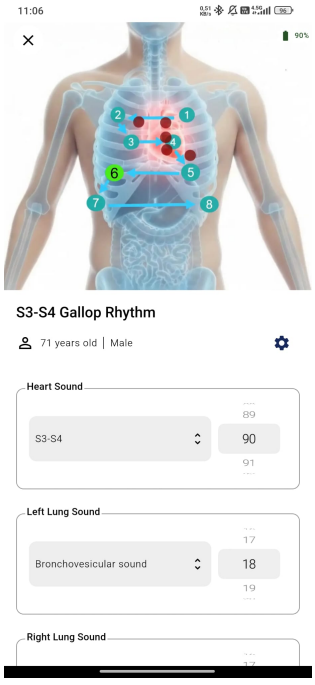

Figure 8: Region-based sound view after the scenario is applied.

6.3 Using RFID Cards

★ TIP

RFID cards allow the simulated regions of the stethoscope to switch automatically:

- Place the RFID cards on the manikin.
- When you bring the stethoscope body near a card, the sound of the corresponding region starts automatically.
- When the card is moved away, the sound stops.

7. Supported Sound Categories

Category	Example Sounds
Heart Sounds	Normal Heart Sound, Aortic Stenosis, Mitral Regurgitation, S3–S4 Gallop, Neonatal Heart Sounds, and more.
Lung Sounds	Normal Vesicular, Fine Crackles, Wheezing (Asthma), Rhonchi, Stridor, Silent Lung, and more.
Bowel Sounds	Normoactive, Hyperactive, and Hypoactive bowel sounds.

8. Maintenance and Cleaning

Ear Tips (Olives)	Wipe with **70% Isopropyl Alcohol** after every use.
Device Body	Do not submerge in water; do not wash in a washing machine or dishwasher.
General Cleaning	**Do not** use dry-cleaning methods.

9. Troubleshooting

Issue	Solution
Device won't turn on	Charge it (maximum 2 hours).
Application can't see the device	Turn on Bluetooth and stay within 10 meters of the device.
No sound	Check the volume level and the active region selection in the application.

10. Technical Support

⊕ **Web:** simclever.com
✉ **Email:** info@simclever.com
☎ **Phone:** +90 552 879 75 62
♦ **Address:** Fener Mah. Atatürk Cad. No:28/2 Floor:7 Merkez/Rize, TÜRKİYE

SimClever – Connect Mobile Application

Download the **SimClever – Connect** application to your mobile device to control your stethoscope. Scan the QR code to be directed straight to the *Google Play Store* or *App Store*.

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This manual is based on SimClever Simulation Stethoscope software version 2.0.