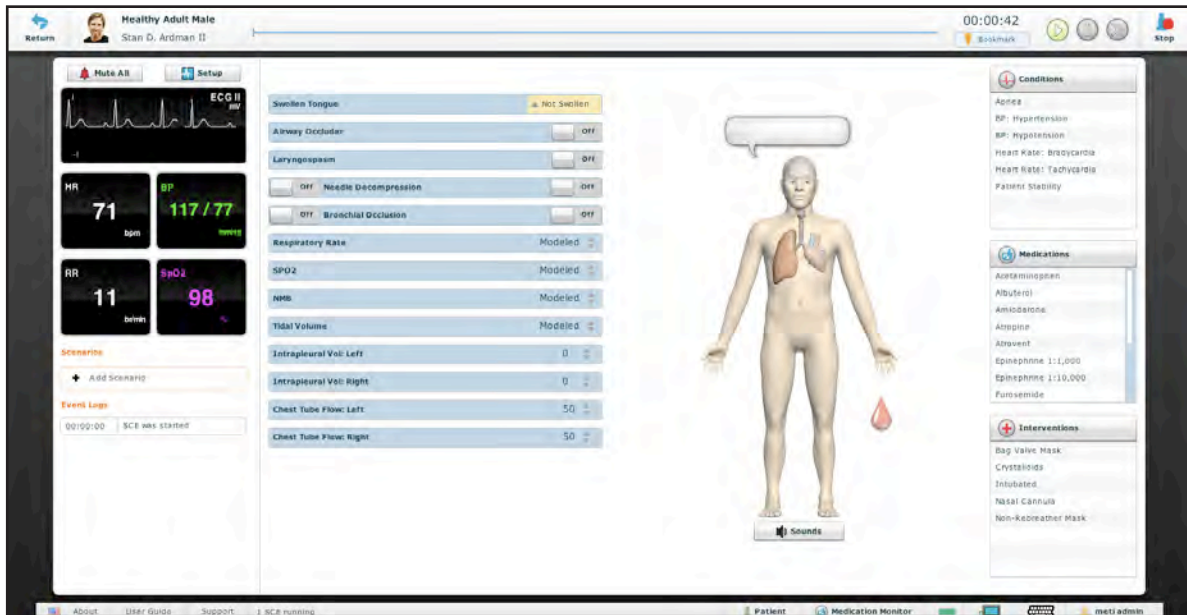


Using METIman

Once METIman has been set up (see the Setup section) and the software has been launched (see the Using the Software section), the simulator is ready for learner interventions. The features of METIman are broken down by Neurological, Respiratory, Cardiovascular, Gastrointestinal and Genitourinary systems.

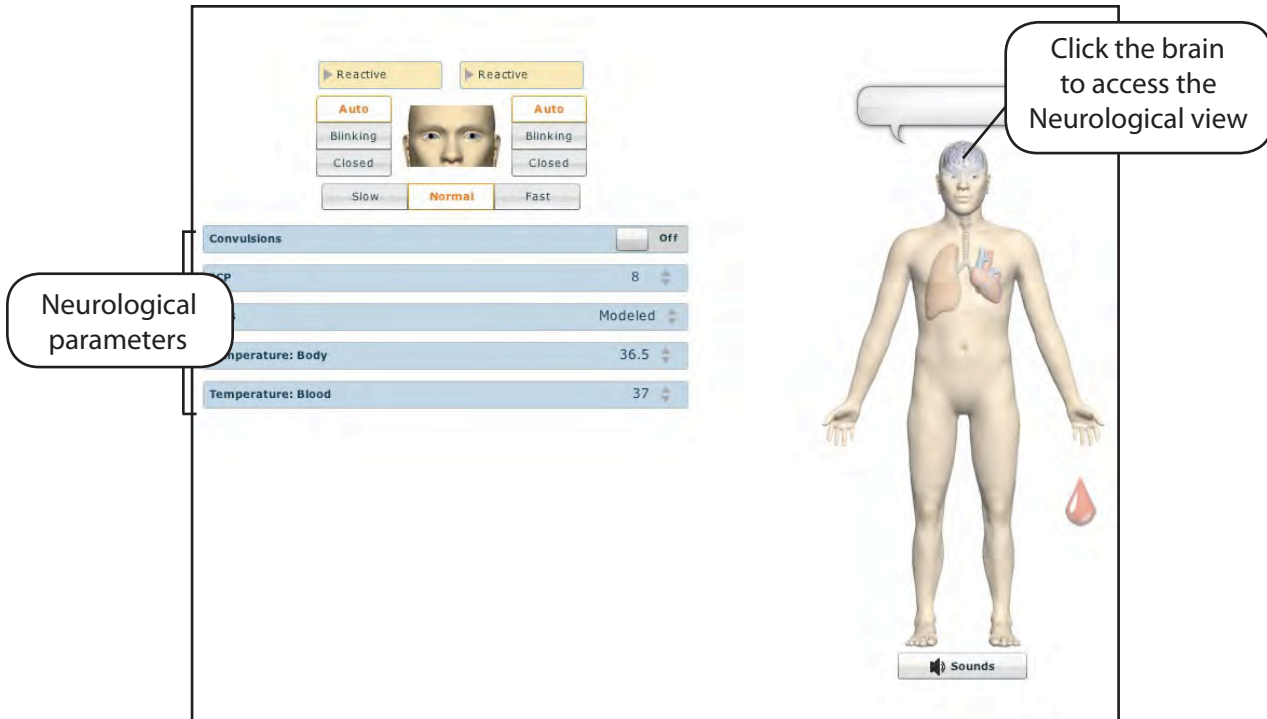


The Run Screen

Neurological

The clinical features that can be controlled from the Neurological Assessment view are Blinking Eyes, Reactive Pupils, Convulsions, Neuromuscular Block, Body and Blood Temperature and Speech.

To access the Neurological view, from the Run screen, click the brain on the human form.



The Neurological View

Eyes

The pupil diameter, pupil reactivity, blinking and blink speed of the simulator's eyes can be controlled from the software.

Click the **Reactive** drop-down menus of each eye to determine reactivity: Reactive, Non-Reactive, Pinpoint or Blown.

Click **Auto** to have the eyes blink while the patient is conscious. Click **Closed** to close the eyes. Click **Blinking** to force the eyes to be open and blinking regardless of patient consciousness. These features can be controlled on both eyes.

Click **Slow**, **Normal** or **Fast** to control the blink speed.

Convulsions

METIman simulates convulsions when the feature is activated on the software. To activate the Convulsions feature, click the **Convulsions** switch. The Convulsions feature is activated when **On** appears. To deactivate the convulsions feature, click the switch again. The feature is deactivated when **Off** appears.

Neuromuscular Blockade

To manually adjust the Neuromuscular Blockade (NMB: Set), click **NMB**. The **NMB** slider appears. Set the percentage by dragging the arrow up or down. Click **Accept** to exit and save the changes.

Body Temperature

To control a patient's body temperature, click **Temperature: Body**. The Body Temperature slider appears. Set the body temperature by dragging the arrow up or down. Click **Accept** to exit and save the changes.

Blood Temperature

To manually control a patient's blood temperature, click **Temperature: Blood**. The Blood Temperature slider appears. Set the temperature by dragging the arrow up or down. Click **Accept** to exit and save the changes.

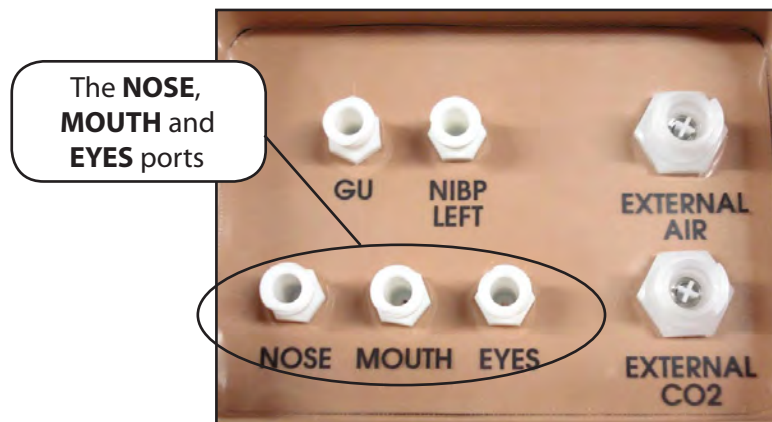
Head Secretions (Prehospital Only)

Secretions of the eyes, nose and mouth are manually controlled with a gravity feed.

NOTE: An IV bag is needed for each site in use.

To use the head secretion features:

1. Using a 60 mL syringe, prime the line of the desired secretion by injecting fluid into the **NOSE, MOUTH** or **EYES** port on METIman's left shoulder until fluid emerges from the secretion sites.
2. Set up the IV pole near the simulator.
3. Fill an IV bag with the clinically appropriate fluid. Use distilled water only, with food coloring, if desired.
4. Hang the IV bag on the IV pole.
5. Ensure the roller clamp is closed and insert the IV spike into the IV bag.
6. Connect to the simulator by attaching the end of the IV spike set tubing to the **NOSE, MOUTH** or **EYES** port on the simulator's left shoulder. (Repeat for each site necessary.)



METIman Prehospital's Left Shoulder

7. Open the clamp and allow fluid to flow into the simulator.
8. Keep the IV bag attached. Adjust the flow rate manually using the roller clamp.

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Respiratory

METIman Prehospital's Respiratory system is comprised of the airway management, spontaneous breathing and ventilation features. On METIman Nursing, various clinical signs such as breath sounds, chest excursion and airway patency can be physically demonstrated. A series of speakers inside each simulator can generate a range of breath and throat sounds used in diagnosing conditions. To access the Respiratory parameters of METIman, on the Run screen, click the lung on the human form. The respiratory parameters appear on the Run screen.

The screenshot displays the 'Respiratory View' interface. On the left, a list of parameters is shown, with a callout box labeled 'Respiratory parameters' pointing to it. On the right, a human form is shown with a callout box pointing to the lung area, labeled 'Click the lung to access the Respiratory view'. A 'Sounds' button is located at the bottom of the human form.

Swollen Tongue	▲ Not Swollen
Airway Occluder	<input type="checkbox"/> off
Laryngospasm	<input type="checkbox"/> off
<input type="checkbox"/> Off Needle Decompression	<input type="checkbox"/> off
<input type="checkbox"/> Off Bronchial Occlusion	<input type="checkbox"/> off
Respiratory Rate	Modeled
	Modeled
	Modeled
Tidal Volume	Modeled
Intrapleural Vol: Left	0
Intrapleural Vol: Right	0
Chest Tube Flow: Left	50
Chest Tube Flow: Right	50

The Respiratory View

Airway

Various clinical signs such as breath sounds, chest excursion and airway patency can be physically demonstrated. A series of speakers inside the simulator can generate a range of breath and throat sounds used in diagnosing conditions.

METIman Prehospital's anatomically realistic upper airway provides for the opportunity to intubate the patient as well as apply other airway interventions. In addition, the METIman Prehospital airway was designed to be a difficult airway that teaches learners to use the best technique when encountering clinical situations with real patients. The airway is best visualized when using the Sellick maneuver, which is performed when a patient is undergoing the intubation procedure.

The METIman Nursing airway has the ability to produce secretions to allow for suctioning.

Airway Features			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Realistic Upper Airway (Oropharynx, Nasopharynx and Larynx) <i>(Prehospital only)</i>	Allows direct laryngoscopy, oral and nasal intubation and use of specialty airway devices. Simulator detects and responds appropriately to right mainstem intubation. Endobronchial intubation results in unilateral chest excursion and breath sounds.	None required.	None required.
Trachea, Left and Right Mainstem Bronchi <i>(Prehospital only)</i>	Tracheal intubation results in bilateral chest excursion and breath sounds.	None required.	None required.
Airway Management and Ventilation	Alveolar and arterial gas concentrations appropriately reflect the efficacy of ventilation and oxygen administration.	Oxygen administration input by the instructor. VIEW: Respiratory	None required.
Gastric Distention <i>(Prehospital only)</i>	Esophageal intubation results in gastric distension and the absence of breath sounds, chest excursion and CO ₂ output.	None required.	None required.
Breakaway Teeth <i>(Prehospital only)</i>	Upper front teeth can be dislodged if laryngoscopy is performed incorrectly.	None required.	<i>See Breakaway Teeth</i>
Tongue Edema (On/Off)	Hinders, but does not prevent, intubation.	VIEW: Respiratory	None required.
Posterior Pharynx Swelling <i>(Prehospital only)</i>	Obstructs view of larynx to prevent intubation, but allows mask ventilation "can't intubate, can ventilate" scenario.	VIEW: Respiratory	None required.
Laryngospasm <i>(Prehospital only)</i>	Closes vocal cords and prevents intubation and ventilation. When used with posterior pharynx swelling, creates a "can't intubate, can't ventilate" scenario.	VIEW: Respiratory	None required.
Cricothyroid Membrane	Allows needle cricothyrotomy, transtracheal jet ventilation, retrograde wire techniques and cricothyrotomy.	None required.	<i>See Cricothyrotomy,</i>

Swollen Tongue

The swollen tongue feature is activated on the Respiratory view by setting the **Swollen Tongue** switch to **Swollen**.

Posterior Pharynx Swelling (Prehospital Only)

Swelling of the posterior oropharynx (posterior airway occlusion) can be activated to obstruct the view of the larynx and prevent intubation, but allow mask ventilation of the patient's lungs, thereby creating a "cannot intubate, can ventilate" scenario. Click the **Airway Occluder** switch to activate the feature.

Realistic Upper Airway (Prehospital Only)

The upper airway of METIman Prehospital is designed to allow for intubation and laryngoscopy. Oral and nasal intubation can be performed using a variety of airway devices, including LMAs (3), endotracheal tubes (6.5 mm to 7.5 mm), nasal-pharyngeal airways (30 mm) and oropharyngeal airways (90 mm).



Intubation

The simulator detects and responds appropriately to right mainstem intubation, and an event is recorded in the Event Log.

Intubation incorrectly applied into the esophagus causes abdominal distension.

IMPORTANT

Airways can be damaged by improper insertion of an airway adjunct (e.g. endotracheal tube). To protect the airway, lubricate the adjunct prior to insertion using the silicone spray provided.

Use **ONLY** the provided **SILICONE SPRAY** to lubricate the adjunct. **NEVER** use a water-based lubricant because of resulting residue damage.

Laryngospasm (Prehospital Only)

A laryngospasm actuator closes the patient's vocal cords and prevents both ventilation and intubation. Click the **Laryngospasm** switch to activate the feature.

Teeth with Breakaway Incisors (Prehospital Only)

METIman Prehospital is equipped with Breakaway Teeth whose front incisors become dislodged with improper handling of a laryngoscope.

The teeth are tied to the upper denture with a lanyard, which prevents losing the teeth down the airway or misplacing them during storage.

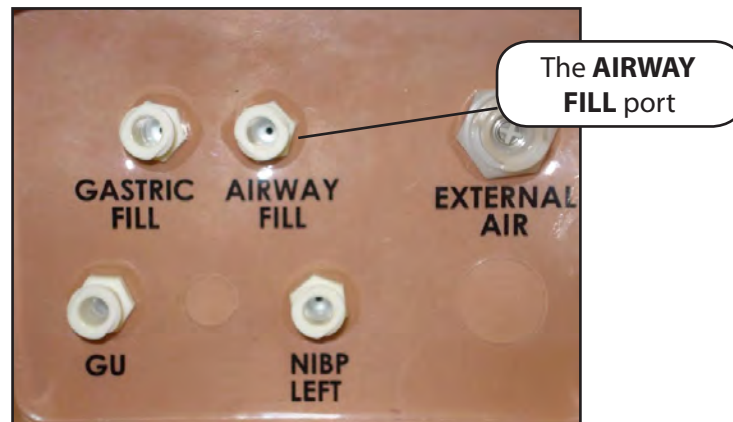
Airway Secretions (Nursing Only)

METIman Nursing allows for suctioning of fluids from the airway using a manual feed. Ensure all fluids have been removed from previous uses before each new use to prevent overfilling.



Tracheostomy Suction

To use the airway secretion feature, inject up to 40 mL of clinically appropriate colored fluid into the **AIRWAY FILL** port on METIman Nursing's left shoulder.



METIman Nursing's Left Shoulder

The trachea is now ready to be suctioned. Using the proper clinical technique, insert the suction catheter (14 Fr) until resistance is encountered at the bifurcation. Withdraw and apply suction. Fluid can be suctioned over a distance of approximately 4 cm distal to the bifurcation.

NOTE: Use only distilled water with food coloring, if desired.

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Cricothyrotomy

Cricothyrotomy can be simulated on METIman. Before performing a needle cricothyrotomy, the Cricothyrotomy plug must be removed, and a 2.25-inch (6-cm) length of red tape from the roll provided must be placed over the hole.

To replicate a needle cricothyrotomy:

1. Spray the silicone lubricant onto the airway adjunct prior to the simulation session. To prevent damage to the simulator, always spray silicone lubricant into the airway.
2. Locate the simulated cricothyroid membrane sealed with tape underneath the neck skin.
3. Follow standard clinical techniques and palpate to find the cricothyroid space.
4. Puncture the space through the neck skin of the patient simulator and into the tape "membrane." This puncture goes all the way through to the "trachea," simulating the clinical procedure.
5. Users must replace the tape that simulates the cricothyroid membrane after each cricothyrotomy.

NOTE: Replacement components are available in the Inventory Kit.

NOTE: When ventilating through a surgical airway, the Laryngospasm feature must be deactivated, or the chest rise is not observed.

NOTE: When finished using the Cricothyrotomy feature, replace the Cricothyrotomy plug.

Replacing the Cricothyrotomy Tape

Remove the old, punctured tape completely from the cricoid feature and use alcohol to clean the glue residue from the surface. (An alcohol prep pad works well.) Allow to dry.

Cut an approximately 2.25-inch (6 cm) length of the double-sided tape from the roll provided.

Carefully remove the paper backing and lightly stretch the newly revealed adhesive side of the tape over the cricoid hole and down the far side of the cricoid feature. Use the non-stick paper backing to press the tape against the cricoid feature.

Cut a 2.5-inch to 3-inch (7 cm to 8 cm) length of red tape and apply it over the cricoid feature and the tape.

Resealing the Membrane After a Puncture

To reseal the cricoid feature, apply a small piece of red tape over the punctured area. This can be repeated a brief number of times, but when the number of layers impedes the cricothyrotomy, all existing tape must be removed and replaced with new tape.

Pulmonary

METIman uses both physical and mathematical models to achieve an extremely accurate simulation of respiration. METIman's chest rises and falls, mimicking inspiration and expiration. METIman Prehospital's lungs also react realistically to intubation as well as to pathophysiologic states.

Pulmonary System			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Spontaneous Breathing	Normal tidal breathing and pathophysiological conditions such as atelectasis, pneumothorax, asthma and COPD.	None required, but adjustable VIEW: Respiratory	None required.
Exhaled CO ₂ (<i>Prehospital only</i>)	Measure the presence or absence of CO ₂ during positive pressure ventilation.	None required.	CO ₂ canister is inserted
Pneumothorax or Hemothorax	Increase in intrapleural volume, leading to asymmetrical breathing.	None required, but adjustable VIEW: Respiratory CONTROL: Intrapleural Volume (Left or Right)	None required.
Chest Excursion	Synchronized with ventilation (spontaneous or positive pressure ventilation). Excursion depth proportional to tidal volume.	None required.	None required.
Breath Sounds	Normal and abnormal breath sounds are independently synchronized with ventilation of the right and left lungs. Breath sounds can be auscultated over anterior and posterior anatomic locations.	None required, but adjustable VIEW: Sounds	None required.
Bronchial Occlusion	Completely obstructs right and/or left mainstem bronchi, simulating a lower airway obstruction (e.g. mucus plug). This yields an inability to ventilate the lungs and asymmetric chest excursion.	VIEW: Respiratory	None required.
Pulse Oximetry	Oxyhemoglobin saturation (SpO ₂) automatically correlates with the oxygen concentration in the lungs and the intrapulmonary shunt fraction.	None required, but adjustable	SpO ₂ probe is attached.
Arterial Blood Gases	PaO ₂ , PaCO ₂ and pH are continuously calculated, and the Patient Status Display can be configured to show them.	None required, but adjustable	None required.
Venous Blood Gases	PvO ₂ and PvCO ₂ are continuously calculated, and the Patient Status Display can be configured to show them.	None required, but adjustable	None required.

Pulmonary System			
Needle Decompression <i>(Prehospital Only)</i>	Decompression of a pneumothorax can be performed bilaterally by inserting a needle at the midclavicular line of the second intercostal space.	The instructor must adjust the amount of physiologic intrapleural air present. VIEW: Respiratory CONTROL: Needle Decompression, Intrapleural Vol: Left, Intrapleural Vol: Right	See <i>Needle Decompression setup</i> .

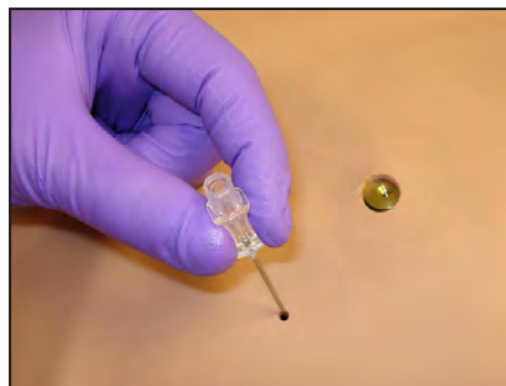
Needle Decompression (Prehospital Only)

Needle decompression can be performed bilaterally into a small hole located in the midclavicular line of the second intercostal space using a 14-gauge needle.

To enable the Needle Decompression feature, activate the switch for the appropriate side(s). From the Respiratory view, turn the desired **Needle Decompression** switch to **On**.



Needle Decompression Switch



Needle Decompression

When a needle is inserted in the second intercostal space, along the midclavicular line, air is released while intrapleural volume is present.

Needle Decompression and Chest Tube

When using the METIman Prehospital system, the Needle Decompression and Chest Tube features can be enabled simultaneously. Intrapleural volume will decrease when both are in use.

Bronchial Occlusion (Prehospital Only)

When bronchial occlusion is enabled, unilateral chest excursion is observed during spontaneous breathing or positive pressure ventilation. To stop airflow to the bronchi, creating a bronchial occlusion, the switch for the appropriate side(s) must be activated. From the Respiratory view, turn the desired **Bronchial Occlusion** switch to **On**.



Bronchial Occlusion Switch

Respiratory Rate

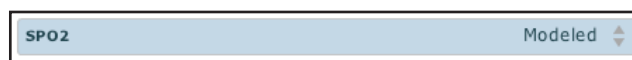
To adjust the respiratory rate manually, from the Respiratory view, click **Respiratory Rate**. The Respiratory Rate slider appears. Set the rate by dragging the arrow up or down. Click **Accept** to exit and save the changes. The switch is now orange, indicating a change has been made. To return to the programmed physiologic model, click the switch and turn the **Override** switch to **Modeled**.



Respiratory Rate Parameter

Pulse Oximetry

To adjust the SpO₂ percentage manually, from the Respiratory view, click **SpO₂**. The SpO₂ slider appears. Set the rate by dragging the arrow up or down. Click **Accept** to exit and save the changes. The switch is now orange, indicating a change has been made. To return to the programmed physiologic model, click the switch and turn the **Override** switch to **Modeled**.



SPO2 Parameter

The SpO₂ probe is integrated with the TouchPro (optional) and the physiological model. The connection for the SpO₂ probe is located on the left side of the simulator. The SpO₂ probe must be connected for pulse oximetry data to be displayed.

CO₂ Exhalation (Prehospital Only)

Whether supplied via a portable canister or from an external source, the simulator exhales CO₂ during positive pressure ventilation.

NOTE: An optional regulator kit must be purchased to use CO₂ from an external source.

To use the CO₂ Exhalation feature, connect the CO₂ canister to the CO₂ canister socket or connect the external source on the simulator's right shoulder, and METIman Prehospital exhales CO₂ gas. There are approximately 15 minutes of CO₂ gas available once the canister is connected.

Positive Pressure Ventilation

When positive pressure ventilation is administered, the process is automatically detected by the simulator, and the physiologic model is sensitive to the volume administered.

Gastric Distention (Prehospital Only)

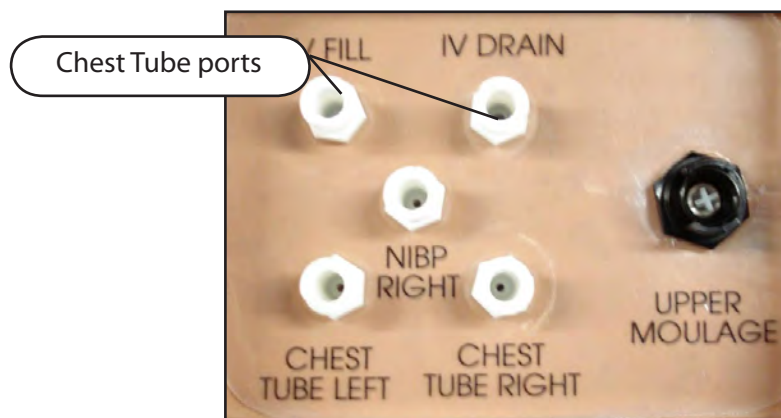
During esophageal intubation or overly aggressive bag valve mask ventilation, gastric distention occurs. Gastric distention is relieved by putting pressure on the abdomen.

Chest Tube: METIman Prehospital

METIman Prehospital has the ability to simulate chest tube drainage. The Chest Tube sites are located bilaterally in the fifth intercostal space. Use only a 28 Fr chest tube. Ensure all fluids have been removed from previous uses before each new use to prevent overfilling. *Please refer to the Care and Maintenance section for directions on fluid removal.*

To simulate continuous chest tube drainage:

1. Insert the METIman Priming Tube in the Chest Tube site.
2. Set up the IV pole near the simulator.
3. Fill an IV bag with the clinically appropriate fluid. Use distilled water only, with food coloring if desired.
4. Hang the IV bag on the IV pole.
5. Ensure the roller clamp is closed and insert the IV spike into the IV bag.
6. Connect to the simulator by attaching the end of the IV spike set tubing to the corresponding **CHEST TUBE** port (**LEFT or RIGHT**) on the simulator's right shoulder.



METIman's Right Shoulder

7. Open the clamp and allow fluid to flow into the simulator until fluid is seen in the METIman Priming Tube.

8. Once fluid appears in the METIman Priming Tube, remove the METIman Priming Tube. The simulator is ready for chest tube insertion.
9. Keep the IV bag attached and adjust the flow rate manually using the roller clamp.

The chest tube must be fully inserted for the fluid to flow.



Chest Tube Insertion

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

When the Chest Tube feature is used on METIman Prehospital, the simulator automatically detects the tube insertion and creates a log entry.

On METIman Prehospital, if a small volume of fluid is needed to simulate proper chest tube insertion, the internal reservoir may be filled.

To insert a small amount of fluid into the Chest Tube reservoir:

1. Insert the METIman Priming Tube in the Chest Tube site.
2. Using a 60 mL syringe filled with clinically appropriate fluids, inject the contents into the **CHEST TUBE** port (**LEFT or RIGHT**) until fluid is seen in the METIman Priming Tube. Use distilled water only, with food coloring, if desired.
3. Remove the METIman Priming Tube.
4. Inject the remaining contents of the syringe into the **CHEST TUBE** port.
5. Remove the syringe.

Chest Tube and Needle Decompression

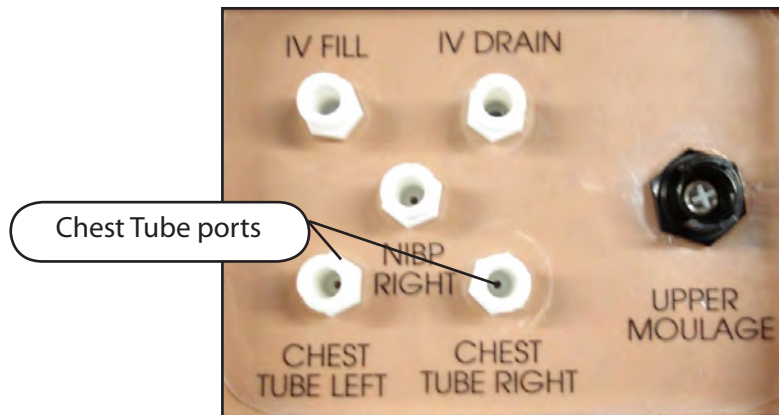
The Chest Tube and Needle Decompression features can be enabled at the same time on the METIman Prehospital system. Intrapleural volume will decrease when both are in use.

Chest Tube: METIman Nursing

METIman Nursing has the ability to simulate chest tube drainage. The Chest Tube sites are located bilaterally in the fifth intercostal space. Use only a 28 Fr chest tube. Ensure all fluids have been removed from previous uses before each new use to prevent overfilling. *Please refer to the Care and Maintenance section for directions on fluid removal.*

To simulate continuous chest tube drainage:

1. Insert the METIman Priming Tube in the Chest Tube site.
2. Set up the IV pole near the simulator.
3. Fill an IV bag with the clinically appropriate fluid. Use distilled water only, with food coloring if desired.
4. Hang the IV bag on the IV pole.
5. Ensure the roller clamp is closed and insert the IV spike into the IV bag.
6. Connect to the simulator by attaching the end of the IV spike set tubing to the corresponding **CHEST TUBE** port (**LEFT or RIGHT**) on the simulator's right shoulder.



METIman's Right Shoulder

7. Open the clamp and allow fluid to flow into the simulator until fluid is seen in the METIman Priming Tube.
8. Once fluid appears in the METIman Priming Tube, remove the METIman Priming Tube. The simulator is ready for chest tube insertion.
9. Keep the IV bag attached and adjust the flow rate manually using the roller clamp.

The chest tube must be fully inserted for the fluid to flow.

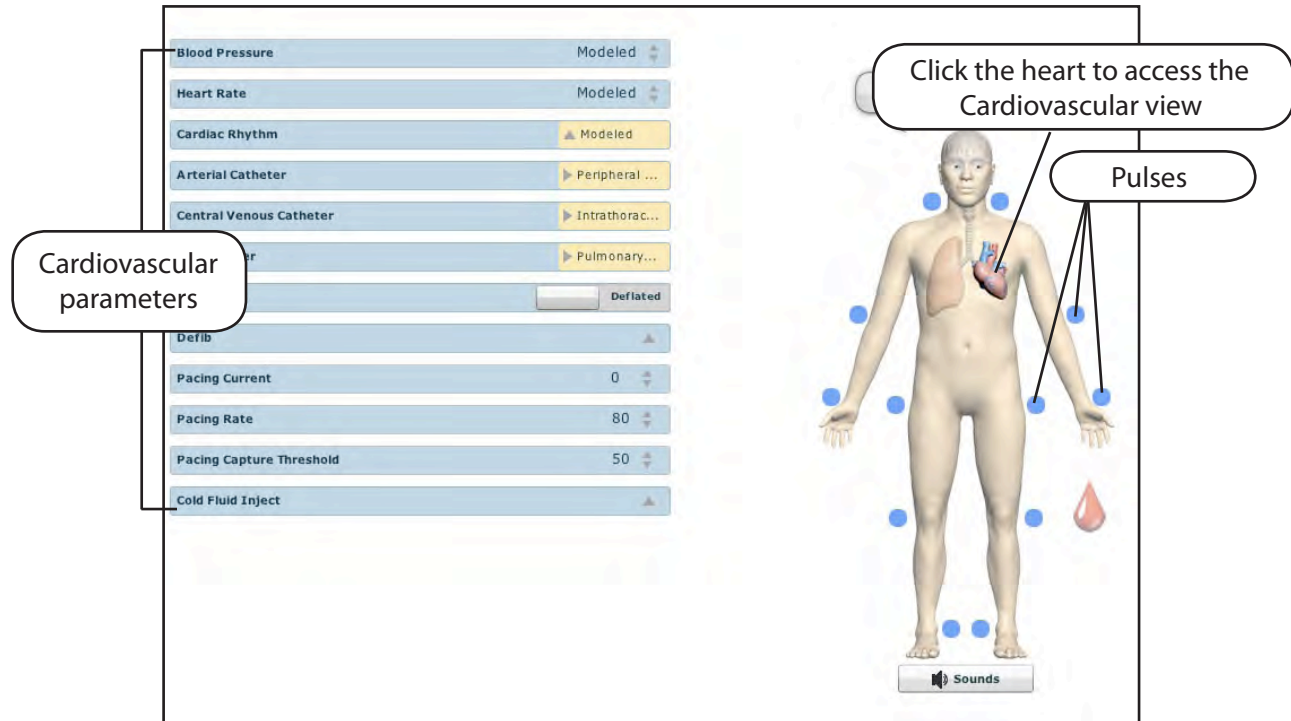
NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Cardiovascular

With METIman's Cardiovascular system, users can replicate the clinical signs associated with cardiac activity, including palpable pulses, heart sounds and electrical activity.

Cardiovascular System			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Heart Sounds	Normal and abnormal heart sounds are synchronized to the cardiac cycle and audible to a standard stethoscope. Heart sounds can be auscultated over the left and right upper sternal border, right lower sternal border and apex.	None required; specific sounds can be selected. VIEW: Cardiovascular	None required.
5-Lead ECG	ECG waveforms can be viewed on a standard monitor and/or on the TouchPro Patient monitor. Normal and abnormal cardiac rhythms are linked to patient physiology (e.g. blood pressure, cardiac output).	None required; specific rhythms can be selected.	ECG monitor may be utilized.
Myocardial Ischemia	Myocardial oxygen supply and demand automatically influence the cardiac rhythm, yielding response to hypoxemia.	None required, but adjustable.	None required.
Palpable Pulses	Carotid, brachial, radial, femoral, popliteal, posterior tibial and dorsalis pedis pulses can be palpated bilaterally and are synchronous with the cardiac cycle. A pulse deficit automatically occurs if the systolic arterial blood pressure falls below specified thresholds.	None required, but adjustable. VIEW: Available on all views on the Run screen	None required.
Non-Invasive Blood Pressure Measurement	Systemic blood pressure can be measured using the return-to-flow technique. Korotkoff sounds can also be auscultated.	None required.	Use of modified blood pressure cuff.

To access the Cardiovascular parameters of METIman, on the Run screen, click the heart on the human form. The cardiovascular features appear on the Run screen.



The Cardiovascular View (Prehospital)

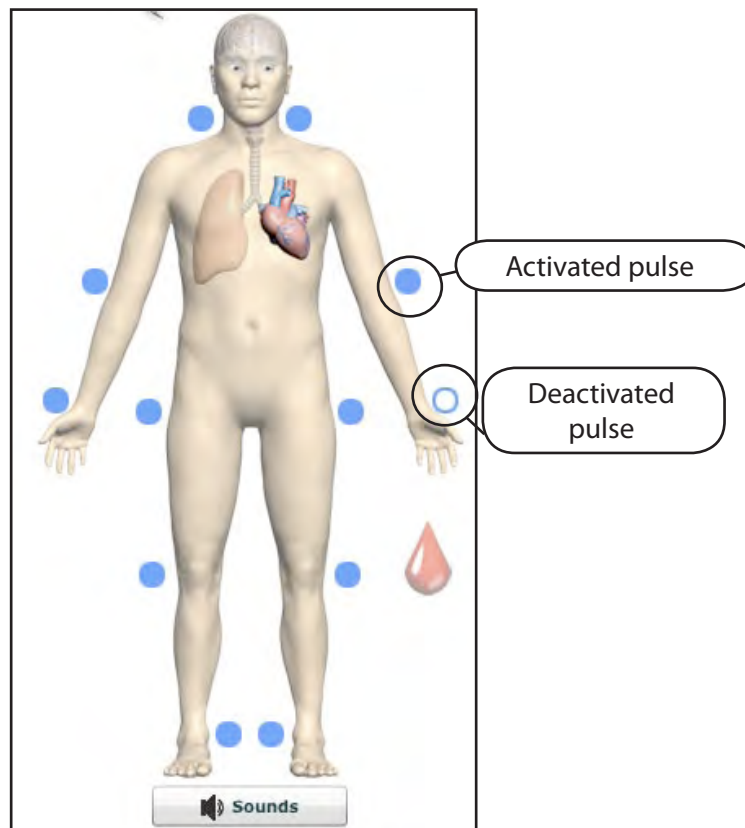
Pulses: METIman Prehospital

METIman Prehospital has 14 pulse sites that are activated by touch.

- Carotid (2)
- Brachial (2)
- Radial (2)
- Femoral (2)
- Popliteal (2)
- Posterior Tibial (2)
- Dorsalis Pedis (2)

NOTE: The Dorsalis Pedis and Posterior Tibial pulses are controlled together. The left and right Carotid pulses are also controlled together.

Pulses are visible and can be controlled from any physiological view. To disable a pulse, click the pulse location on the human form. To enable a pulse, click the pulse location again.



Pulses: METIman Prehospital – Active and Inactive

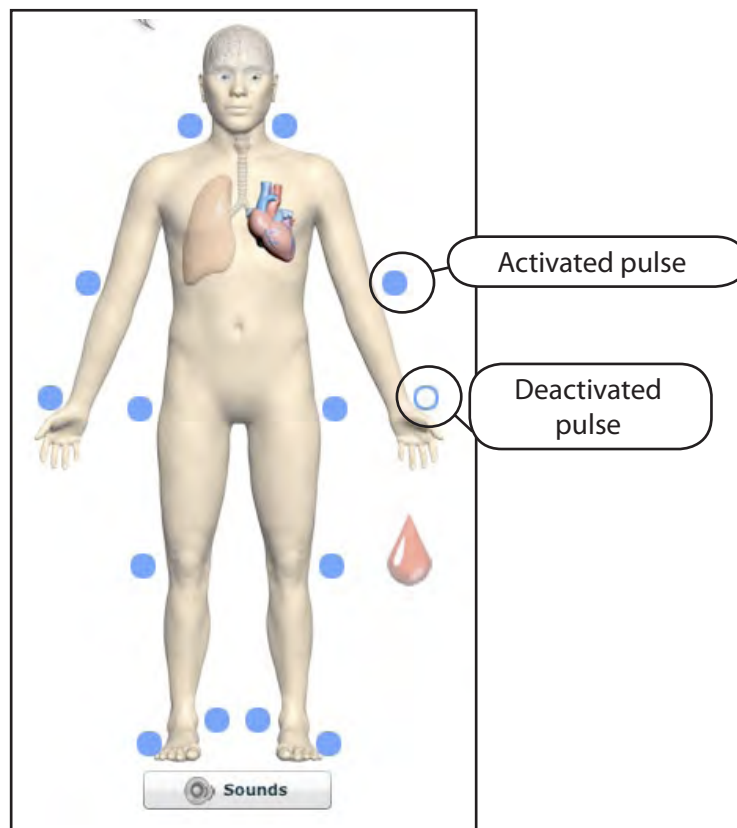
Pulses: METIman Nursing

METIman Nursing has 14 pulse sites that are activated by touch.

- Carotid (2)
- Brachial (2)
- Radial (2)
- Femoral (2)
- Popliteal (2)
- Posterior Tibial (2)
- Dorsalis Pedis (2)

NOTE: The left and right Carotid pulses are controlled together.

Pulses are controlled from the Cardiovascular view only. All pulses, unless altered by an SCE, are enabled by default. To disable a pulse, click the pulse location on the human form. To enable a pulse, click the pulse location again.



Pulses: METIman Nursing – Active and Inactive

Blood Pressure

METIman supports non-invasive blood pressure measurements, and systolic and diastolic readings can be obtained and manipulated through the software.

Systolic and Diastolic Blood Pressure

To manually adjust the systolic and/or diastolic blood pressure:

1. From the Cardiovascular view, click the parameter of desired blood pressure.
2. Set the pressure by dragging the arrow up or down.
3. Click **Accept** to exit and save the changes. The switch is now orange, indicating a change has been made.
4. To return to the programmed physiologic model, click the switch and turn the **Override** switch to **Modeled**.

Non-Invasive Blood Pressure Measurement

Blood pressure can be taken manually on either arm. Non-invasive blood pressure (NIBP) monitoring techniques can be used by attaching the standard cuff modified with a T-fitting and adapters.

To modify a standard blood pressure cuff:

1. Cut the blood pressure cuff tube approximately 9 cm from the cuff.
2. Insert the barbed end tubing connectors into the cut ends of the blood pressure cuff tubes.

3. Secure the tubing connectors with cable ties.



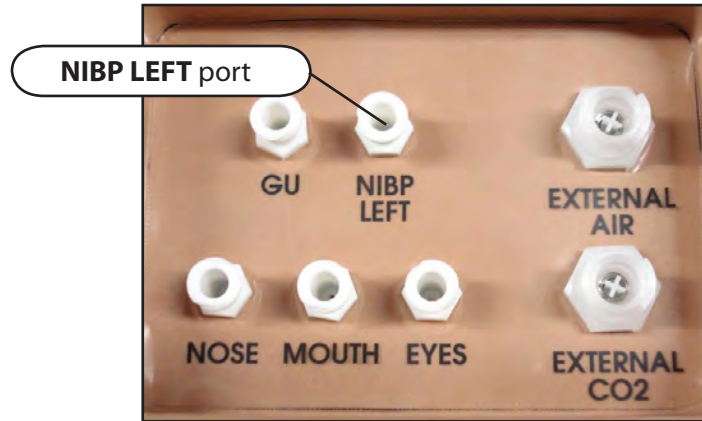
An Attached Tubing Connector

4. Attach the blood pressure adapter to the connectors.

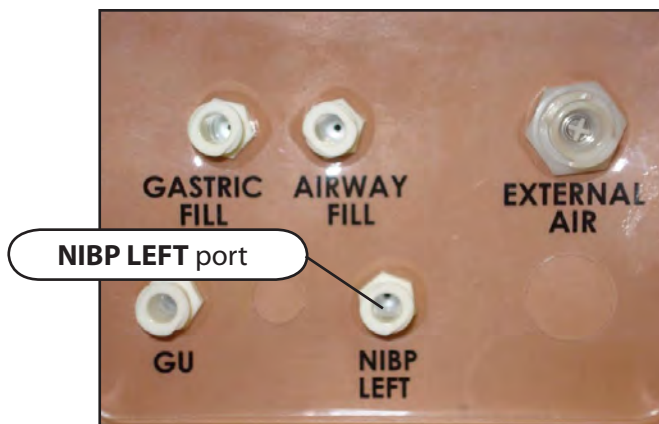


An Attached Blood Pressure Cuff Adapter

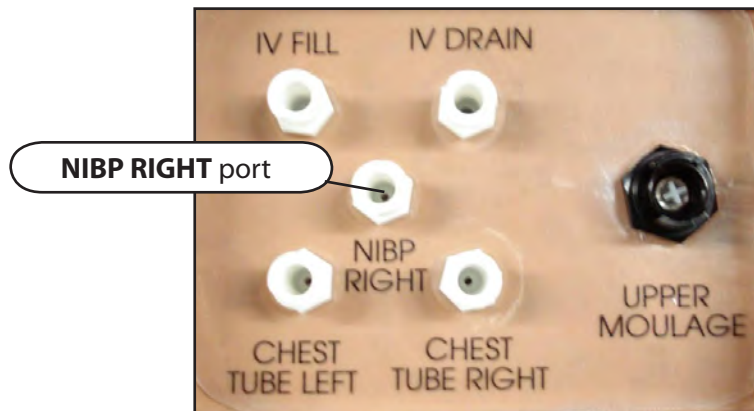
To get a blood pressure reading, connect the extension from the T-fitting on the blood pressure cuff adapter to either of the **NIBP** ports on METIman's left and right shoulders.



METIman Prehospital's Left Shoulder



METIman Nursing's Left Shoulder



METIman's Right Shoulder

Connect the T-fitting extension to the hose.

Take the non-invasive blood pressure reading using the return-to-flow technique.



Attached Blood Pressure Cuff

At appropriate cuff pressures, Korotkoff sounds are produced, and the radial pulse disappears.

Heart Rate

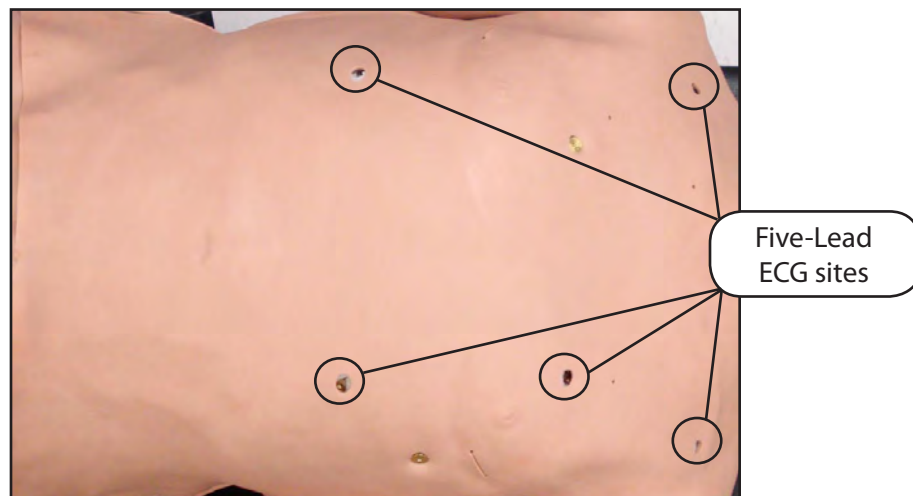
To manually adjust the heart rate, from the Cardiovascular view, click **Heart Rate**. Set the rate by dragging the arrow up or down.

Click **Accept** to exit and save the changes. The switch is now orange, indicating a change has been made.

To return to the programmed physiologic model, click the switch and turn the **Override** switch to **Modeled**.

Five-Lead ECG

On METIman, a 5-lead ECG is emitted from the appropriate positions for display on a standard monitor. A contact is available on METIman's chest for each of the five cables.



5-Lead ECG Sites

The simulator generates a normal sinus ECG, as well as a broad range of abnormalities such as myocardial ischemia, sinus tachycardia and bradycardia, ventricular fibrillation and asystole. The hemodynamic response to the arrhythmias is physiologically correct. Myocardial oxygen balance and cardiac ischemia automatically influence the cardiac rhythm resulting in a realistic and automatic response of the rhythm to hypoxemia. The degree of influence can be controlled or completely overridden by the instructor.

Cardiovascular Interventions/Therapy

METIman can simulate chest compressions and three types of electrical therapy: defibrillation, cardioversion and pacing.

Realistic Cardiovascular Interventions			
Anatomy, Physiology and Clinical Signs	Clinical Interventions, Patient Monitoring and Scenarios.	Software Control	Manual Control
Chest Compression	Effective chest compression results in artificial circulation, cardiac output, central and peripheral blood pressures, palpable pulses, and CO ₂ return.	None required, but adjustable.	None required.
Cardiac Monitoring	The desired arrhythmia can be selected.	The response to clinical intervention must be controlled by the instructor. VIEW: Cardiovascular	None required.
Defibrillation	METIman supports operation with a variety of manual and automatic external defibrillators.	Defibrillation can be simulated by the instructor under the Interventions palette VIEW: Cardiovascular	<i>See Defibrillation below for defibrillation disk locations and instructions.</i>
Cardiac Pacing	Transthoracic cardiac pacemaker can be used with METIman. Pacing results in appropriate physiological changes in blood pressure and cardiac output.	None required.	<i>See Pacing below for cardiac pacing disk locations and instructions.</i>

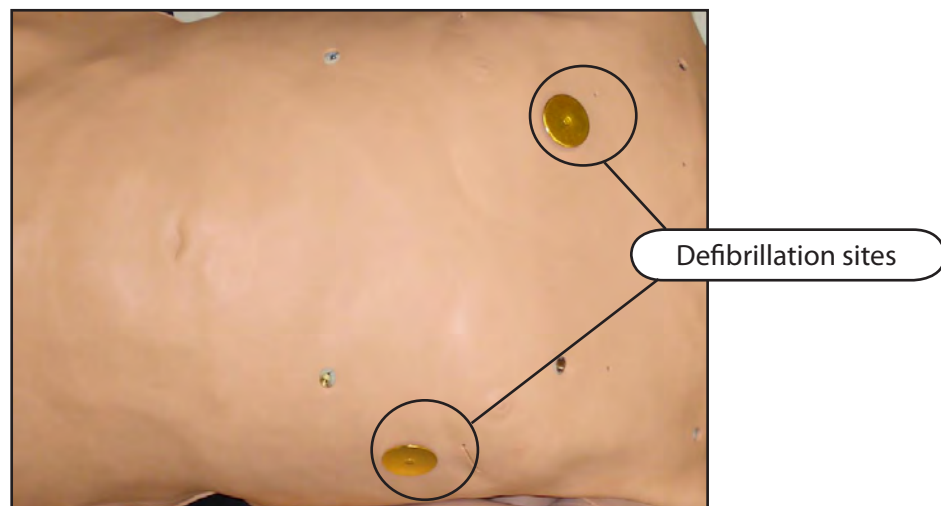
Chest Compressions

METIman supports normal hand placement and standard compression techniques, and chest compressions can be performed. METIman can detect the compressions, and the physiology responds accordingly.

Defibrillation and Cardioversion

Manual defibrillation and cardioversion can be performed on METIman. Additionally, defibrillation and cardioversion are available virtually through the software.

METIman is designed to safely absorb the energy discharged from manual and automatic defibrillators. Standard defibrillation energy levels should be used for positive learning reinforcement and to avoid negative training transfer.



Defibrillation Sites

However, use of a defibrillator for training purposes represents an operational hazard equivalent to use of a defibrillator on a real patient. Consequently, ALL SAFETY PRECAUTIONS for the use of defibrillators MUST BE FOLLOWED as if the simulator were a patient. Consult the specific defibrillator's user manual for further information.

The following cautions should be observed:

- Defibrillation should be performed on the defibrillation electrodes only. If defibrillation is performed over any ECG electrode, high voltage may be present on the remaining connectors during the shock. This may also damage ECG circuitry.
- To prevent overheating, do NOT provide more than three (3) defibrillator discharges (maximum 200 joules with a biphasic defibrillator) in a sequence. Do NOT exceed an average of two (2) defibrillator discharges per minute during the training session.
- Avoid a large number of consecutive discharges. For example, 20 or 25 discharges without any recovery interval may damage the system.
- Do NOT let the simulator come in contact with electrically conductive surfaces or objects during defibrillation. A flame-supporting atmosphere, for example, with a high content of oxygen, should be avoided during defibrillation.
- Keep the simulator's chest dry. Special attention should be taken when using the urinary system or the chest tube feature.
- To prevent pitting of the chest skin electrode, do NOT apply conductive gel or conductive defibrillation pads intended for patient use.
- Do NOT use cables or connectors having visible damage.
- Do NOT spill fluids over any component inside the simulator torso. This could damage the system and may also present a possible hazard for the operator.
- When using a manual defibrillator, the ECG can be monitored via the defibrillator paddles. Coarse ventricular fibrillation and high-rate ventricular tachycardia cardiac rhythms are automatically recognized as "shockable" rhythms.
- With each defibrillation, the METIman automatically records the amount of energy discharged and the time defibrillation was performed. The simulated patient response to defibrillation is determined by the scenario script or instructor intervention. Thus, cardioversion is not automatically determined by the physiological models.
- The minimum electrical charge recognized by the circuitry within the simulator is 20 joules.
- For paddle placement on the chest, the simulator has two anterior defibrillation disks, which can be unscrewed, leaving threaded connections, if required.
- Biphasic defibrillators can be used with either paddles or hands-free connectors.

Pacing

Pacing can be achieved virtually by selecting the appropriate intervention in the Interventions palette. A standard transthoracic cardiac pacemaker can be connected to the simulator using the anterior contacts. The simulator automatically detects and responds to pacing signals (from 20 mA to 200 mA, in increments of 10).

Subclavian Catheter (Nursing Only)

The Subclavian Catheter feature allows for cleaning and dressing practice. When using the Subclavian Catheter feature, users can infuse up to 50 mL of distilled water in the line.



Subclavian Catheter

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Intramuscular Injection

METIman allows for the administration of a deltoid intramuscular (IM) injection. Injection sites are located on both of METIman's arms. Use only a 20- to 22-gauge needle.



Intramuscular Injection

IV Cannulation

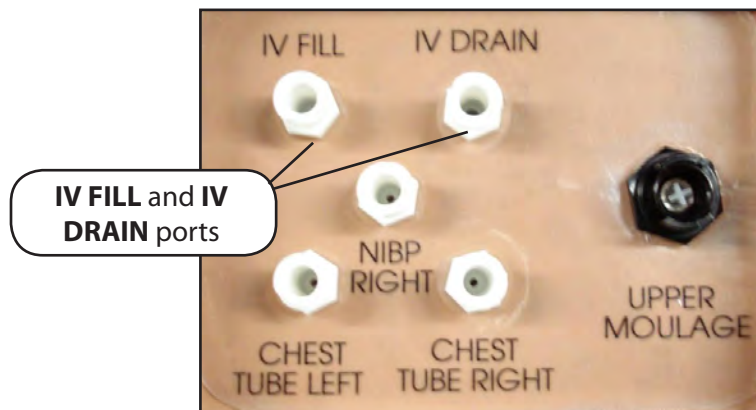
Veins for the IV Cannulation feature are located in the dorsum of the hands, forearms and antecubital region of the arms. Use only a 20- to 22-gauge needle. To simulate realistic flashback, the system must be primed prior to use. Ensure all fluids have been removed from previous uses before each new use to prevent overfilling. *Please refer to the Care and Maintenance section for directions on fluid removal.*



IV Cannulation

To prime the IV access ports, connect a 60 mL syringe filled with distilled water (with clinically appropriate food coloring if desired) to the **IV FILL** port on METIman's right shoulder and firmly inject all 60 mL. This primes the arms and charges the system for Flashback and Venipuncture support.

WARNING: If a flash does NOT occur, do NOT inject any fluid and remove the needle immediately. Repeat the priming directions and ensure you have injected the needle properly and into the simulated vein.



METIman's Right Shoulder

Fluids and medications can be administered intravenously. Approximately 50 mL of fluid may be infused. To support infusion of larger volumes, connect an empty IV bag or other receptacle to the **IV DRAIN** port located on METIman right shoulder.

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Fluids

METIman is capable of bleeding simultaneously at two sites from an internal tank. Arterial and venous bleeding can be simulated.

Venous settings produce a continuous bleed at three user-adjustable flow rates.

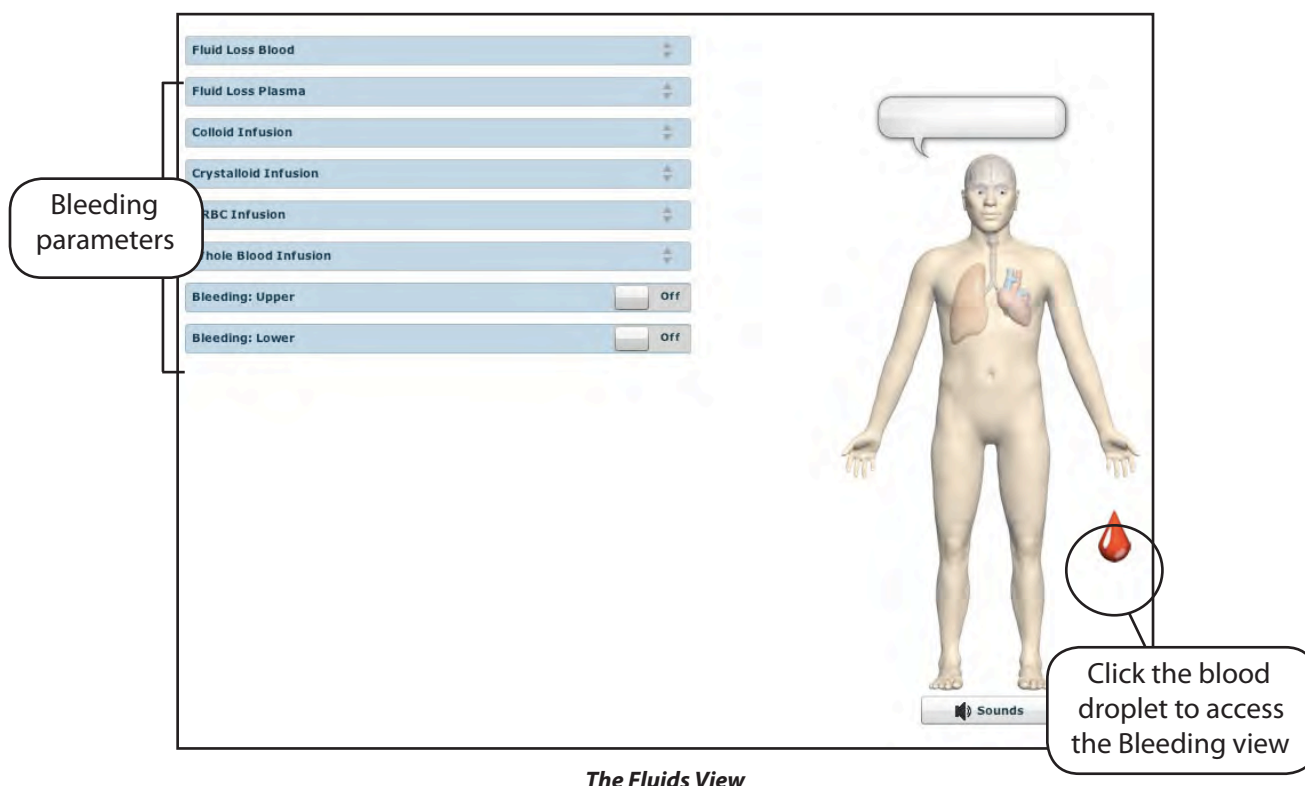
Arterial settings produce a pulsing flow synchronized with the cardiac cycle at three user-adjustable flow rates.

The flow rate is determined by the selected bleeding vessel size and the blood pressure. In addition, the simulator features auto-sensing of hemorrhage control (e.g., tourniquet application or direct pressure).

Bleeding results in an automatic loss of blood from the physiologic models with subsequent changes in hemodynamics. Blood loss occurs at a rate dependent on wound size and Mean Arterial Pressure (MAP).

Setup must be completed before using the bleeding feature.

To enable bleeding, on the Run screen, click the blood droplet. The Fluids view appears.



The Fluids View

Simulated blood **MUST** be removed from the simulator after each use. Failure to remove simulated blood from the simulator can void the warranty. *For instructions on how to clean the simulator after using the Bleeding feature, please refer to the Care and Maintenance section for directions on fluid removal.*

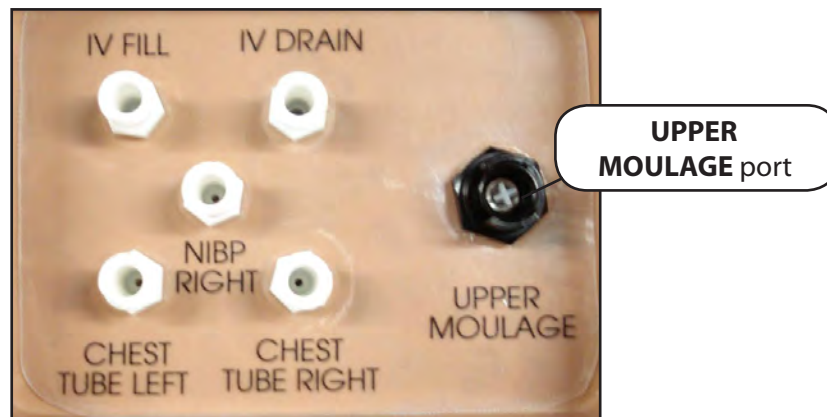
Hemorrhage Setup

The user determines the type and placement of the bleeding moulage for the lesson. An optional Moulage Kit can provide molded gunshot wounds, broken and protruding bones, amputations and an abdominal wound as well as theatrical components.

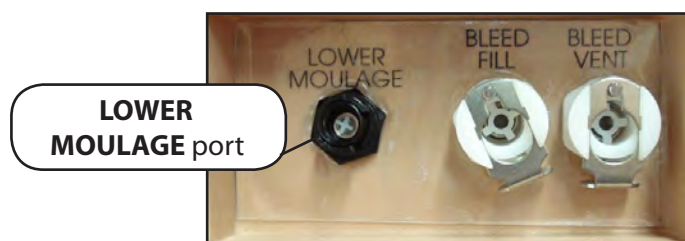
To decrease the likelihood of staining, apply a thin coat of petroleum to the area of bleeding.

To use one of the moulage wounds from the Moulage Kit:

1. Secure the wound over the simulator using the integrated straps.
2. Connect the wound haptic to the one of the moulage ports located on METIman's right shoulder (**UPPER MOULAGE**) or right hip (**LOWER MOULAGE**).



METIman's Right Shoulder



METIman's Right Hip

3. Enable **Bleeding: Upper** or **Bleeding: Lower** on the Fluids view of the Müse software, as desired.

Hemorrhage Control

When bleeding is controlled (e.g., hemostat, tourniquet), the action is detected and logged, and the physiology responds accordingly.

Tourniquet Application

A tourniquet may be applied to stop the flow of blood.

The wound umbilical contains an 18-inch section of soft tubing that allows the use of a tourniquet to stop the flow of blood.

For added realism, the simulator should be dressed in clothing that can be torn to “conform” with the type of injury being demonstrated. Bleeding moulages and the wound umbilical should be concealed under the victim’s clothing with only the wound showing.



Tourniquet Application

Fluid Loss Blood

To manually control a patient’s blood loss, from the Fluids view, click the **Fluid Loss Blood** parameter. The Fluid Loss Blood slider appears. Set the amount of blood loss by dragging the arrow up or down. Click **Accept** to exit and save the changes.

Fluid Loss Plasma

To manually control a patient’s plasma loss, from the Fluids view, click the **Fluid Loss Plasma** parameter. The Fluid Loss Plasma slider appears. Set the amount of Plasma loss by dragging the arrow up or down. Click **Accept** to exit and save the changes.

Gastrointestinal

METIman produces realistic bowel sounds. In addition, on METIman Nursing, gastric lavage, gavage and suction can be administered.

Gastrointestinal Gavage, Lavage and Suction (Nursing Only)

METIman Nursing has a gastric reservoir that allows for simulated gavage, lavage and gastric suction. Before each use, ensure the reservoir has been drained completely. The reservoir should be primed with 60 mL of fluid before performing gastric suction (see *Gastric Suction* on page 162 for more information). A maximum of 100 mL of fluid may be added to the gastric reservoir once the reservoir is primed.

Gavage (Nursing Only)

To perform gastrointestinal gavage, ensure the reservoir is empty and infuse fluid according to procedure using a 14 Fr nasogastric tube.

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

NOTE: Ice the nasogastric tube if extra rigidity is needed for insertion.

Lavage (Nursing Only)

To perform gastrointestinal lavage, ensure the reservoir is empty and infuse fluid normally using a 14 Fr nasogastric tube. Fluids can then be removed according to proper clinical procedure.



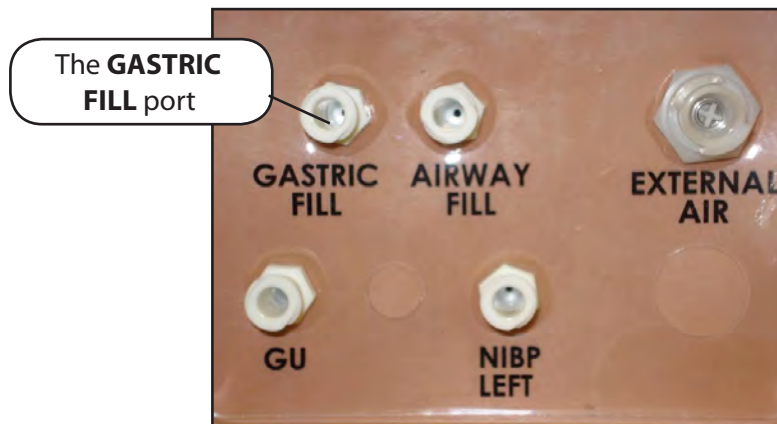
Gastric Lavage

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

NOTE: Ice the nasogastric tube if extra rigidity is needed for insertion.

Gastric Suction (Nursing Only)

To perform gastric suction, the reservoir must be primed prior to use. To prime the gastrointestinal reservoir, attach a syringe with a luer-lock extension set (provided) and inject 60 mL of distilled water into the **GASTRIC FILL** port on the simulator's left shoulder.



METIman Nursing's Left Shoulder

Fluids can then be removed according to procedure using a 14 Fr nasogastric tube.

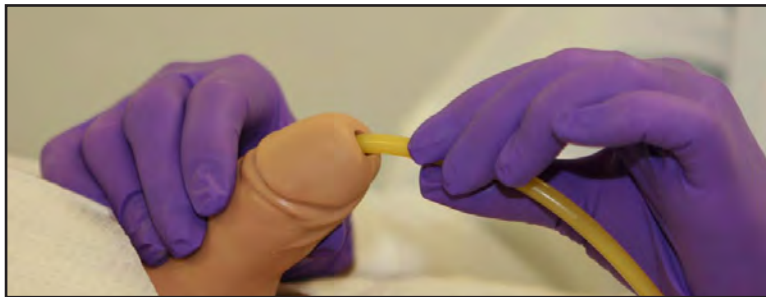
NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

Genitourinary System

METIman may be configured with either male or female genitalia, either of which allows for the insertion of a urinary catheter. The genitourinary system also provides for the excretion of urine.

Urinary Catheterization

Catheterize the simulator using a standard 16-Fr urinary catheter lubricated with silicone spray.



Urinary Catheterization

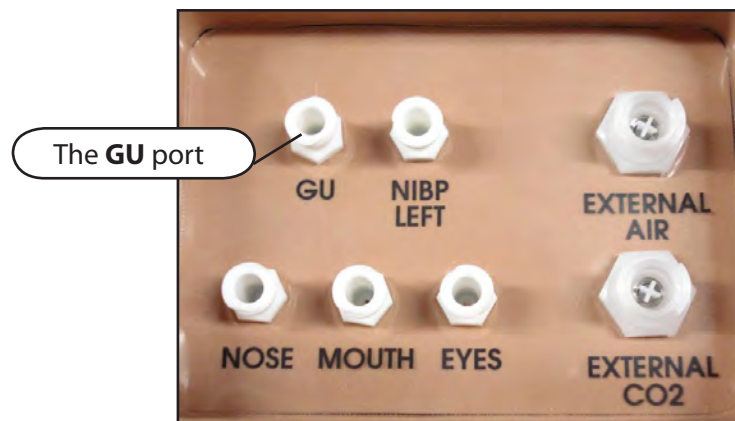
The bladder for the simulated urine is accessed directly via the urethra.

Simulating Urine Output

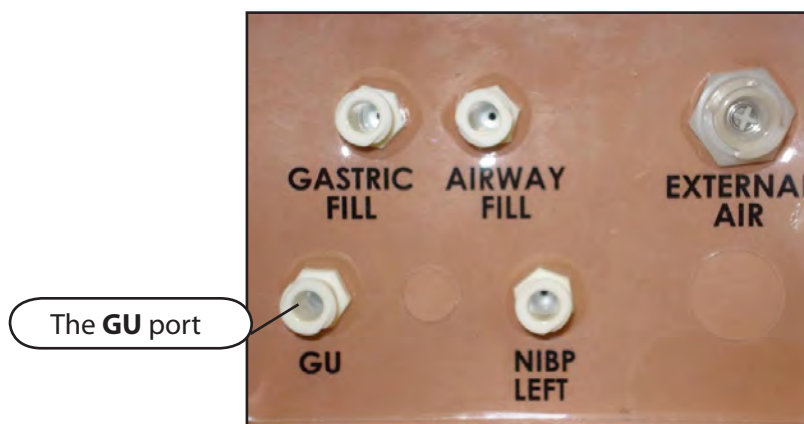
METIman allows urinary catheterization and simulation of urinary output. Ensure all fluids have been removed from previous uses before each new use to prevent overfilling. *Please refer to the Care and Maintenance section for directions on fluid removal.*

To simulate continuous urinary output:

1. Set up the IV pole near the simulator.
2. Fill an IV bag with the clinically appropriate fluid. Use distilled water only, with food coloring if desired.
3. Hang the IV bag on the IV pole.
4. Ensure the roller clamp is closed and insert the IV spike into the IV bag.
5. Connect to the simulator by attaching the end of the IV spike set tubing to the **GU** port on the simulator's left shoulder.



METIman Prehospital's Left Shoulder



METIman Nursing's Left Shoulder

6. Open the clamp and allow fluid to flow into the simulator. There is a reservoir inside the simulator that fills up with the fluid.
7. Keep the IV bag attached. Adjust the flow rate manually using the roller clamp.
8. Catheterize the simulator using a 16-Fr urinary catheter lubricated with silicone spray. The urinary catheter must be fully inserted for the fluid to flow.

NOTE: Cleanup is very important when using simulated fluids. *Please refer to the Care and Maintenance section for directions on fluid removal.*

If a small volume of fluid is needed to simulate proper urinary catheterization in a field location, the internal reservoir may be filled. To fill the genitourinary reservoir, attach a syringe with a Luer-lock extension set (provided) and inject 60 mL of distilled water into the **GU** port on the simulator's left shoulder.

Changing the Simulator's Genitalia

METIman comes with male and female genitalia.

To switch genitalia:

1. Pull apart the Velcro holding the genitalia.
2. Loosen and remove the urethra connector. This connection may be tight when genitalia are removed the first time.
3. Remove the genitalia.
4. Attach urethra tube to the urethra connector.
5. Attach the desired genitalia using the Velcro.

Sounds

A variety of simulated sounds are available to enhance realism. A patient must be running on METIman for any sounds to be available.

Speech

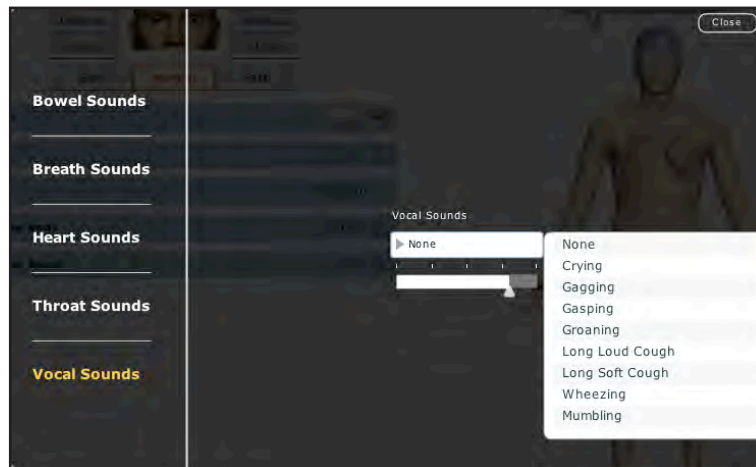
Speech can be added to simulations using the Vocal Sounds and Speech Sounds features on the software or by using an external microphone.

Vocal Sounds

A variety of programmable vocal sounds are available. Vocal sounds are male or female based on the gender of the active patient.

Vocal Sounds
None
Audible Wheezing
Crying
Gagging
Gasping
Groaning
Long loud cough
Long soft cough
Mumbling

To select a sound from the Vocal Sounds drop-down menu, click the **Sounds** button on the Run screen. The Sounds panel appears.



Vocal Sounds Menu

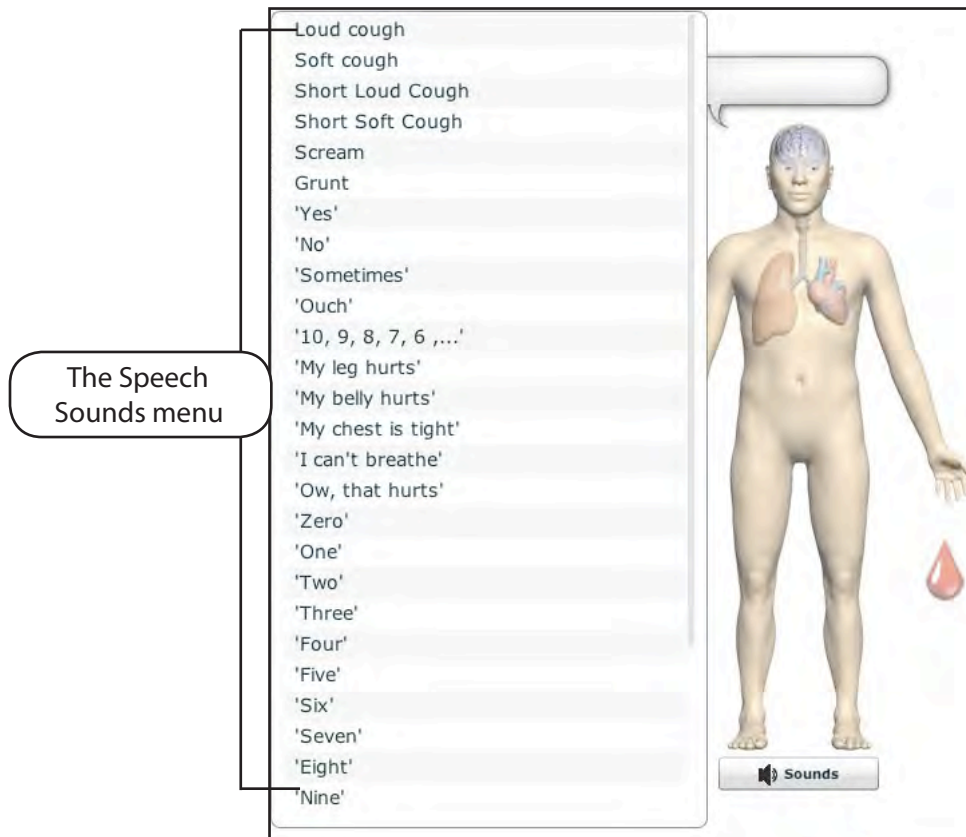
Click **Vocal Sounds** and select the type of sound desired from the Vocal Sounds drop-down menu. Vocal Sounds play continuously when selected and are emitted immediately when selected from the **Vocal Sounds** drop-down menu. To stop playing one of the vocal sounds, select **None** from the list.

Speech Sounds

Speech Sounds include a male or female voice that can utter pain rating indicators from 0 to 10, various phrases and a series of other utterances. Unlike Vocal Sounds, Speech Sounds only play once.

Speech Sounds
Loud Cough
Soft Cough
Short Loud Cough
Short Soft Cough
Scream
Grunt
"Yes"
"No"
"Sometimes"
"Ouch"
"My leg hurts"
"My belly hurts"
"My chest is tight"
"I can't breathe"
"Ow, that hurts"
"0" through "10" - Pain Ratings
"Sharp"
"Pressure"
"Aching"
"Dull"
"Stabbing"

To play a Speech Sound, click the **Speech** balloon. A list of Speech Sounds appears.



The Speech Sounds Menu

Select the desired sound. The sound plays, and the list disappears.

To replay the last sound, click the **Play** button in the **Speech** balloon.

Wireless Voice Capability

In addition to the pre-programmed speech, any response can be transmitted through the speakers using the wireless microphone.



Wireless Microphone

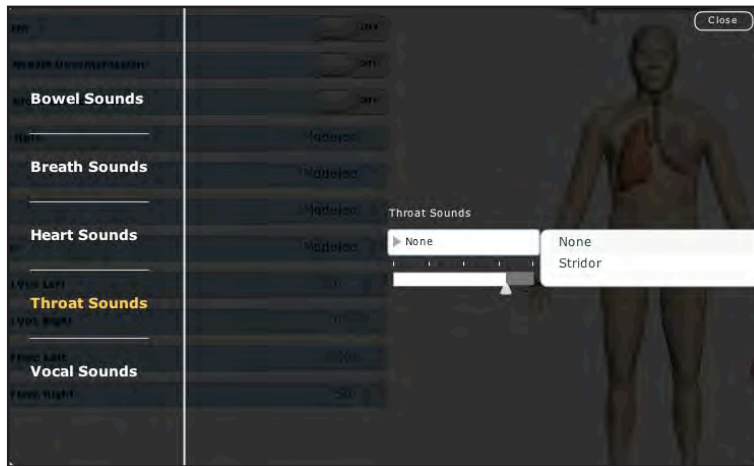
The microphone volume can be adjusted on the microphone itself using the volume control.

Wireless Voice Link

If a wireless voice link package was included with the METIman simulator, see *Appendix B - Wireless Voice Link* on page B-1 for additional instructions.

Throat Sounds

Stridor throat sounds can be enabled using the software. Throat sounds can be adjusted by clicking the **Sounds** button on the Run screen. When the Sounds panel appears, select Throat Sounds.



The Throat Sounds Menu

Click the **Throat Sounds** drop-down menu to change the type of sound. Click and drag the slider to adjust the volume.

Breath Sounds

Breath sounds are independently synchronized with ventilation of the left and right lungs. Fourteen speakers, eight anterior and six posterior, provide breath sounds that can be auscultated. Each of the four quadrants of the torso can be set independently to produce a particular breath sound.

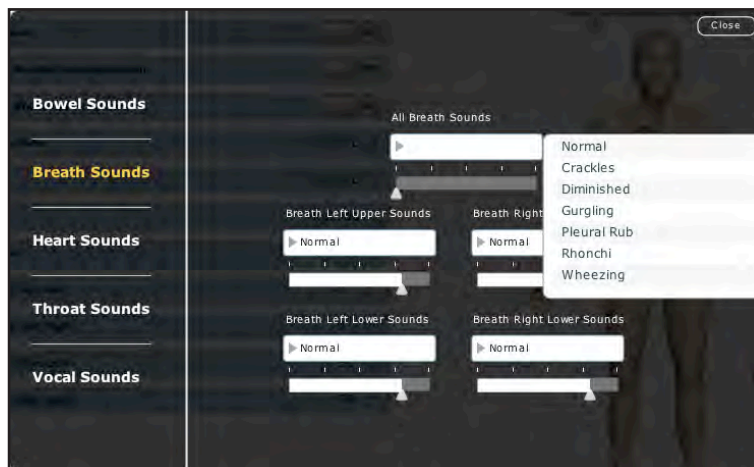
Breath Sounds
Normal
Crackles
Diminished
Gurgling
Pleura Rub
Rhonchi
Wheezing

Click any one of the **Breath Sounds** drop-down menus that each control one of four quadrants to change the type of sound. Click and drag the slider for each location to adjust the volume.

A patient must be running on a METIman simulator for any sounds to be available.

By default, **Normal** breath sounds are heard.

Breath sounds can be adjusted by clicking the **Sounds** button on the Run screen. When the Sounds panel appears, select **Breath Sounds**.



The Breath Sounds Menu

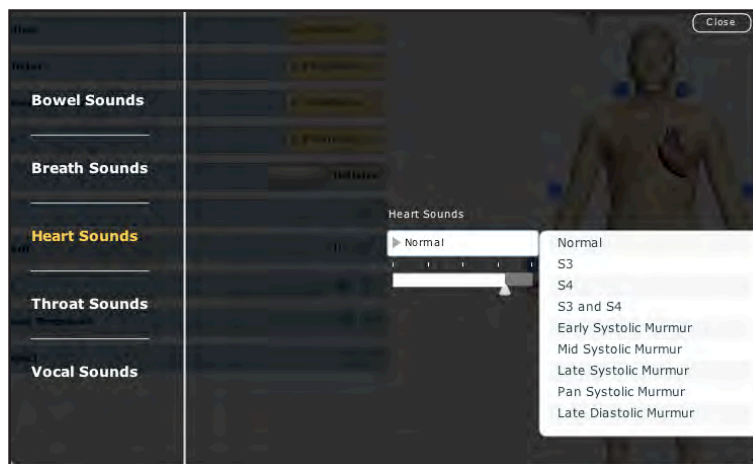
Heart Sounds

Heart sounds emanate from four speakers and are synchronized with the cardiac cycle. Heart sounds can be auscultated over the left and right sternal border, right lower sternal boarder and apex.

By default, heart sounds are set to the **Normal** sound. The following sounds are available:

Heart Sounds
Normal S1-S2
S3
S4
S3 and S4
Early Systolic Murmur
Mid Systolic Murmur
Late Systolic Murmur
Pan Systolic Murmur
Late Diastolic Murmur

Heart sounds can be adjusted by clicking the **Sounds** button on the Run screen. When the Sounds panel appears, select **Heart Sounds**.

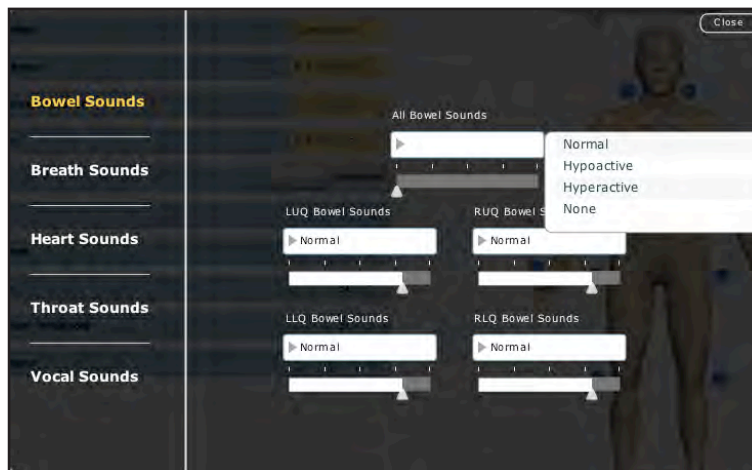


The Heart Sounds Menu

Click the **Heart Sounds** drop-down menu to change the type of sound. Click and drag the slider to adjust the volume.

Bowel Sounds

Learners can auscultate bowel sounds over each of four intestinal quadrants: the Upper Right, Upper Left, Lower Right and Lower Left. The sounds can be independently set in each anatomical region to **Normal**, **Hypoactive**, **Hyperactive** or **None** (bowel sounds are absent).



The Bowel Sounds Menu

Bowel sounds can be adjusted by clicking the **Sounds** button on the Run screen. When the Sounds panel appears, select **Bowel Sounds**.

Click any one of the **Bowel Sounds** drop-down menus that each control one of four quadrants to change the type of sound.

Click and drag the slider for each location to adjust the volume.

Normal bowel sounds are present by default.

Care and Maintenance

Maintaining METIman requires careful treatment of the electronic and mechanical components. Each time METIman is assembled or disassembled, make sure all components are properly handled and either removed from or placed into storage correctly.

METIman Warranty Programs

General Information

CAE Healthcare patient simulator products come with a one-year Manufacturer's Warranty (excluding batteries and consumables). All warranties begin at date of shipment or CAE Healthcare installation. You may upgrade your first year Warranty to an Enhanced Warranty and receive remedial and planned maintenance. To prevent equipment downtime and delays after your warranty expires, we encourage you to contract for extended maintenance services for all subsequent years.

Units Out of Agreement

For units no longer under warranty requiring repairs, the Time and Materials service plan will apply (see Time and Materials section).

To place an out-of-warranty unit under a warranty contract, CAE Healthcare reserves the right to have the patient simulator inspected by a CAE Healthcare-approved technician at the customer's expense. If necessary, the unit would have to be repaired at the customer's expense prior to issuance of a warranty contract.

The repairs required as the result of the examination will be quoted on a time and material basis.

How to Contact Customer Service

CAE Healthcare Customer Service Headquarters - United States and Latin America

Monday - Friday from 7:00 a.m. to 6:00 p.m. ET

Toll Free +1 (866) 462-7920

24-hour Hotline +1 (941) 342-5605

Fax +1 (941) 342-5600

Email Address: customerservice@caehealthcare.com

Web URL: www.caehealthcare.com

CAE Healthcare Customer Service - Canada

Monday - Friday from 8:00 a.m. to 5:00 p.m. ET

Toll Free +1 (877) 223-6273

Email Address: can.service@caehealthcare.com

CAE Healthcare Customer Service - Europe, Middle East and Africa (EMEA)

Monday - Friday from 8:00 a.m. to 5:00 p.m. CET

Phone +49 (0) 6131 4950354

Fax +49 (0) 6131 4950351

Email Address: international.service@caehealthcare.com

CAE Healthcare Customer Service - UK and Ireland

Monday - Friday from 9:00 a.m. to 5:00 p.m. GMT

Phone +44 (0)800-917-1851

Email Address: uk.service@caehealthcare.com

Principal hours of operation exclude holiday and non-business days.

Contract Period

Warranty contracts are not ordinarily offered for periods of less than one year. However, multiple-year warranty contracts may be arranged for up to an additional three years. Discounts are available for purchase of multiple-year contracts.

Limitations of Agreement

Your exclusive remedy for any defective patient simulator is limited to the repair or replacement of the defective patient simulator.

CAE Healthcare may elect which remedy or combination of remedies to provide at its sole discretion. CAE Healthcare shall have a reasonable time after determining that a defective material exists to repair or replace defective material. CAE Healthcare's replacement material will be manufactured from new and/or serviceable parts. CAE Healthcare's agreement applies to repaired or replaced materials for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced material, whichever is longer. CAE Healthcare warrants its LABOR for 30 days or the balance at the applicable period of the original warranty, whichever is greater.

CAE Healthcare shall not be liable under this warranty for incidental or consequential damages, or in the event of any unauthorized repairs or modifications have been made or attempted, or when the product, or any part thereof, has been damaged by accident, misuse or abuse. This warranty does not cover normal wear and tear, staining, discoloration or other cosmetic irregularities that do not impede or degrade product performance. Any damage or malfunction as a result of the installation of software or hardware, not authorized by CAE Healthcare, will be repaired under the Time and Materials service plan (see Time and Materials section).

CAE Healthcare's warranty does not cover products that have been received improperly packaged, altered or physically damaged. Products will be inspected upon receipt.

Some states in the USA do not allow the exclusion or limitations of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.

Return Materials Authorization (RMA)

No product may be returned directly to CAE Healthcare without first contacting CAE Healthcare for an RMA number. If it is determined that the product may be defective, you will be given an RMA number and instructions for product return. An unauthorized return, e.g., one for which an RMA number has not been issued, will be returned at your expense. Authorized shipments are to be shipped prepaid to the address on the RMA. Your original box and packaging materials should be kept for storing or shipping your product. To request an RMA, please contact Customer Service.

System Software Upgrade Support

Customers with current warranty contracts are entitled to receive upgrades to applications software previously purchased. Installation of the system software is the user's responsibility.

The System Software Upgrades Support includes software upgrades for base software and purchased optional software modules.

****This does not apply for major upgrades or technological enhancements.****

Pricing Structure

Time and Materials

For those systems not under agreement, service will be provided as required on a Time and Material basis:

Description	In-House	On-Site
Technical Support	As quoted at time of repair	CAE Healthcare's prevailing labor rate with a minimum of four hours labor
Material	As quoted at time of repair	As quoted at time of repair
Travel	N/A	Priced at CAE Healthcare's fully burdened cost plus fee

Principal period of on-site support (customer's local time) is:

- Monday through Friday, 8:00 AM to 5:00 PM (customer's time zone)
- Holiday and non-business days excluded
- Support outside the principle period is billed at the premium rate (hourly rate x 1.5)

A minimum of 48 hours notice is required for scheduling an on-site support call. Urgent on-site support with less than 48 hours notice will be charged at the premium hourly rate.

On-site time is described as the time period commencing from arrival at customer site through departure from customer site.

Breakdown

After each use, METIman should be properly disassembled and stored in a secure place. To ensure that METIman remains in good working condition, follow the prescribed CAE Healthcare breakdown procedures below. These procedures are estimated to take less than 30 minutes.

Breakdown Steps	
1	Stop All Running SCEs
2	Clean the Simulator and the Fluid System
3	Shut Down the Software
4	Power off the Simulator

Step 1: Stop All Running SCEs

Stop any running SCEs using the **Stop** button in the upper right corner of the Müse software for each SCE.

Step 2: Clean the Simulator and the Fluid System

Refer to the Maintenance Advice on the following pages for detailed instructions.

Step 3: Shut Down the Software

To shut down the Müse software:

1. Click the Account Name in the lower, right-hand corner of the screen. The Logout/Shutdown dialog box appears.
2. Click **Logout** to exit the software, or click **Shutdown** to shut down the computer.

To shut down the TouchPro software (optional):

1. Click the **Settings** button from the bottom, right-hand corner of the TouchPro screen.
2. From the Settings menu, click **Shutdown**. A warning box appears asking if you want to exit.
3. Click **Shutdown**.

Step 4: Power Off the Simulator

1. Carefully pull back the skin on METIman's left hip and hold the power switch for two seconds. The light on the button begins to blink, indicating shutdown is in progress. After approximately 30 seconds, the light is off, and shutdown is complete. If the simulator fails to shut down when the above steps are performed correctly, hold the power button for five seconds to force the system to power off
2. Carefully put the skin back into place for storage.

Maintenance Advice

Simple care and maintenance helps to ensure that METIman stays in good working condition. Many problems are caused by inadequate or improper maintenance. Perform a thorough check of the various components each time the simulator is used. Failure to follow these guidelines can lead to damage not covered by warranty.

General Simulator Care

Avoid the use of writing instruments and sharp objects near the patient simulator to prevent unattractive markings on or tears in the skin.

Lubricate airway adjuncts, urinary catheters and chest tubes with silicone spray (NOT a water-based lubricant) prior to insertion.

A mild detergent and warm water will remove most marks and stains. Gently rub the soiled area with a soft cloth. Do NOT use ABRASIVE soaps or pads.

Prior to using moulage of any kind, CAE Healthcare suggests the application of a very light coating of petroleum jelly, followed by a light dusting of baby powder, to the simulator's skin. This application makes cleaning the skin easier.

If any of METIman's fluid systems have been used, flush out the simulator as described in the following pages. Failure to flush the systems may cause damage to the simulator.

Storage

When in regular use, METIman's breakdown procedure and general cleanup should be sufficient to prepare the simulator for storage.

In addition, be certain to follow these instructions:

- Storage temperature should not exceed 122° F (50° C) or fall below 41° F (5° C).
- If a soft-sided simulator case is being used, the simulator should lie flat.
- The simulator should NEVER be stored or shipped with fluids in the system.

Care of Electronic Equipment

Install any CAE Healthcare software updates as soon as they become available.

Airway Inspection

METIman is equipped with an anatomically accurate airway that supports the practice of difficult airway management techniques. In the process of performing these techniques improperly or aggressively, the upper airway can be damaged.

Because damage can occur, occasional visual inspection of the airway is recommended. Using the light of a laryngoscope blade or a flashlight, visually examine the airway. While tears in the upper airway resulting from intubation may be obvious, needle holes in the lower trachea resulting from techniques such as transtracheal jet ventilation may not be readily apparent.

If damage to the airway is found, small cuts or tears may be repairable with silicone adhesive. However, for permanent repair of damaged simulators, contact CAE Healthcare Customer Service.

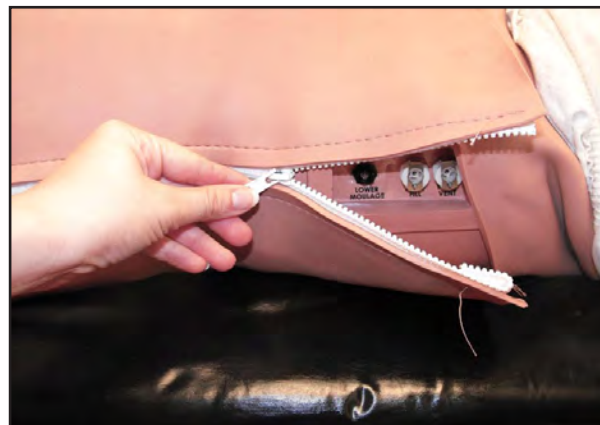
Replacing the Battery

After approximately four hours of use, the simulator's battery must be removed to be recharged or replaced with a charged battery.

WARNING : When handling METIman's batteries, be sure to adhere to all the cautions and warnings.

To replace the battery:

1. Unzip the chest skin.



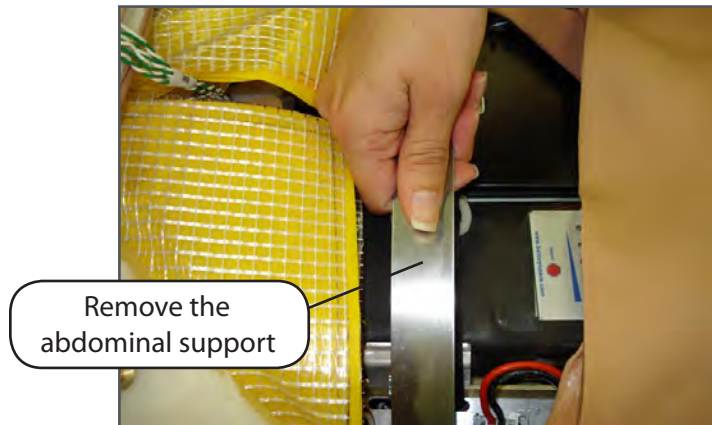
Unzipping the Chest Skin

2. Lift the abdominal insert.



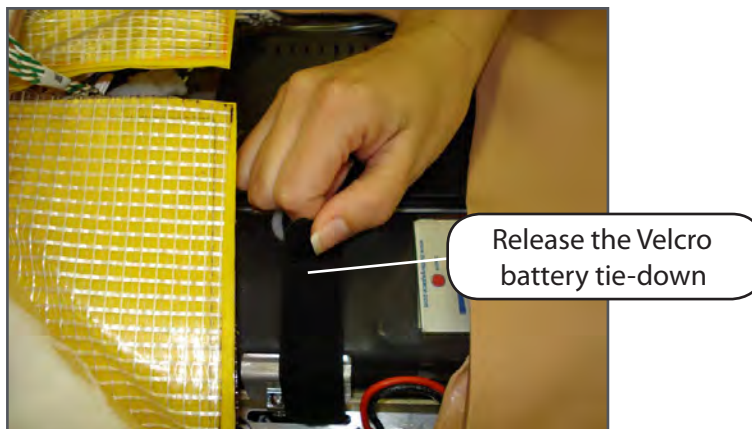
Lifting the Abdominal Insert

3. Remove the abdominal support.



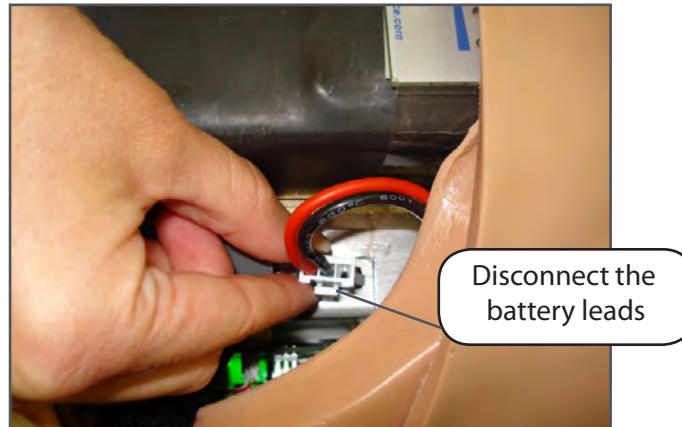
Removing the Abdominal Support

4. Release the Velcro battery tie-down.



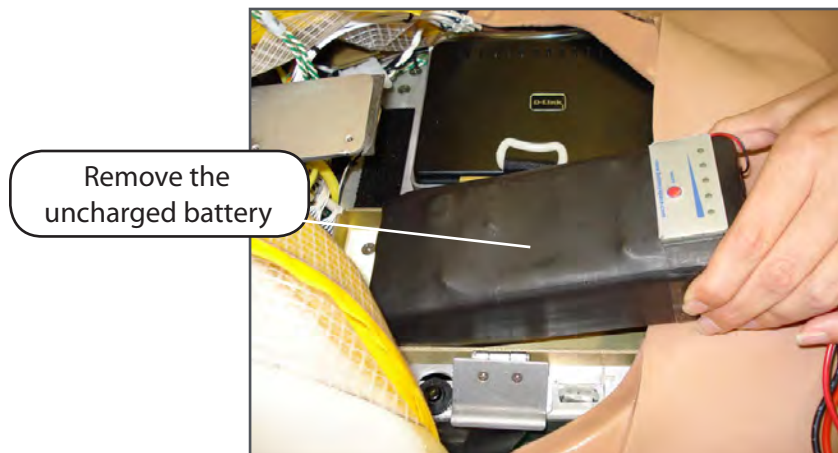
Releasing the Battery Tie-Down

5. Disconnect the battery leads.



Disconnecting the Battery Leads

6. Remove the uncharged battery.



Removing the Battery

7. Insert a charged battery and affix the battery tie-down.
8. Connect the battery leads and replace the abdominal support, ensuring both ends are secure in the slits.
9. Replace the abdominal insert and chest skin.

Recharging the Battery

The battery should be recharged after approximately four hours of use.

To recharge the battery, disconnect and remove the battery from the simulator and connect to the external charger provided.

WARNING: When handling METIman's batteries, be sure to adhere to all the cautions and warnings

Recharging should take approximately four hours.

IMPORTANT: Never recharge the battery while it is connected to METIman.

Draining Condensation from the Simulator

As part of a regular preventive maintenance schedule, condensation should be drained from the simulator.

Depending on environmental conditions, moisture may condense inside the compressed air lines and tanks within the simulator. It is recommended that this fluid be drained every 40 hours of operation. In outside, high-humidity conditions, the system should be drained more frequently.

To drain condensation:

1. Locate the Condensation Drain Hose included with the Inventory Kit.



Condensation Drain Hose

2. Bring the hose and a small bucket to the simulator location.
3. Locate the **EXTERNAL AIR** port on METIman's left shoulder.
4. With assistance, place METIman into a supine position.
5. Power on METIman. Do NOT launch the Müse software.
6. Allow 60 seconds for the internal compressor to pressurize the system.
7. Power down METIman.
8. With assistance, raise the left leg 45 degrees.
9. Place the tubing end of the Condensation Drain Hose into the small bucket and then connect the fitting onto the simulator's drain connector. There will be a sudden release of pressure into the bucket. Any condensation within the system drains with this exhaust.
10. Disconnect the Condensation Drain Hose from the simulator.

Cleaning the Simulator and the On-Board Bleeding System

NOTE: A small bucket is recommended to collect wastewater during cleaning and flushing operations.

To clean and maintain the simulator and On-Board Bleeding system:

1. Remove and clean the wound haptics.
2. Connect the beige-colored “fill” connector from the Trauma Fill Tank to the hip, but do not connect the white “vent” connection.
3. Open the yellow Pressure Relief knob clockwise on the Trauma Fill Tank or loosen its Fill Lid so the tank is able to vent during this draining process.
4. With the wound umbilicals in place, put the ends of both wound umbilicals into a wastewater bucket.
5. From the Müse home screen, click the **System Administration** button in the top right of the screen.
6. From the Maintenance screen, click **Flush System**. The fluid begins to drain.
7. Verify both channels produce a high, steady flow.
8. When fluid stops flowing from either wound umbilical, detach the Fill Tank from the simulator.
9. When fluid stops flowing from the lower wound umbilical, detach from the simulator.
10. When fluid stops flowing from the upper wound umbilical, detach from the simulator.
11. Click **Done** on the Maintenance screen. The fluids are now drained.
12. Empty the wastewater bucket.
13. Rinse out the Trauma Fill Tank and fill with approximately 1 liter of clean, distilled water.
14. Pump this fluid into the simulator.
15. Repeat Steps 3 through 7 and 9 through 15 until the fluid exiting the simulator runs clear.
16. Empty the Fill Tank and dry the wound umbilicals with a towel before storage.

NOTE: It takes two to three minutes for this final flush.

Once a month, it is advised to flush the system with a mix of 50% distilled water and 50% white vinegar to keep mineral and algae buildup to a minimum. Always perform the steps for Flushing the Simulator afterward to remove vinegar.

Cleaning the Trauma Fill Tank

To prolong the life of the Trauma Fill Tank assembly and the fluid reservoirs, wash and flush the tank and connections after each use with clean distilled water.

NOTE: A small bucket is recommended to collect wastewater during cleaning and flushing operations.

Do NOT store liquids in the Trauma Fill Tank. If simulated blood mixtures are stored in the tank, they may clog the system when they dry and possibly damage the seals, filter and other components.

1. Remove and rinse the Overflow Bottle.
2. Remove and rinse the Pump Assembly.
3. Rinse the tank to remove all traces of the simulated blood.
4. Pour 480 mL (16 oz) of distilled water into the tank and reinstall the Pump Assembly. (The Overflow Bottle holds 16 ounces.)
5. Place the Overflow Bottle lid with umbilical attached into the wastewater bucket.
6. Attach the fill (blue-labeled) and vent (yellow-labeled) fittings together at the other end of the umbilical.
7. Pump the tank 25 times while making sure the wastewater is going into the bucket.
8. Allow the tank to empty completely (the remaining air pressure will purge the fluid from the lines).
9. Reinstall the lid onto the Overflow Bottle and place the bottle back onto the tank assembly.
10. Remove the Pump Assembly and pour any remaining fluid out of the tank. Then, reinstall the pump.
11. Disconnect the fill and vent fittings from each other and wrap the Trauma Tank Umbilical around the neck of the tank.

Always depressurize the tank, remove trauma fluid and clean the tank before performing maintenance. The pump assembly may need periodic lubrication. Call CAE Healthcare Customer Service for details if the pump loses the ability to create pressure, squeaks loudly or is difficult to move.

Cleaning the In-Line Filter

To clean the in-line filter:

1. Grasp both ends of the in-line filter and twist counterclockwise.
2. Pull apart both ends of the filter to separate.
3. Remove the blue filter cone from the encasement. Do NOT remove the black rubber seal.
4. Using a 60 mL syringe with distilled water, push fluid from the outside of the blue filter cone to the inside, removing all debris.
5. Repeat process until all debris is removed.
6. Re-assemble the in-line filter, ensuring the black rubber seal is in place at the base of the blue filter cone.



The In-Line Filter

Troubleshooting the Trauma Fill Tank

Before making any repairs, ALWAYS depressurize the tank, remove all trauma solution and clean the tank.

Problem	Cause	Solution
Tank can be pressurized, but only air comes out.	Siphon tube has detached from insert.	Remove hose from tank and reinsert siphon tube.
Pressure does not build up. No fluid is transported to simulator.	<ul style="list-style-type: none"> (1) Pump assembly not sealed tightly into tank or (2) Damaged pump cylinder gasket or o-ring or (3) Tank pressure relief valve is set to "open." 	<ul style="list-style-type: none"> (1) Thoroughly clean pump cylinder gasket or o-ring and surrounding area and apply a light coating of silicone to pump gasket or o-ring. (2) Contact CAE Healthcare for service. (3) Turn valve until it returns to a "sealed" position.
Simulator fill time is too long (more than 5 minutes).	<ul style="list-style-type: none"> (1) Not enough strokes applied to create pressure or (2) The in-line filter is dirty or (3) The umbilical is disconnected at Overflow Bottle or (4) Too much fluid in fill tank. 	<ul style="list-style-type: none"> (1) Pump 25 to 35 times for best performance. (2) Clean filter. (3) Reconnect the overflow fitting. (4) The Trauma Fill Tank works best with 1 gallon (3.6 liters) of fluid inside. If greater amounts of fluid are used, tank may require additional pumps as fluid is transported to simulator.

Emptying and Flushing the Chest Tube Reservoir

Removing fluids from the Chest Tube reservoir and the Chest Tube system requires the same steps.

To empty the Chest Tube reservoir or flush the Chest Tube system, have a chest tube and a basin to catch fluid in place. Use a syringe to slowly push air through the appropriate **CHEST TUBE** port until only air flows through the chest tube.

Flushing the IV Lines

To flush the IV lines:

1. Connect an empty IV bag to the **IV DRAIN** port.
2. Using a syringe, slowly push air into the **IV FILL** port. The fluid drains out of the **IV DRAIN** port.
3. Continue to push air until empty.

Emptying the Genitourinary Reservoir

To empty the Genitourinary reservoir, have a catheter in place and a basin to catch fluid. Use a syringe to slowly push air through the **GU** port until only air flows through the catheter.

Emptying the Head Secretions Lines (Prehospital Only)

To remove fluid from the Head Secretions lines, connect a syringe to the **NOSE** port and vacuum out fluid until empty. Repeat this process for the **MOUTH** and **EYES** ports.

Emptying the Airway Secretions Reservoir (Nursing Only)

To empty the Airway Secretions reservoir, connect a 60 mL syringe to the **AIRWAY FILL** port and vacuum out fluid until empty.

Flushing the Subclavian Catheter (Nursing Only)

When flushing the Subclavian Catheter, the catheter must be in place.

To flush the Subclavian Catheter:

1. Connect an external drain to the **IV DRAIN** port and place a basin to catch fluid.
2. Using a syringe, slowly push air into the **IV FILL** port. The fluid drains out of the **IV DRAIN** port.
3. Continue to push air until empty.
4. Using the same syringe, push air through the Subclavian Catheter until empty.

Handling CO₂ Canisters (Prehospital Only)

Careful handling is required in the use of CO₂ canisters. Please read and follow all appropriate cautions and warnings.

Removing CO₂ Canisters from the Regulator

The following instructions describe how to safely remove the CO₂ canister from the regulator assembly for replacement or shipping.

CAUTION: If unsure that CO₂ canister is empty, eye and hand protection must be worn to protect from release of freezing gas or liquid.

1. Remove the CO₂ regulator assembly from the simulator.
2. While holding the regulator assembly firmly, slowly unscrew the CO₂ canister from the regulator. There is a small relief hole in the side of the regulator from which any remaining CO₂ will bleed. If this should happen, no harm will be done to system, but it is rather noisy and the rapid release of CO₂ gas can freeze the canister's surface and cause frostbite to unprotected skin.
3. Continue unscrewing the canister until it is free from the assembly.

Important Canister Information

The 16 Gram CO₂ Canister with threaded neck is available at most sports equipment retailers - most often used for bicycle tire inflators. We recommend purchasing Leland brand canisters (P/N 82122Z), which are also available from CAE Healthcare.

Punctured canisters are considered to be empty. No residue remains in the canister after use. The steel used is a low carbon type, which rusts if disposed in a landfill. If your community requires recycling, then place with normal household recycling.

CO₂ Canisters are considered by the U.S. Department of Transportation to be "Other Regulated Materials - Domestic" (ORM-D). Ground shipping containers must be clearly marked with this label. CO₂ Canisters are considered hazardous material when offered for air transportation, so different rules apply. Contact carrier for details and instructions.

Related CAUTIONS/WARNINGS

CO₂ Canister

- Store the CO₂ canisters in a dry location between 32° and 104° F (0 to 40°C).
- Do not expose the CO₂ canister to heat above 140° F, as rupture may occur.
- Never point the CO₂ canister towards your face or someone nearby.
- Use only CAE Healthcare specified CO₂ canisters.

CO₂ Regulator Assembly

- Care must always be taken when using high-pressure equipment.
- Do not disassemble or alter regulator.
- Dry completely if the regulator becomes wet.
- Discontinue use of this equipment if leakage or visible damage is evident.

Use of Equipment

- Canister end becomes punctured when screwed into regulator base and therefore should not be removed until empty.
- Unscrewing canister before it is empty will result in sudden release of all high-pressure gas with a possibility of liquid CO₂ spray. Unprotected skin could receive freezing burns.
- Wear protective gloves and eye protection when removing canister from regulator assembly.
- Remove CO₂ canister from regulator assembly when shipping simulator.

Condition Guidelines for Programming METIman

This card is intended to help you select Müse conditions to achieve desired vital signs within each programmed state. All four conditions should be programmed into each state in the order presented below.

- Respiratory: Desaturation
- Cardiovascular: Blood Pressure
- Cardiovascular Heart Rate
- Respiratory: Respiratory Rate

The Müse software is physiologically driven. When using multiple conditions (e.g., Desaturation + Hypertension + Tachycardia + Tachypnea), physiological regulatory mechanisms such as the baroreceptor reflex and ventilatory control cause compensatory changes within parameters. To achieve the desired vital sign, select one condition level, above (greater) or below (less), to achieve the desired physiological effect.

Respiratory: Desaturation

Desaturation	SpO ₂ Value
Reset	98%
High 90s	96-97%
Mid 90s	94-96%
Low 90s	91-93%
High 80s	87-90%
Mid 80s	84-86%
Low 80s	80-83%
High 70s	77-80%
Mid 70s	74-77%
Low 70s	69-71%
Less than 70	<69%

Cardiovascular: Blood Pressure

Hypertension		Hypotension	
Reset	110s/70s	Reset	110s/70s
Increased	120s/80s	Decreased	100s/70s
Pre-Borderline	130s/80s	Pre-Borderline	100s/60s
Borderline	140s/90s	Borderline	90s/50s
Mild	150s/90s	Mild	80s/40s
Moderate	160s/100s	Moderate	70s/40s
Severe	170s/100s	Severe	60s/30s
Profound	190s/110s	Profound	50s/30s
Extreme	220s/120s	Extreme	40s/30s

Cardiovascular: Heart Rate

Tachycardia		Bradycardia	
Reset	70s	Reset	70s
Increased	High 70s	Decreased	Mid 60s
Elevated	80s	Pre-Borderline	Low 60s
Pre-Borderline	90s	Borderline	Mid 50s
Borderline	100s	Intermediate	Low 50s
Intermediate	110s	Mild	High 40s
Mild	120s	Moderate	Mid 40s
Moderate	130s	Severe	Low 40s
Severe	140s	Extreme	Mid 30s
Supra	150s	Acute	Low 30s
Profound	160s		
Extreme	170s		
Acute	High 170s		



Respiratory: Respiratory Rate

Tachypnea		Bradypnea	
Reset	11	Reset	11
Increased	15	Increased	10
Elevated	18	Intermediate	9
Borderline	20	Mild	7
Intermediate	22	Moderate	6
Mild	25	Severe	5
Moderate	28	Profound	3
Severe	31	Extreme	2
Profound	33		
Extreme	36		

Appendix A – Müse Parameter Descriptions

The Müse software has a number of parameters that control the physiological features of METIman. The parameters are grouped by category: Neurological, Respiratory, Cardiovascular, Fluids and Sounds. The following is a brief description of each parameter.

Each parameter description lists the default settings for the Stan D. Ardman II and Norma L. Female patients as well as the ranges, if available, for all patients.

Neurological

METIman can simulate a variety of neurological clinical indicators, such as reactive eyes and convulsions.

Neurological Parameters
Eyes: Pupil Size
Eyes: Blink Speed
Convulsions
ICP
NMB
Temperature: Body
Temperature: Blood

Eyes

Each eye has reactive pupils and eyelids that blink and close.

Eyes: Pupil Diameter

These parameters are used to control the diameter of the pupils in the eyes. Each eye has reactive pupils and functional eyelids that blink.

Currently, there are four pupil options that are used to control the diameter of the pupils in both eyes: **Reactive**, **Non-Reactive**, **Pinpoint** or **Blown**.

When the Eyes are set to **Reactive**, the pupils re-size in response to changes in lighting condition. If both pupils are set to **Reactive**, both pupils re-size in a consensual manner.

The **Non-Reactive**, **Pinpoint** and **Blown** settings allow the user to fix one or both pupils to a specific size. The **Non-Reactive** setting fixes pupils to a normal size, the **Pinpoint** setting fixes pupils in the pinpoint position and the **Blown** setting fixes pupils in the blown position.

Default: Reactive

Eyes: Blinking

In **Auto** mode, the eyelids are normally blinking under the following conditions: Minute Ventilation is greater than 1500 mL, SpO₂ is greater than 70% and neuromuscular blockade (NMB) is less than 30%.

The **Blinking** and **Closed** settings allow the user to have one or both eyes either blinking or closed and override the automatic response.

Default: Auto

The **Slow**, **Normal** and **Fast** parameters control the eyelid blinking frequency. Presently, blinking frequency is not linked to the physiological models. However, the response can be done "on the fly" or scripted using the Scenario Designer.

Default: Normal

Convulsions

The **Convulsions** parameter is used to simulate the presence of convulsions. They are either **ON** or **OFF**.

Default: Off

Intracranial Pressure (ICP)

The **ICP** parameter is used to set the ICP displayed as a numeric value on the TouchPro monitor. The base value is set at 8 mmHg. This parameter is uninfluenced by physiological models.

Default: 8 mmHg

Range: 0.0 mmHg - 65.0 mmHg

Neuromuscular Blockade (NMB)

The pharmacokinetic and pharmacodynamic models based on the neuromuscular blocking agents administered and the time course of their injection automatically determines the degree of NMB. For some educational applications, however, the instructor may wish to set a fixed degree of neuromuscular blockade that remains stable for an indefinite period. This can be accomplished using the **NMB** parameter. The default setting instructs the pharmacologic models to determine the degree of neuromuscular blockade based upon the drugs injected and their pharmacologic properties.

When a positive numeric value is assigned to this parameter, the degree of NMB is set to that level. For example, 80% NMB causes the simulator to set the degree of NMB to 80%, regardless of the presence (or absence) of neuromuscular blocking drugs. Clinically, the spontaneous tidal volume is markedly reduced.

Default: Modeled

Range: 0% - 100%

Temperature: Body

The temperature measured at the body surface can be set using this parameter and can be displayed on the Patient Status Display and TouchPro software.

The body temperature is not linked to the physiologic models. However, changes can be made “on the fly” or scripted using the Scenario Designer.

Default: 36.5° C

Range: 32.0° C - 42.0° C

Temperature: Blood

The arterial blood temperature can be set using the **Temperature: Blood** parameter. The arterial blood temperature can then be displayed on the Patient Status Display and TouchPro software. Note that changes in arterial temperature may alter the shape of the standard oxyhemoglobin dissociation curve. As temperature increases or pH decreases, more oxygen is released from hemoglobin and thus the patient's saturation decreases. The inverse is also true.

Default: 37° C

Range: 32.0° C - 42.0° C

Respiratory Parameters

Respiratory Parameters
Swollen Tongue
Airway Occluder (Prehospital Only)
Laryngospasm (Prehospital Only)
Needle Decompression (Left and Right) (Prehospital Only)
Bronchial Occlusion
Respiratory Rate

Respiratory Parameters
SpO ₂
NMB
Tidal Volume
Intrapleural Volume: Left
Intrapleural Volume: Right
Chest Tube Flow: Left
Chest Tube Flow: Right

Swollen Tongue

This parameter is used to create tongue swelling. The tongue is either **Swollen** or **Not Swollen**. The **Not Swollen** setting returns the tongue to its normal anatomic state.

Default: Not Swollen

Options: Not Swollen, Swollen

Airway Occluder (Prehospital Only)

Using the **Airway Occluder** parameter, swelling of the posterior oropharynx can be activated to obstruct the view of the larynx and prevent intubation but allow mask ventilation of the patient's lungs, thereby creating a "cannot intubate, can ventilate" scenario.

Default: Off

Laryngospasm (Prehospital Only)

Use the **Laryngospasm** parameter to simulate a laryngospasm. A laryngospasm actuator closes the patient's vocal cords and prevents both ventilation and intubation. When activated with the **Airway Occluder** parameter, a "cannot ventilate, cannot intubate" crisis scenario is achieved.

Default: Off

Needle Decompression (Left and Right) (Prehospital Only)

The **Needle Decompression** parameter is used to activate the **Needle Decompression** hardware in the simulator to relieve a pneumothorax in the simulator. This causes a rush of air to be heard on successful decompression. The amount of decompression is automatically subtracted from the **Intrapleural Volume** set.

Default: Off

Bronchial Occlusion

Turning on the **Bronchial Occlusion** parameter completely obstructs the right or left bronchi, simulating a lower airway obstruction (e.g., mucus plug). Improper intubation creates a main-stem occlusion, yielding an inability to ventilate the lungs. However, the right and left bronchi are not occluded individually.

Default: Off

Respiratory Rate

The **Respiratory Rate** parameter is used to set the respiratory rate to a given number of breaths per minute. Once set, arterial oxygen and carbon dioxide values have no effect on the resulting respiratory rate, but continue to influence other components of the physiological models. The patient continues to breathe at the set number of breaths per minute, regardless of the arterial oxygen or carbon dioxide levels.

For example, when the respiratory rate is set to 10 breaths per minute, the respiratory rate remains at 10 breaths per minute, regardless of arterial oxygen or carbon dioxide levels. In such situations, the patient can only respond to arterial oxygen or carbon dioxide levels by adjusting the **Tidal Volume** parameter.

Default: Modeled

Range: 4 breaths per minute - 40 breaths per minute

SpO₂

The SpO₂ parameter is used to override the normal pulmonary circulation and set the SpO₂ at a fixed numeric value, regardless of the oxygen applied. Resetting to **Modeled** returns control of the underlying SpO₂ to the physiological models.

Default: Modeled

Range: 0% - 100%

Neuromuscular Blockade (NMB)

The degree of NMB is automatically determined by pharmacokinetic and pharmacodynamic models, which are based on the neuromuscular blocking agents administered and the time course of their injection. For some educational applications, however, the instructor may wish to set a fixed degree of neuromuscular blockade that remains stable for an indefinite period. This can be accomplished using the **NMB** parameter. The default value instructs the pharmacologic models to determine the degree of neuromuscular blockade based on the drugs injected and their pharmacologic properties.

When a positive numeric any other positive value is assigned to this parameter, the degree of NMB is set to that level. For example, 80% NMB causes the simulator to set the degree of NMB to 80%, regardless of the presence (or absence) of neuromuscular blocking drugs. Clinically, the spontaneous tidal volume is markedly reduced.

Default: Modeled

Range: 0% - 100%

Tidal Volume

The **Tidal Volume** parameter is used to set the tidal volume to a given volume per breath. Once Tidal Volume is set to a numeric value, arterial oxygen and carbon dioxide values have no effect on the tidal volume, but continue to influence other components of the physiological models.

For example, with the tidal volume set to 600 mL in the adult simulator, the tidal volume

remains a constant (set) 600 mL even in the event of falling arterial oxygen levels. In such situations, the patient can only respond to arterial oxygen or carbon dioxide levels when the respiratory rate is adjusted.

Default: Modeled

Range: 0 mL- 2500 mL

Intraleural Volume (Vol): (Left and Right)

The **Intraleural Vol** parameters allow intraleural volume to accumulate, for example, as happens during pneumothorax, hydrothorax or hemothorax.

To simulate a pneumothorax, set the corresponding **Intraleural Vol** to a value greater than 0 mL. Values more than 1500 mL reduce the corresponding lung volume significantly. The breath sounds are automatically diminished on the appropriate side due to decreased ventilation of the affected lung.

Default: 0

Range: 0 mL - 2500 mL

Chest Tube Flow: (Left and Right)

The **Chest Tube Flow** parameter is used with the chest tube feature of the simulator. The Chest Tube Flow specifies the rate at which fluid can be removed from the simulated pleural space via a chest tube drainage system. As the chest tube drains, the volume is automatically subtracted from the set amount of Intraleural Volume.

Default: 50 mL per minute

Range: 0 mL per minute - 50 mL per minute

Cardiovascular Parameters

Cardiovascular Parameters
Blood Pressure
Heart Rate
Cardiac Rhythm

Cardiovascular Parameters
Arterial Catheter
Central Venous Catheter
PA Catheter
PA Balloon
Defib
Pacing Current
Pacing Rate
Pacing Capture Threshold
Cold Fluid Inject

Blood Pressure

The **Blood Pressure** parameter is used to override the physiological modeling for blood pressure. The systolic and diastolic blood pressures can both be set to fixed numeric values, regardless of interventions performed. Resetting the parameter to **Modeled** returns control of the underlying Blood Pressure to the physiological models.

Default: Modeled

Range: Systolic 20 mmHg - 200 mmHg

Diastolic 10 mmHg - 200 mmHg

Heart Rate

The **Heart Rate** parameter is used to set the heart rate to a given (fixed) number of beats per minute. Once the heart rate is set to a numeric value, administered drugs or intravascular volume changes have no effect on the heart rate, but continue to influence other components of the physiological models. Use this parameter to “fix” or set the heart rate to a specific number.

Default: Modeled

Range: 30 beats per minute - 220 beats per minute

Cardiac Rhythm

The **Cardiac Rhythm** parameter is used to change the patient's underlying cardiac rhythm displayed on the Patient Status Display, TouchPro software or physiological monitor. To change the cardiac rhythm, click the **Cardiac Rhythm** parameter and select the desired rhythm from the available list. If a number appears following the cardiac rhythm on the list, this overrides the heart rate to the rate indicated.

Default: Modeled

Options: Modeled

- Asystole
- Atrial Enlargement, Left
- Atrial Enlargement, Right
- Atrial Fibrillation
- Atrial Fibrillation: HR 120
- Atrial Fibrillation: HR 80
- Atrial Flutter with 2:1 AV Conduction
- Atrial Flutter: HR 150
- Atrial Tachycardia
- AV Block, First-Degree
- AV Block, Second-Degree - Mobitz I
- AV Block, Second-Degree - Mobitz II
- AV Block, Third-Degree
- Bundle Branch Block, Incomplete Right
- Bundle Branch Block: Left
- Bundle Branch Block, Left with PVC 25%
- Bundle Branch Block: Right
- Hypercalcemia
- Hyperkalemia
- Hypertrophy, Biventricular
- Hypertrophy, Left Ventricular
- Hypertrophy, Right Ventricular
- Hypocalcemia
- Hypokalemia
- Hypothermia
- Junctional
- Junctional: HR 50
- Long QT Syndrome
- Myocardial Infarction with LBBB
- Myocardial Infarction, Anterior

Myocardial Infarction, Anterolateral
Myocardial Infarction, Inferior
Myocardial Infarction, Lateral
Myocardial Infarction, Posterior
Myocardial Infarction, Septal
Myocardial Ischemia: Mild
Myocardial Ischemia: Moderate
Myocardial Ischemia: Moderate with PVC 10%
Myocardial Ischemia: Severe
Paroxysmal Junctional Tachycardia
Paroxysmal Junctional Tachycardia: HR 130
Pericarditis
Premature Atrial Contraction
Premature Ventricular Contraction 10%
Premature Ventricular Contraction 25%
Pulseless Electrical Activity
Sinus
Sinus Bradycardia
Sinus Bradycardia: HR 40
Sinus Tachycardia
Sinus Tachycardia: HR 120
ST Elevation with Chest Pain
Torsade de Pointes
Trifascicular Block
Ventricular Fibrillation: Coarse
Ventricular Fibrillation: Fine
Ventricular Tachycardia
Ventricular Tachycardia: Pulseless
Ventricular Tachycardia: HR 151
Ventricular Tachycardia: Pulseless HR 151
Wellen's Syndrome
WPW Syndrome, Left Lateral Pathway

Arterial Catheter

The arterial pressure displayed on the Patient Status Display or TouchPro software is set using this parameter. A non-pulsatile, “zero” pressure signal is emitted when the **Atmosphere** position is selected and can be used to simulate zeroing a pressure transducer. This may also be used to remove the arterial pressure waveform, if desired. The **Left Ventricle** position is useful for simulating cardiac catheterization procedures, or for demonstrating left ventricular end-diastolic pressure and its relationship to pulmonary artery occlusion (“wedge”) and central venous pressure.

Default: Peripheral Artery

Options: Atmosphere
Peripheral Artery
Left Ventricle

Central Venous Catheter

The venous pressure displayed on the Patient Status Display or TouchPro software is set using this parameter. A non-pulsatile, “zero” pressure signal is emitted when the **Atmosphere** position is selected and can be used to simulate zeroing a pressure transducer. This may also be used to remove the central venous pressure waveform, if desired (i.e., beginning of an SCE with an “unmonitored” patient).

Default: Intrathoracic Vein

Options: Atmosphere
Extrathoracic Vein
Intrathoracic Vein

Pulmonary Artery (PA) Catheter

The pulmonary artery pressure displayed on the Patient Status Display or TouchPro software is set using this parameter. A non-pulsatile, “zero” pressure signal is emitted when the **Atmosphere** position is selected and can be used to simulate zeroing a pressure transducer. This may also be used to remove the pulmonary artery pressure waveform, if desired (i.e., beginning of an SCE with an “unmonitored” patient). The pulmonary artery catheter can be “floated” into position by sequencing through the right heart positions. This may also be scripted into a scenario using the Scenario Designer.

Default: Pulmonary Artery

Options: Atmosphere
Intrathoracic Vein
Right Atrium
Right Ventricle
Pulmonary Artery

PA Balloon

Inflation of the pulmonary artery catheter balloon is simulated by switching to the **Inflated** option of the **PA Balloon** parameter. The appropriate pulmonary artery occlusion or “wedge” waveform is then displayed on the Patient Status Display or TouchPro software.

Default: Deflated

Options: Deflated
Inflated

Defibrillation (Defib)

The **Defib** parameter is used to simulate a specified amount of energy discharged via an external cardiac defibrillator. Setting this parameter results in the characteristic spike in the ECG, followed by a return to the pre-defibrillation rhythm. **Defib** has no direct effect on the electrical conduction system of the heart. Thus, synchronized cardioversion may be done “on the fly” or scripted using the Scenario Designer.

Default: 0 Joules

Range: 0 Joules- 360 Joules

Pacing Current

The **Pacing Current** parameter is used to simulate a specified amount of current discharged via an external cardiac pacer. Setting this parameter results in the characteristic pacing signal on the ECG waveform when the pacing current is at or above the capture threshold. Also, see **Pacing Capture Threshold**.

Default: 0 mA

Range: 0 mA- 200 mA

Pacing Rate

The **Pacing Rate** parameter determines the cardiac rate (in beats/minute) when the pacing current is at or above the pacing capture threshold. Also, see **Pacing Current** and **Pacing Capture Threshold**.

Default: 80 beats per minute

Range: 0 beats per minute - 119 beats per minute

Pacing Capture Threshold

The **Pacing Capture Threshold** parameter determines the minimum pacing current necessary to pace the heart via an external cardiac pacer. Also see **Pacing Current**. Pacing current values below the pacing capture threshold have no effect on the patient's heart rate.

Default: 50 mA

Range: 0 mA - 119 mA

Cold Fluid Inject

The **Cold Fluid Inject** parameter is used to simulate the injection of 10 mL iced saline into the pulmonary artery catheter. The appropriate Thermodilution waveform and cardiac output measurement are then displayed on the Patient Status Display or TouchPro software.

Pulses

The tables below show the defaults and ranges for the pulses and pulse deficits for METIman Prehospital and METIman Nursing.

METIman Prehospital

Pulse	Default	Range
Left Carotid	On	N/A
Right Carotid	On	N/A
Carotid Deficit	60	0 - 300
Left Brachial	On	N/A
Right Brachial	On	N/A
Brachial Deficit	80	0 - 300
Left Radial	On	N/A
Right Radial	On	N/A
Radial Deficit	90	0 - 300
Left Femoral	On	N/A
Right Femoral	On	N/A
Femoral Deficit	70	0 - 300
Left Popliteal	On	N/A
Right Popliteal	On	N/A
Popliteal Deficit	80	0 - 300
Left Dorsalis Pedis/ Left Posterior Tibial	On	N/A
Right Dorsalis Pedis/ Right Posterior Tibial	On	N/A
Dorsalis Pedis/ Posterior Tibial Deficit	80	0 - 300

METIman Nursing

Pulse	Default	Range
Left Carotid	On	N/A
Right Carotid	On	N/A
Carotid Deficit	60	0 - 300
Left Brachial	On	N/A
Right Brachial	On	N/A
Brachial Deficit	80	0 - 300
Left Radial	On	N/A
Right Radial	On	N/A
Radial Deficit	90	0 - 300
Left Femoral	On	N/A
Right Femoral	On	N/A
Femoral Deficit	70	0 - 300
Left Popliteal	On	N/A
Right Popliteal	On	N/A
Popliteal Deficit	80	0 - 300
Left Dorsalis Pedis	On	N/A
Right Dorsalis Pedis	On	N/A
Dorsalis Pedis Deficit	80	0 - 300
Left Posterior Tibial	On	N/A
Right Posterior Tibial	On	N/A
Posterior Tibial Deficit	80	0-300

All pulses, unless altered by an SCE, are enabled by default. To disable a pulse, click the pulse location on the human form. To enable a pulse, click the pulse location again. Click and hold a pulse location to adjust the pulse deficit.

Fluids

The blood droplet provides a means of controlling the amount of fluid lost by or infused into the patient. The amount of fluid to be lost or infused and the time frame during which the fluid loss or infusion takes place can be entered.

Fluid Parameters
Fluid Loss Blood
Fluid Loss Plasma
Colloid Infusion
Crystalloid Infusion
PRBC Infusion
Whole Blood Infusion
Bleeding: Upper
Bleeding: Lower

Fluid Loss Blood

When used, the **Fluid Loss Blood** parameter reflects a decrease in total blood volume. Blood loss proportionally decreases both the red blood cell volume and the plasma volume according to the current hematocrit.

Range: 0 mL - 4000 mL

Fluid Loss Plasma

When used, the **Fluid Loss Plasma** parameter reflects a decrease in plasma volume. Plasma loss decreases the plasma volume without changing the red blood cell volume. It refers collectively and generically to all fluid losses, including evaporative, transcellular, bowel and third space fluid losses.

Range: 0 mL - 4000 mL

Colloid Infusion

When used, the **Colloid Infusion** parameter reflects an addition to the plasma volume without changing the red blood cell volume. Colloids include modified fluid gelatin starch solutions, dextran and human albumin.

Range: 0 mL - 4000 mL

Crystalloid Infusion

When used, the **Crystalloid Infusion** parameter reflects an addition to the plasma volume without changing the red blood cell volume. The term crystalloid is used to describe salt solutions for infusion (i.e., normal saline, dextrose in water and Ringer's Lactate).

Range: 0 mL - 4000 mL

PRBC Infusion

Packed red blood cells are a preparation of 70% red blood cells and 30% liquid plasma, often administered in severe anemia to restore adequate levels of hemoglobin and red cells without overloading the vascular system with excess fluids.

Range: 0 mL - 4000 mL

Whole Blood Infusion

The term whole blood is used to refer to blood that has not been separated into its various components. It represents a preparation of 40% red blood cells and 60% liquid plasma.

Range: 0 mL - 4000 mL

Bleeding: Upper

The **Bleeding: Upper** parameter is used to activate the site of bleeding.

Default: Off

Bleeding: Lower

The **Bleeding: Lower** parameter is used to activate the site of bleeding.

Default: Off

Sounds

A variety of simulated sounds are available to enhance realism.

Bowel Sounds

Bowel Sounds
Normal
Hypoactive
Hyperactive
None

Normal, Hypoactive, Hyperactive and absent bowel sounds (**None**) are selected using this parameter. Independent control of the type and volume of bowel sounds may be selected in each anatomical region.

Bowel Sounds Locations
All Bowel Sounds
LUQ Bowel Sounds
RUQ Bowel Sounds
LLQ Bowel Sounds
RLQ Bowel Sounds

To affect the bowel sounds simultaneously in all anatomical regions, select **All Bowel Sounds** and the desired sound.

Default: Normal

NOTE: The volume control slider underneath each area may be used to adjust the amplitude of the sound.

Breath Sounds

Normal and abnormal breath sounds are selected using this parameter. Breath sounds are independently synchronized with ventilation of the left and right lungs. Independent control of the type and volume of breath sounds may be selected in each anatomical region.

Breath Sounds Locations
All Breath Sounds
Breath Left Upper Sounds
Breath Right Upper Sounds
Breath Left Lower Sounds
Breath Right Lower Sounds

Breath Sounds
Normal
Crackles
Diminished
Gurgling
Pleural Rub
Rhonchi
Wheezing

To affect the breath sounds simultaneously in all anatomical regions, select **All Breath Sounds** and the desired sound.

Default: Normal

NOTE: The volume control slider underneath each area may be used to adjust the amplitude of the sound.

Heart Sounds

Normal and abnormal heart sounds are selected using this parameter. Heart sounds are synchronized with the cardiac cycle.

Heart Sounds
Normal
S3
S4
S3 and S4
Early Systolic Murmur
Mid Systolic Murmur
Late Systolic Murmur
Pan Systolic Murmur
Late Diastolic Murmur

Default: Normal

NOTE: The volume control slider may be used to adjust the amplitude of the sound.

Speech Sounds

Speech Sounds include a male or female voice, based on the gender of the active patient, that can utter pain rating indicators from 0 to 10, various phrases and a series of other utterances. Unlike Vocal Sounds, Speech Sounds only play once.

Speech Sounds
Loud cough
Soft cough
Short Loud Cough
Short Soft Cough
Scream
Grunt
"Yes"
"No"
"Sometimes"
"Ouch"
"10, 9, 8, 7, 6..."
"My leg hurts"
"My belly hurts"
"My chest is tight"
"I can't breathe"
"Ow, that hurts"
"0" through "10" - Pain Ratings
"Sharp"
"Pressure"
"Aching"
"Dull"
"Stabbing"

To play a Speech Sound, click the Speech balloon. A list of Speech Sounds appears.

Select the desired sound. The sound plays once, and the list disappears.

To replay the last sound, click the **Play** button in the Speech balloon.

Throat Sounds

The **Stridor** throat sounds option from the simulator is selected using the **Throat Sounds** parameter. The stridor is synchronized with ventilation of both lungs.

Default: None

NOTE: The volume control slider may be used to adjust the amplitude of the sound.

Vocal Sounds

To have the simulator emit the various vocal sounds, select the one desired. It immediately begins to play in a continuous loop until **None** is selected.

A variety of programmable Vocal Sounds are available. Vocal Sounds are male or female based on the gender of the active patient.

Vocal Sounds
None
Crying
Gagging
Gasping
Groaning
Long Loud Cough
Long Soft Cough
Wheezing
Mumbling

To select a sound from the **Vocal Sounds** drop-down menu, click the **Sounds** button on the Run screen. The Sounds panel appears.

Click **Vocal Sounds** and select the type of sound desired from the **Vocal Sounds** drop-down menu.

Default: None

NOTE: The volume control slider may be used to adjust the amplitude of the sound.

Appendix B - Wireless Voice Link

This information is intended to assist in preparing Wireless Voice Link (WVL) devices for use in conjunction with METIman.

Cautions and Warnings

This device complies with part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes d'Industrie Canada exempts de licence RSS (s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences.
2. Cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

Any modifications made to this device without the express approval of CAE could void the user's authority to operate this equipment.

What's Included

The WVL package includes the following items:

- Wireless Voice Link Handset (1)
- Olympus ME52W Standalone Microphone (1)
- AAA Alkaline Batteries (2)
- Quick Start Guide (1)

How It Works

The WVL is a radio pair that operates in the 2.4 GHz unlicensed radio band. The handset communicates wirelessly with the base station located inside the simulator. The base station converts the digitized microphone stream from the handset and outputs it via the base station to the headphone and line out jacks. The output projects through the head speakers inside the simulator.

To accommodate multiple WVL pairs in close proximity, each WVL is assigned two RF channels on which to operate. The RF channels divide up the 2.400 – 2.4835 GHz spectrum in 80 single frequencies to prevent the WVLs from interfering with each other.

Due to the nature of the unlicensed 2.4 GHz band, there may be other devices such as Wi-Fi, microwave ovens or Bluetooth® radios operating in the 2.4 GHz band as well. Therefore, two channels are used to transmit the audio stream redundantly to avoid interference. In case there is an interference in one channel, the other can be used to extract the audio stream.

To operate correctly, both the handset and base station should be set to the same frequency using the DIP switches located in the devices. If the interference is too high, the WVL firmware has the ability to change channels automatically to avoid interruption. This process occurs simultaneously in both the handset and the base station without the need for user intervention. The units revert back to the original frequency set on the DIP switches when both devices are restarted using the power switch.

Recommendations for Use

To receive the best sound quality from the WVL, please note the following recommendations:

- Do not separate the WVL pair with more than two walls.
- Use channels 0 through 11 for the best sound quality.
- Use channels 12 through 31 if more than 12 simulators are present in one area.

Wireless Voice Link Devices

There are two unique devices that make up a WVL pair: the handset device and the base station device. The base station device is located inside the simulator, while the handset device is battery powered and carried by the user. The handset transmits voice input through a microphone to the base station receiver, where it is transmitted to the speakers in the simulator's head. The two different devices can be identified by their cases.

The handset device has a cover that extends over the length of the antenna.



Figure 1: WVL Handset

The base station device antenna is almost fully exposed.



Figure 2: WVL Base Station

Physical Features

The following features are located on the top of the WVL devices:

- **Headphone jack:** Used to plug in headphones or an iPhone compatible headphone/microphone combination
- **Microphone jack:** Used to plug in a standalone microphone
- **Red power light:** Indicates when the unit is powered on by blinking. Also indicates when the Mute button is activated by solidly staying on.
- **Green connection light:** Indicates an RF link connection between the handset and base station by blinking.

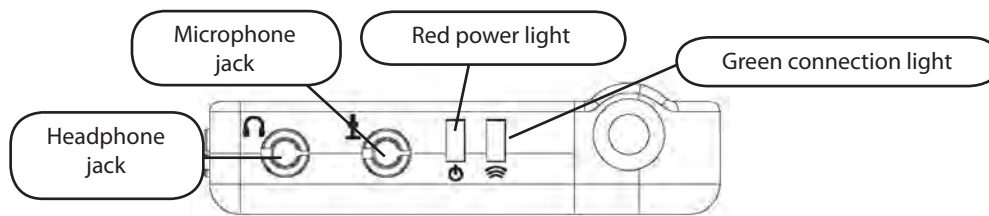


Figure 3: WVL Front View

The following features are located on the side of the WVL devices:

- **Battery compartment:** Houses two AAA batteries and the DIP switch.
- **DC power jack:** Accommodates a 5VDC/0.2A power source.
- **ON/OFF switch:** Turns WVL handset power on or off.
- **Line out jack:** Connects the WVL to the simulator's audio amplifier.
- **Volume/mute dial:** Controls microphone gain and microphone mute on the handset. See *Special Handset Settings* on page B-9

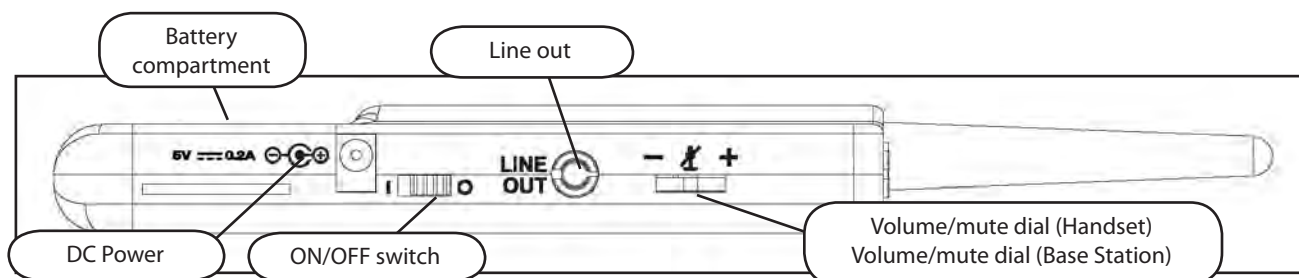


Figure 4: WVL Side View

On the WVL handset, the volume/mute dial controls the microphone volume or mutes the microphone. See *Special Handset Settings* on page B-9.

On the WVL base station, the dial serves as the volume control for the speakers inside the simulator. Moving the dial toward the plus sign increases the volume. Moving the dial toward the minus sign decreases the volume and setting. On the handset, pressing straight down on the volume dial in the center mutes the microphone.

Preparing the Base Station in the Simulator

When using the base station in the simulator, ensure the batteries are removed and the following items are attached:

- Power cable
- Line out cable
- Serial Connector

The DIP switch is located in the battery compartment of the base station (Figure 5: DIP Switch Settings).

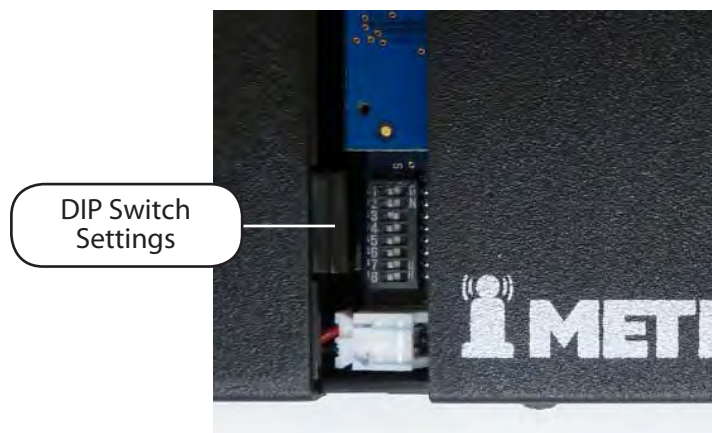


Figure 5: Dip Switch Settings

The serial connector is located on the side of the base station (Figure 6: Serial Connector).

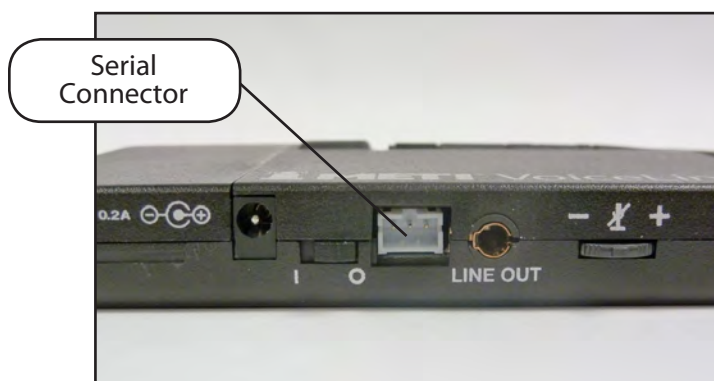


Figure 6: Serial Connector on base station

The base station should come already connected and installed inside the METIman.

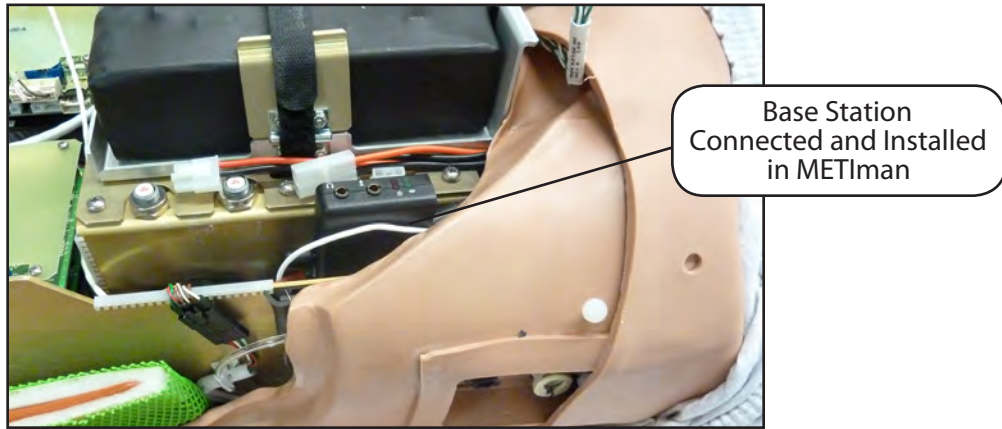


Figure 7: Base Station in METIman

To prepare the base station:

3. Set the base station DIP switch positions 6 and 7 to OFF, and 8 to ON.
4. Turn the power off and on using the power switch on the outside of the base station to ensure the DIP switch changes take effect.
5. Leave the power switch on the outside of the base station in the on position.

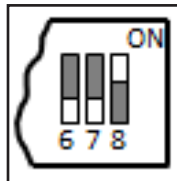


Figure 8: DIP Switch Settings for the Base Station

NOTE: Since the base station receives power from the simulator, the power switch on the outside of the base station must remain in the ON position. Use this power switch to refresh DIP switch settings. Do not turn the simulator off and on to refresh the DIP switch settings.

Preparing the Handset for Use

To prepare the handset for use:

1. Insert two AAA batteries into the battery compartment.
2. Set the handset DIP switch positions 6 and 7 to OFF and position 8 to ON.
3. Turn the power switch off and back on to ensure the DIP switch changes take effect.

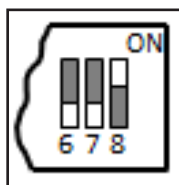


Figure 9: DIP Switch Settings for the Handset

While DIP switch positions 6 through 8 affect the handset and base station settings, DIP switch positions 1 through 5 are used to set the radio frequency channel used for communication between the handset and the base station.

Selecting the Radio Frequency Channel

There are two ways to configure the radio frequency (RF) channel spacing. The first method reduces channel-to-channel interference, but allows only 12 channels to operate simultaneously in the same vicinity. The second method increases the number of channels that can be used simultaneously to 20 channels. However, this method diminishes the channel-to-channel noise immunity.

All of the WVL pairs in the same vicinity must use channels from RF Channel Group 1 or RF Channel Group 2, and channels must belong to the same group. The DIP switch determines the initial communication frequencies that the WVL pair use to communicate when the power of the base station and handset is first turned on. If there is too much interference at the initial channel, the WVL pair changes frequency automatically and continues operating. The WVL pair repeats this process automatically as needed and changes frequencies when interference is too high.

Multiple WVL pairs can be set to the same initial frequency. However, setting different initial frequencies helps the WVL pairs quickly find a stable operating frequency.

For example, if there are 12 or fewer simulators in the same vicinity, set all of the WVL pairs to use channel 0 of RF Channel Group 1. To give unique initial RF frequencies, assign each WVL pair to its own RF channel with the settings found in CH 0 through CH 11.

If you have 13 to 20 simulators in the same vicinity, set all of the WVL pairs to use channel 12 or RF Channel Group 2. To give unique initial RF frequencies, assign each WVL pair to its own RF channel with the settings found in CH 12 through CH 31.

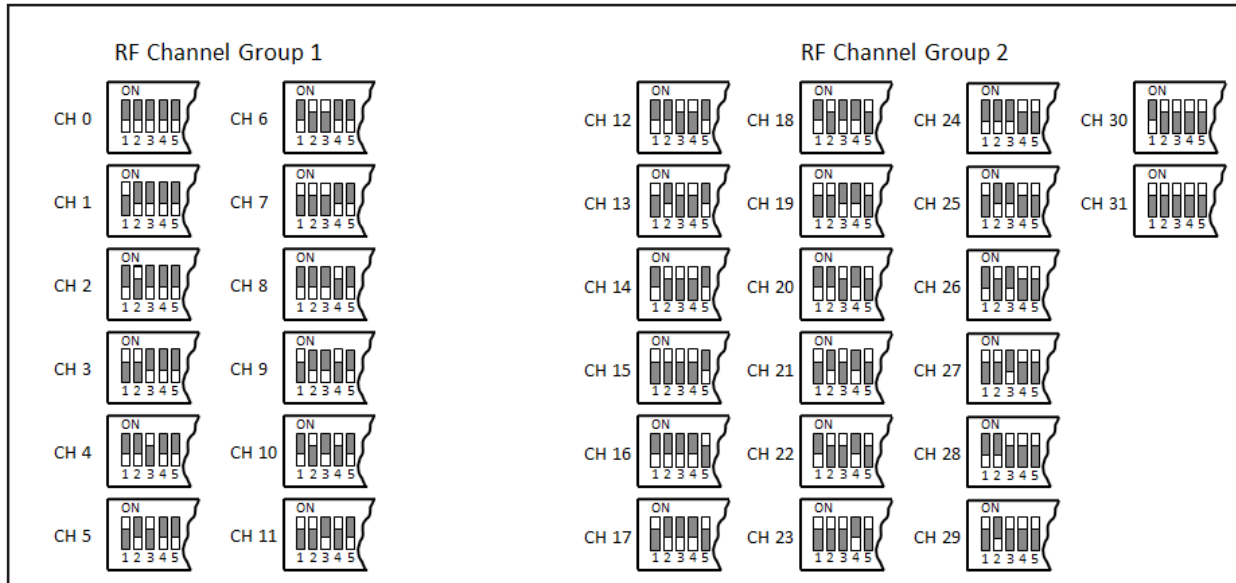


Figure 10: RF Channel Selection Methods

For a complete list of the initial frequencies associated with the RF Channels, see *RF Channel Initial Operating Frequencies* on page B-12.

Powering Up the WVL Pair

To power up the WVL pair:

Power on the base station by turning on the simulator. The base station power switch is in the on position by default.

Power on the handset by setting the power switch to the on position.

The red power light on each unit blinks when the unit is on. Once both units are powered on and communicating with each other, the green connection light flashes once every second.

If the green connection light fails to blink, ensure both units are set to the same RF channel. See *Selecting the Radio Frequency Channel* on page B-6. If you make changes to the DIP switch settings, toggle the power switches of the handset and base station off and back on to ensure the changes take effect.

Using the iPhone/Standalone Microphone

DIP switch position 6 on the handset determines if the iPhone microphone input or the standalone microphone input is enabled. When DIP switch position 6 is set to the OFF position, the standalone microphone jack is enabled for the standalone microphone, provided by CAE Healthcare.



Figure 11: Handset and CAE Healthcare-provided Microphone

To use a microphone compatible with an iPhone (three-pole jack), set DIP switch position 6 to ON. Please note that an iPhone-compatible microphone is not provided as part of the product package. Any microphone with a common 3.5 mm input jack can be used with the handset when DIP switch position 6 is set to ON.

Special Handset Settings

Advanced settings for the handset DIP switch are available.

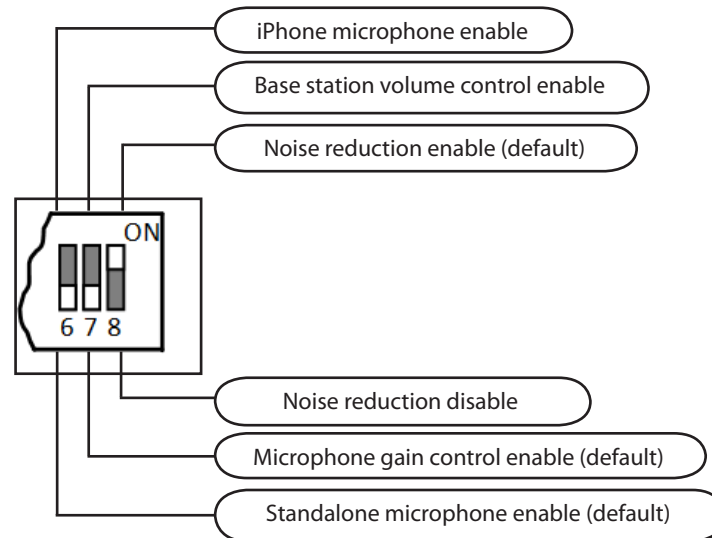


Figure 12: Advanced DIP Switch Settings

DIP switch settings are only refreshed when the handset is powered on. To ensure the DIP switch changes take effect, turn the power off and back on after making changes.

To enable noise reduction and minimize background noise in high ambient noise environments, place the position 8 DIP switch in the ON position.

Battery Capacity Indicator

The red power light flashes one time every second when the battery capacity is good. When the battery capacity is nearly depleted, the red power LED flashes twice in quick succession every second. This indicates the batteries need to be replaced.

To get the most battery life out of the handset, the handset should be powered down when it is not in use.

Troubleshooting

CAE Healthcare Customer Service is available to help with iStan problems, should they arise. However, sometimes you can speed up the customer service process by performing diagnostics before calling, and eliminating some problems on your own with the help of the following instructions.

Power Problems

The red power light on the handset does not flash when power switch is turned on.

- Check that the batteries are inserted correctly. Install a fresh set of batteries, if needed.

The red power light on my base station is not flashing when the simulator is powered on.

- Check that the cables from the simulator are installed in the base station correctly.

Communication Problems

The simulator and handset are turned on, but the green connection light is not blinking.

- Verify that DIP switch positions 1 through 5 are all set to OFF, which is the default position set in the simulator base station and handset at the factory. If you have modified this setting, verify positions 1 through 5 on the handset and the simulator base station are the same.
- Be sure to turn the power off and back on for the changes to take effect on both the handset and the base station. Check if the green connection light is flashing after turning the power off and back on each time to see if communication has been established between the base station and the handset.

I'm experiencing static or dropouts in the simulator audio output.

- Reduce the range between the base station and the handset. Most likely, the handset is out of range of the base station, or there may be too many obstacles (walls, windows, doors) between the handset and the simulator.

Audio Problems

The sound output from the simulator is low when using a microphone on my lapel.

- Increase the microphone gain on the handset by moving the dial towards the plus sign. DIP switch 7 must be in the OFF position for this to work.

I'm hearing feedback from the microphone when I am close to the simulator.

- Decrease the microphone gain on the handset by moving the dial towards the minus sign. DIP switch 7 must be in the OFF position for this to work.

The sound output from the simulator is too high or too low.

- The volume level is configured at the factory for optimal performance. However, if you want to adjust the volume level of the base station (located inside the simulator), set the handset DIP switch 7 to ON. Remember to turn the handset power off and on after each DIP-switch change. After this step is complete, you will be able to adjust the volume level of the base station by adjusting the handset volume dial.

The sound output from the simulator is noisy when the speaker is not speaking.

- You can use the noise reduction feature by setting the handset DIP switch position 8 to ON.

The simulator voice output is cut off when the speaker is speaking quietly.

- In this case, there are three possible options:
 - Attempt to talk louder
 - Increase the microphone gain
 - Disable the noise reduction feature by setting the handset DIP switch 8 to OFF.

RF Channel Initial Operating Frequencies

RF Channel	Frequency 1 (GHz)	Frequency 2 (GHz)
0	2.402	2.480
1	2.405	2.477
2	2.408	2.474
3	2.411	2.471
4	2.414	2.468
5	2.417	2.465
6	2.420	2.462
7	2.423	2.459
8	2.426	2.456
9	2.429	2.453
10	2.432	2.450
11	2.435	2.447
12	2.402	2.480
13	2.404	2.478
14	2.406	2.476
15	2.408	2.474
16	2.410	2.472
17	2.412	2.470
18	2.414	2.468
19	2.416	2.466
20	2.418	2.464
21	2.420	2.462
22	2.422	2.460
23	2.424	2.458
24	2.426	2.456
25	2.428	2.454
26	2.430	2.452
27	2.432	2.450
28	2.434	2.448
29	2.436	2.446
30	2.438	2.444
31	2.440	2.442

Specifications

Frequency of operation: 2.400 – 2.4835 GHz

Wireless range: 100 ft clear line of sight

RF power output: 0dBm

Batteries: 2 AAA Alkaline, NiCd, NiMH, Lithium

Handset battery life with base station on: 25 hours with alkaline batteries

Handset battery life with base station off: 100 hours with alkaline batteries

DC voltage input: 5 VDC, 0.2A

Line out jack: 3.5 mm

Headphone/iPhone jack: 3.5 mm

Standalone microphone jack: 3.5 mm

Mechanical dimensions with antenna: 6.17" x 2.52" x 0.65"

Mechanical dimensions without antenna: 4.2" x 2.52" x 0.65"



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For more information about CAE Healthcare products, contact your regional sales manager or the CAE Healthcare distributor in your country, or visit caehealthcare.com.

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