

**OPERATOR'S MANUAL
SAM II, The Student Auscultation Manikin**

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SAFETY PRECAUTIONS

Please read this information before using the Sam, the Student Auscultation Manikin. It applies to the basic System as well as any optional equipment that may be used with the System.

In this manual, WARNINGS describes precautions necessary to prevent injury or loss of life. CAUTIONS describes those precautions, procedures, techniques, etc. which are considered essential to emphasize.

WARNING

SHOCK HAZARD: A shock hazard may exist if this System is not properly grounded. The System is designed to operate with a 3-wire AC power system containing a separate ground wire. The ground wire must not be removed or defeated.

WARNING

SHOCK HAZARD: Do not remove protective covers on any components of the SAM II manikin. Hazardous voltages may be present. Cabinet panels for this System and all components must be in place while the System is in use. All the internal adjustments, replacements and initializations should be made by a qualified technician.

WARNING

CLEANING AND CARE: As a general safety precaution, the System should be turned off and the AC power disconnected before performing any cleaning procedures. Use Windex to clean SAM.

CAUTION

CONNECTORS: Do not immerse any of the connectors used in the System in any fluid.

TRADEMARKS

SAM Student Auscultation Manikin, Cardionics, CardioSim, SimulScope, E-Scope and Heartman registered trademarks and Pocket-monitor are trademarks of Cardionics, Inc.

REPRODUCTION OF SOUNDS

All sounds, both simulated and real, and veterinary sounds are copyrighted by Cardionics, Inc. and may not be reproduced for any reason except by written authorization of Cardionics, Inc., Webster, Texas 77598 USA.

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1.0 Product description

SAM II, the Student Auscultation Manikin, is an interactive manikin for teaching students the art of auscultation.

SAM II consists of a half-body male manikin, Laptop computer, the E-Scope Electronic Stethoscope and a stethophone for a second listener



Figure 1 – SAM using the SimulScope Group Auscultation System.

SAM has four listening sites for heart sounds, eight listening sites for breath sounds, two listening sites for bowel sounds, one site for bruit sounds and one carotid pulse. There are 16 Heart/Lung combinations, 27 heart sounds, 21 breath sounds and 20 bowel sounds.. Additional sounds may be added from time to time.

The heart sound sites are the aortic, tricuspid, pulmonic and mitral areas on the chest and breath sound sites are anterior (left upper and lower; right upper and lower) and posterior (left upper and lower; right upper and lower). The bowel sound sites are the upper right and left quadrants. The bruit site is located in the left side neck.

.Sounds may be heard with (1) a normal stethoscope, (2) the E-Scope Electronic Stethoscope (supplied), (3) the SimulScope Bedside Auscultation System for group listening, (3) the Classroom Infrared Emitter for group listening, (4) the CardioSim VII Digital Heart Sound Teaching System for group listening and display (5) the Cardionics Auditorium Infrared Sound System, (6) Cardionics Auditorium Infrared Sound System for large group listening or (7) a low frequency speaker.

When listening to breath sounds, there are eight locations -right and left upper anterior chest, right and left lower anterior chest, right and left upper posterior and right and left lower posterior lobes.

For group listening, the SimulScope Bedside Auscultation System (Cat. No. 718-7003) or the Classroom Infrared Emitter (Cat. No. 718-0015) is recommended. Each listener will need a Heartman[®] Infrared Headphone (Cat. No. 718-7040). For group listening and display of the phonocardiogram, the CardioSim Digital Heart Sound Teaching System (Cat. No. 718-2600) is recommended.

2.0 SAM II Setup

There are two cables and one power supply for the SAM II set up. There are two USB cables that connect to the laptop computer on the left side of SAM II as shown below in Figure 2.

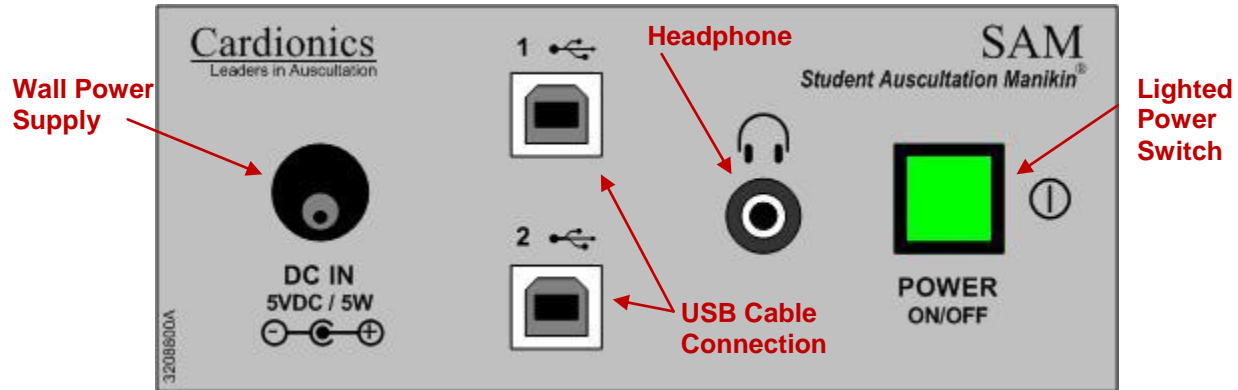


Figure 2 – Control Panel for SAM II

The carotid pulse is located on the left side of the neck of the SAM II. **Important Note:** Do not wrap anything around the neck that will prevent heat from dissipating. The manikin needs to operate in an environment cooler than 80°F or 27°C.

Set up

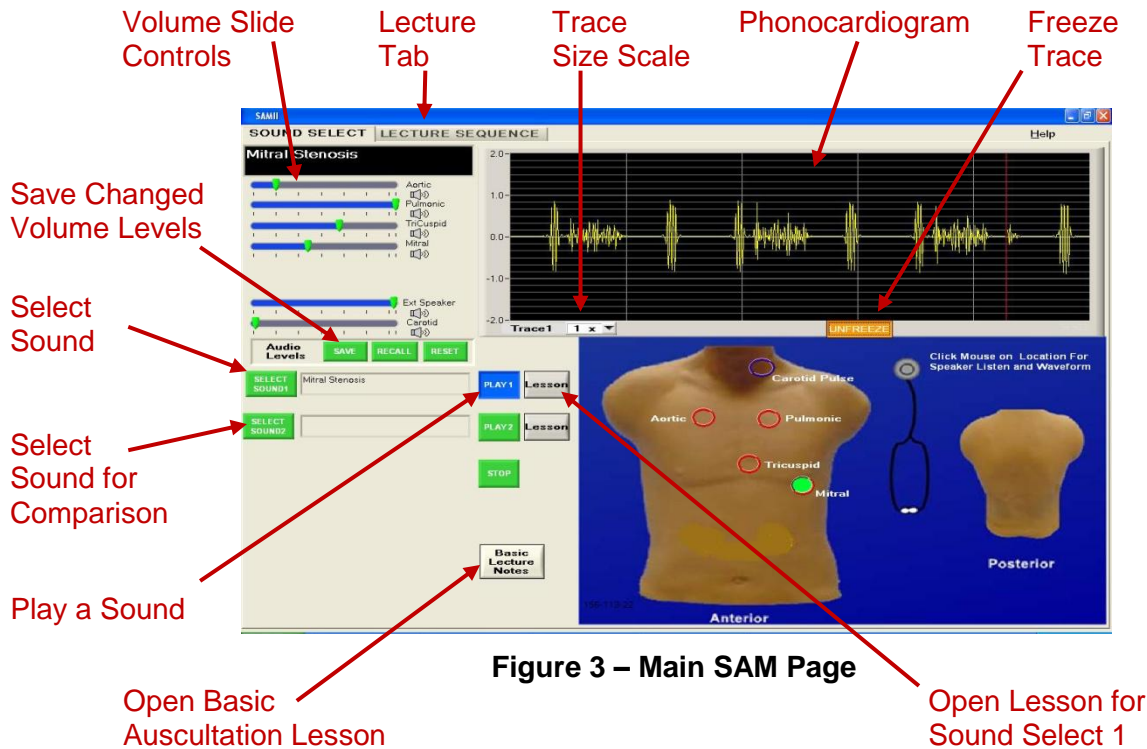
Connect the two USB cables to the SAM II Control Panel as shown above in Figure 2. Connect the Pulse Power Supply to the DC In as shown above. The Pulse Power Supply also powers the electronics within SAM II.

Check the pulse on the manikin by gently placing your middle or index finger over the left carotid artery. The pulse can be felt with every systole. No pulse is felt when breath, bruit or bowel sounds are played without heart sounds.

3.0 Using SAM II

The laptop computer displays two pages. A **Main** or **Exam Room** page and a **Sounds** or **Menu** page.

Begin by selecting the sound for study by clicking on the **Select Sounds** button as shown in Figure 3 below. You will then see the **Sounds Directory** (Figure 3 below). All sounds have been placed in Groups.



1. Volume Adjust. Each sound has preset volumes. The instructor may wish to change these volumes to illustrate certain events. Volume adjustment at different anatomical location is done by moving one or more of the slide bars to the left for sound reduction and right for sound increase. The volume on each listening area of SAM II can be altered to fit the particular situation.
2. Volume SAVE. Once set, these volume levels can be saved by clicking on the SAVE button immediately below the slide bars.
3. RECALL. At any time, the factory settings can be recalled, by simply clicking on the RECALL button next to the SAVE button.
4. RESET – The Reset button allow the user to return to his/her previously saved volumes.
5. Select a Sound – by clicking on this button, the user will be taken to the *Sound Select Menu* (Figure 4).

6. Play a Sound – by clicking on this button, the sound shown in the *Select Sound* area will be played. Initially, there will be no phonocardiogram shown, but sound can be heard using a stethoscope. By clicking on one of the circled areas, the phonocardiogram will appear.
7. Compare a Sound – When selecting a sound, it is often helpful to select a second sounds for comparison purposes. By clicking on this button, the user will be taken to the *Sound Select Menu* for the selection of a sound for comparison purposes.
8. Play a Sound. This button allows the user to play the sound shown in the *Select a Sound* window.
9. Select a Lesson for sound under study. Every sound has a lesson. By clicking on this button, a Lesson will appear on the screen. Each lesson has a description of the sound, a schematic of the chest showing where best to listen, four phonocardiograms at appropriate
10. Select Basic Heart Sound Lesson. In case the student wishes to refer back to the basics, this lesson can be viewed. It appears on every sound.
11. Phonocardiogram. A phonocardiogram is a graphic depiction of the heart or breath sounds. When heart and breath sounds are being played simultaneously, the heart sounds will appear in Yellow and breath sounds in Blue.
12. Freeze Trace. This allows the trace to be frozen for study. However, the sounds can still be heard.
13. Trace Size. This button allows the amplitude of the trace to be increased for better viewing.

Sound Selection. Click on the **Sound Selection** button as shown in **Figure 3** and the below menu will be seen.

<u>Sounds Directory</u>	
<u>Group</u>	<u>Description</u>
Heart Sounds	Normal Heart Sounds, 60 bpm
Heart Sounds	Normal Heart Sounds, 75 bpm
Heart Sounds	Physiological Split of S ₂
Mitral Sounds	Mitral Valve Prolapse, 75 bpm
Mitral Sounds	Mitral Stenosis & Regurgitation, 75 bpm
Aortic Sounds	Aortic Stenosis, Mild, 75 bpm
Breath Sounds	Normal Vesicular Breath Sounds, 12 bpm

Figure 4 – Sound Select Page

By clicking on the Group, the sounds can be sorted by Group, i.e., Heart, Breath, Bruit, Bowel. Select a sound by clicking on the sound of choice. If you wish to select a second sound for comparison purposes, from the Main Page, click on *Select Sound* directly under the first selection. You can now toggle back and forth between sounds as desired.

Once the Sound has been selected, click on *Play 1* or *Play 2*. Initially, you will not see a phonocardiogram on the screen, but the sounds can be heard with a stethoscope on SAM. To visualize a sound while hearing it, click on one of the circled locations. Listening can be done with an ordinary stethoscope or a speaker can be connected to the Headphone/Speaker output on the left side of SAM (see Figure 2).

Volume Level Adjustments

Each heart sound has been adjusted at the factory so that the sound does not migrate to another area. There are times, however, when the instructor may want the sounds to migrate such as having severe aortic stenosis migrate into the neck. In these cases, the instructor may alter the preset volume using the slide bars shown in Figure 3. By clicking on the SAVE button, these the audio volumes will be saved. To RECALL the factory settings, simply click on the RECALL button. Then use the RESET button to go back to the previously saved settings.

Lectures

Instructors can preprogram their lectures. Each Instructor may have multiple lectures each with a different name. To set up a lecture, from the Main Page (Figure 3), click on “Lecture Sequence” at the top of the page. This action brings up the lecture page (Figure 5) below.

Click on *Create*. This brings up the *Create Lecture* page (Figure 6). Fill in the name of the instructor and the Scenario or Lecture name. Then double click on the each sound number.

The Sounds Menu will be seen. Double click on your selection. Wait a moment for the sound fill in in the sequence selected. When finished selecting the sounds, click on the word *Done*.

Delete a Lecture Entry

To delete a lecture entry, right click the mouse.

Playing a lecture

To begin using your lecture, click on *Sound Select* at the top of this page.

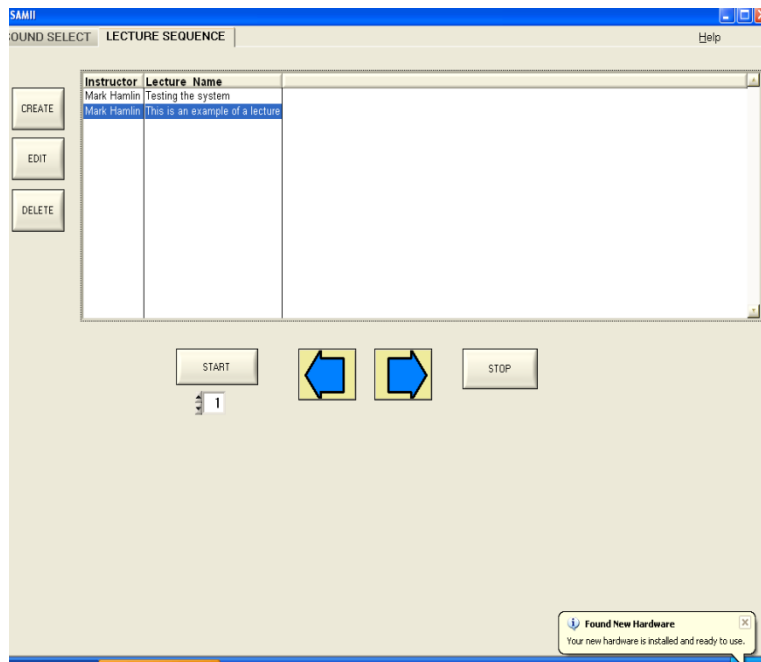


Figure 5 – Lecture Page

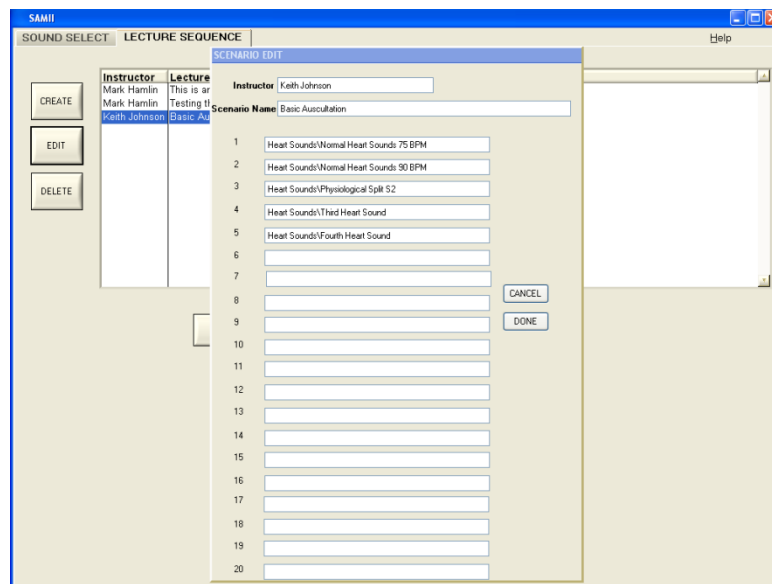


Figure 6 – Create Lecture Page

4.0 Group Listening

To teach with SAM II in a classroom or auditorium, the Classroom Infrared Emitter (Cat. No. 718-0015), the SimulScope Bedside Auscultation System (Cat. No. 718-7003), the Auditorium Infrared Sound System with Patient Auscultation Unit (Cat. No.718-4007) or the CardioSim Digital Heart Sound Teaching System is recommended. Each listener must wear a Heartman[®] Infrared Headphone (Cat. No. 718-7040). A low frequency speaker system may also be used, however, speakers of any kind do not reproduce heart sounds well. Speakers can be connected by inserting the appropriate cable into the Headphone output jack (Figure 2).

Classroom Infrared Emitter

Connect the output of the supplied E-Scope Electronic Stethoscope to the input of the Classroom Infrared Emitter using the supplied cable. The instructor and each student must wear a Heartman[®] Infrared Headphone. Place the E-Scope on SAM in the appropriate anatomical location. The sounds will be heard by the instructor and students simultaneously.

Simulscope Bedside Auscultation System

The SimulScope System is designed for group listening in a classroom or at the bedside. The typical System is supplied with six Heartman[®] Infrared Headphones. More can be added, if desired.

The SimulScope is a small, portable, battery-operated (and/or line-operated), wireless infrared transmitter that picks up heart, lung and bowel sounds and transmits them via infrared energy to the wireless Heartman[®] headphone worn by each listener. The headphone senses the infrared signal and converts it into an audible sound. Each headphone has its own volume control.

After SAM has been set up (see section 2.0), place the stethoscope of the SimulScope on the manikin at the appropriate anatomical site. Each listener wearing a Heartman[®] Infrared Headphone hears the sounds. Adjust the volume of the SimulScope to maximum volume, then adjust the volume control knob on the HeartMan Headphone to a comfortable listening level.

Auditorium Infrared Sound System

The Auditorium Infrared Sound System is designed for large group listening. The Auditorium Infrared Sound System operates in much the same manner as the SimulScope. To use with the infrared sound system,

1. Connect the E-Scope Electronic Stethoscope to the Power Supply Module of the Auditorium Infrared Sound System. Follow the Operator's manual for the Infrared Sound System .
2. Place the stethoscope on the manikin in the appropriate manner and begin listening. Listeners will use the Heartman[®] Infrared Headphone.

Low Frequency Speaker

Connect the Cardionics Low Frequency Speaker, (cat. no. 718-9011) to the Headphone/Speaker Output on the right side of SAM (Figure 2).

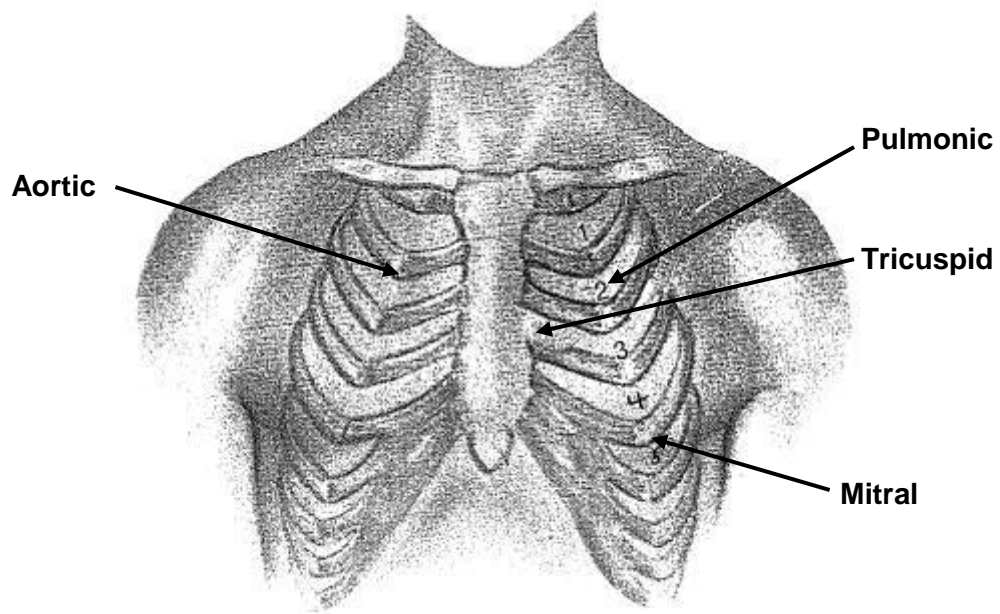


Figure 7 – Location of listening sites for heart sounds.

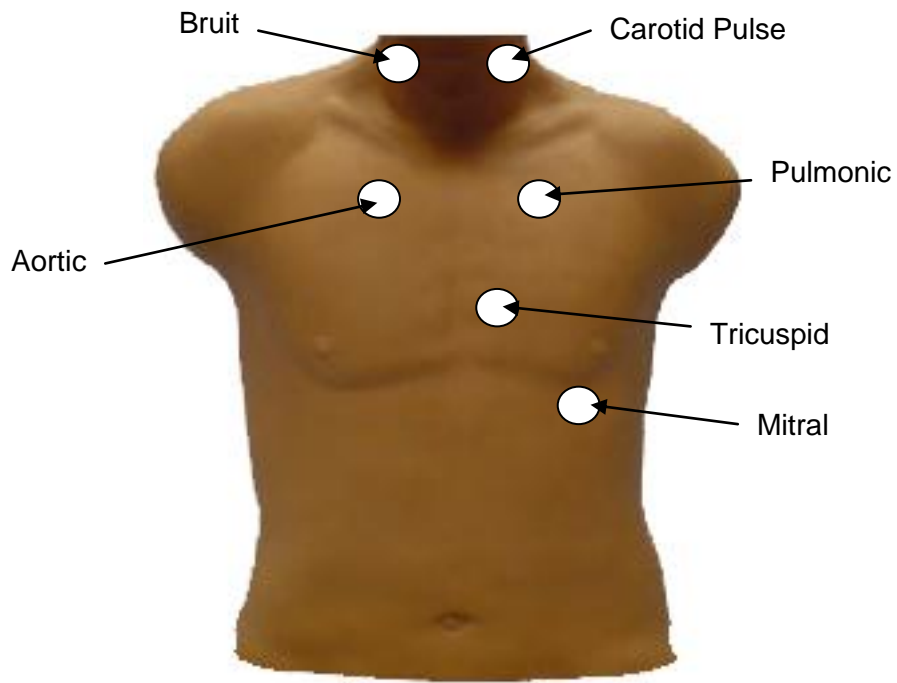


Figure 8 – Heart, Bruit and Carotid Pulse Locations on SAM

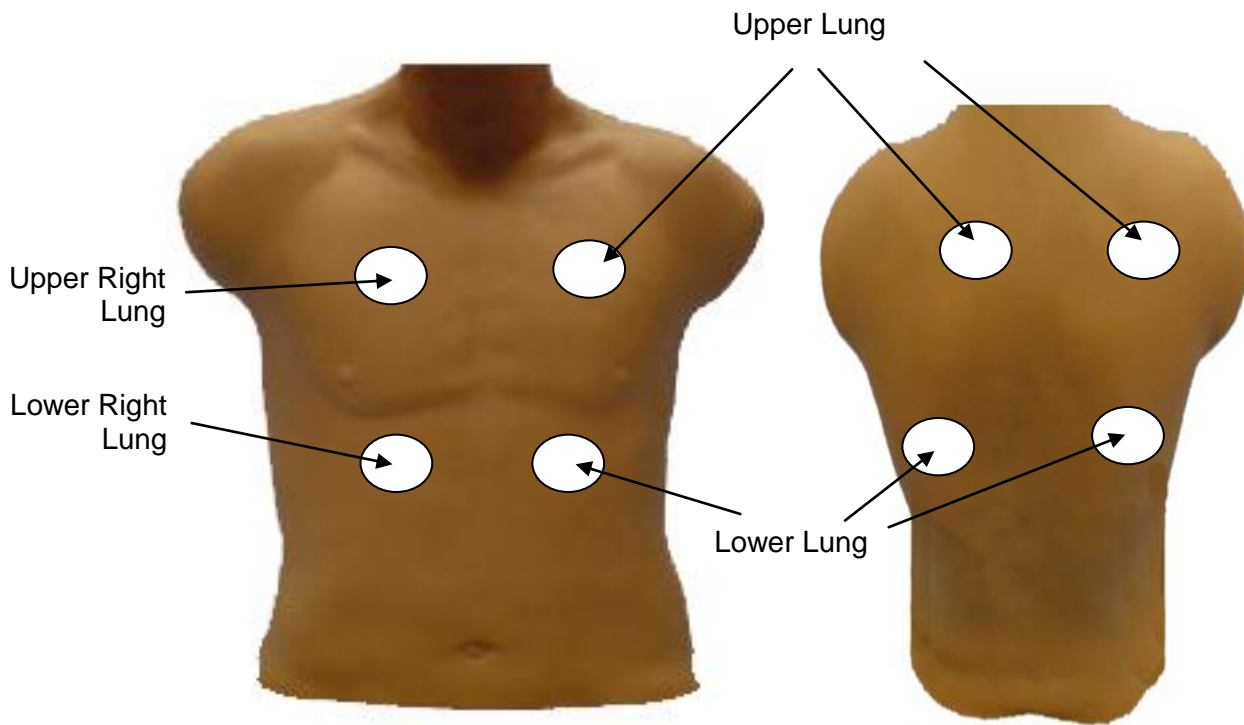


Figure 9 – Breath Sound Locations Anterior and Posterior

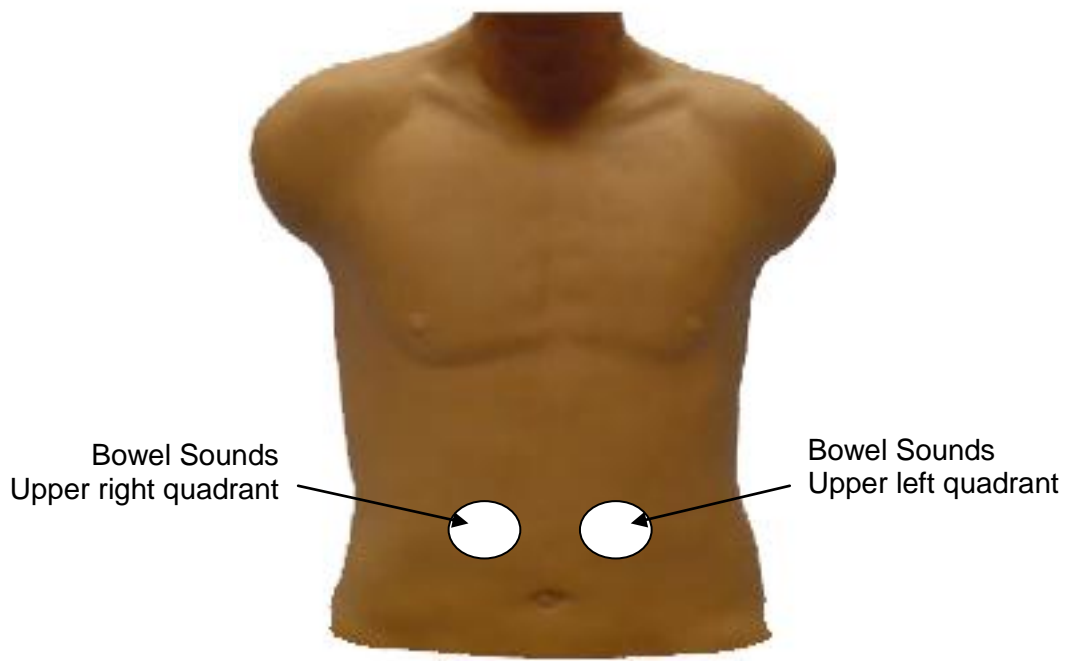


Figure 10 – Bowel Sound Locations

5.0 Appendix A – Sound Group and Sound List

Major Groups	Description
Heart Sound	Normal Heart Sounds Normal Heart Sounds - Pediatric Normal Heart Sounds - 60 bpm Normal Heart Sounds – 75 bpm Normal Heart Sounds – 90 bpm Normal Heart Sounds – 110 bpm Physiological Splitting of S ₂ w/ breath sounds Paradoxical Splitting of S ₂ w/ breath sounds Third Heart Sound – 75 bpm Fourth Heart Sound – 75 bpm
Mitral Sounds	Mitral Valve Prolapse – 75 bpm Mitral Stenosis – 75 bpm Mitral Stenosis with presystolic accent. Mitral Stenosis & Regurgitation – 75 bpm Mitral Regurgitation, Mild, 75 bpm Mitral Regurgitation, Marked – 75 bpm
Aortic Sounds	Aortic Stenosis, Mild – 75 bpm Aortic Stenosis, Severe – 75 bpm Aortic Stenosis and Regurgitation – 75 bpm Aortic Regurgitation – 75 bpm Acute Aortic Regurgitation – 75 bpm Congenital Aortic Stenosis
Pediatric Sounds	Atrial Septal Defect (ASD) Patent Ductus Arteriosus (PDA) Ventricular Septal Defect (VSD) Pulmonary Hypertension Innocent Systolic Murmur Tetralogy of Fallot Congenital Aortic Stenosis
Other HCM	Hypertrophic Cardiomyopathy (HCM) (formerly IHSS) – 75 bpm Pulmonary Stenosis – 75 bpm Acute Pericarditis – 75 bpm
Breath Sounds	Normal Vesicular Breath Sounds – 12 bpm Normal Breath Sounds - Pediatric Bronchial Breath Sounds Tracheal Breath Sounds

Breath Sounds (cont)	Bronchovesicular Breath Sounds
Adventitious Breath Sounds	Crackles, Fine Crackles, Very Coarse Wheeze, End-Expiratory Wheeze, Low-pitched (Rhonchus) Stridor Pleural Rub
Diseases or Conditions	Atelectasis Asthma, Severe Bronchitis, chronic Emphysema Pulmonary edema Pneumothorax Pneumonia, Lower Right Posterior Lobe
Other Breath Sounds	Bronchophony, normal & abnormal, “99” Tactile Fremitus Whispered Pectoriloquy, normal & abnormal “1,2,3” Egophony, E to A, normal & abnormal
Heart & Breath Sound combinations	Normal heart and breath sounds Aortic stenosis with crackles Aortic stenosis with normal breath sounds Congestive heart failure Fourth heart sound variation with respiration Mitral valve prolapse w/normal breath sounds Mitral regurgitation with crackles Mitral regurgitation with normal breath Sounds Atrial fibrillation with normal breath Sounds – 150 bpm Atrial Flutter with low heart rate and PVCs with normal breath sounds COPD with diminished normal heart sounds
Bowel Sounds	Normal, newborn Normal, 1 year old Normal, 4 year old Normal, 16 year old

**Bowel Sounds
(cont)**

Normal, 60 year old

Hyperactive, 2 year old

Hyperactive, 10 year old

Hyperactive, 16 year old

Hyperactive Codeine

Hypoactive Post operative

Hypoactive Anesthesia

Chron's Disease

Diarrhea

Irritable bowel

Ulcerative colitis

Borborgymus I and II

6.0 Appendix B – Troubleshooting

PROBLEM

POSSIBLE SOLUTION

Sound is transmitted into areas other than anatomically correct

If sound is heard in an incorrect area, turn the volume **DOWN** on each sound until no sound is heard. Then increase the sound on the desired area gradually until the proper sound is heard. Use Slide bars (Figure 3)

No sound is heard

Press the stethoscope head a little harder.
Move the stethoscope by inching it around the area of the sound.
Turn *UP* the volume. Use Slide bars (Figure 3)

No pulse is felt, the neck feels warm and pulse switch is lit.

The pulse has overheated. Turn the pulse off and allow 5 to 10 minutes to cool. Pulse will automatically turn back *ON*. No permanent damage will occurred.

On SAM, the pulse is palpated on the left neck only. You may been palpating in the wrong area.

7.0 Appendix C – Limited Warranty

Cardionics, Inc. warrants this product to be free of manufacturing defects in material and workmanship for a period of one year from the date of original consumer purchase or from an authorized dealer.

What this warranty covers:

1. Cardionics, Inc. warrants SAM, the Student Auscultation Manikin and all accessory components to be free of manufacturing defects in material and workmanship for a period of one (1) year from the date of original consumer purchase from Cardionics or an authorized dealer.
2. This written warranty is limited to the original consumer purchaser, transferable only by written authorization of Cardionics, Inc.
3. All warranties, expressed or implied, made by Cardionics, including warranties of merchantability and fitness are limited to the one (1) year period of this warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.
4. This warranty is limited to repair of the product or replacement thereof, at the discretion of Cardionics, Inc. Calibrations are considered normal maintenance and are not included in the one year warranty.

What this warranty does not cover:

1. This warranty does not cover defects or damage resulting from use of the product other than its normal, intended and customary use. This warranty does not cover defects or damages from abnormal use, abnormal conditions, improper storage, exposure to moisture or liquid, unauthorized modifications, repairs made by unauthorized personnel, unauthorized connections (those not described in this manual), misuse, neglect, abuse, accident, alteration, improper installation or other acts which are not the fault of Cardionics, including damage caused by shipping.
2. SAM units or components which have had the serial number, removed or made illegible.
3. Damage resulting from use of non-Cardionics approved accessories.

Policies concerning service.

Shipping charges. The customer shall bear the cost of shipping the product to Cardionics. Cardionics will pay the return freight within the United States. Customers outside the US will be asked to pay for shipping in both directions. This includes both warranty and out-of-warranty service. We suggest that you insure the package

Authorization for return. Before sending equipment for repair, please call Cardionics, at 281-488-5901 or in the U.S. or Canada 1-800-364-5901 for a return authorization number. This will help us track your repair.

Reason for return. Please include a note with your name, address, telephone and email address and what you believe the problem to be.

Packing for return. Equipment requiring repair should be suitably packaged for shipping.

Where to obtain service. Ship package prepaid to Cardionics, Inc., 910 Bay Star Blvd, Webster, Texas 77598 USA. We will endeavor to complete repairs within fifteen (15) working days from date of receipt of product by Cardionics.

Out-of-warranty service. . When a product is returned for service that is out-of-warranty, Cardionics will call you to obtain your authorization prior to making the repair. We will ask for a credit card payment at the time of the call. If the repair is from an authorized Cardionics dealer or institution, Cardionics will ask for a purchase order number.

Consequential Damages

Cardionics, Inc. shall not be liable for incidental or consequential damages arising from the use or failure of this product, including injury to persons or property. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that may vary from state to state.

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