HAL®

S3201 / S3101 / S3000

HAL is an interactive educational system developed to assist a certified instructor. It is not a substitute for a comprehensive understanding of the subject matter and not intended for clinical decision making.
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Introduction
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Care, Maintenance, and Warnings

Damage caused by misuse may void the manufacturer’s warranty. Failure to comply with the following guidelines could result in injury or damage to the equipment.

SET UP

When connecting the battery to the simulator, make sure to match the two color-coded connectors to the corresponding color-coded battery terminals.

Do not use universal AC adapters. Only use the AC adapter supplied with the simulator.

NEVER disconnect the communications module while the UNI software is running. The software will halt, and the module may be damaged.

Do not remove the chest skin. Internal components are serviced by Gaumard certified technicians only.

Never connect HAL to Ethernet cards, LAN networks or unauthorized diagnostic equipment. Doing so may cause damage to the system.

Do not connect the RJ45 cable directly to the tablet’s Ethernet port. Wired communication can only be established using the RF module wired port.

Turn HAL OFF before replacing the battery. Failure to do so could result in serious damage to the system.

STORAGE

Store HAL® in a cool, dry place. Extended storage above 85 degrees Fahrenheit (29 Celsius) will cause the simulator to soften and slowly warp. It is acceptable to operate HAL® at an ambient temperature of 95 degrees Fahrenheit (35 Celsius).

Do not store the simulator with a discharged battery. It is good practice to re-charge the battery at the end of every simulation session. In addition, make sure the battery is re-charged at least once every 3 months even if the simulator is not being used; otherwise permanent loss of capacity might occur because of self-discharge.

PROCEDURES

Do not intubate without lubricating the airway adjunct with mineral oil lubricant (provided). Failure to do so will make intubation very difficult and is likely to result in damage.

Do not introduce flammable gases into the airway.

Providers must use an empty syringe when simulating drug administration via endotracheal tube. Passing liquids into the trachea or esophagus may cause internal damage.

Mouth to mouth resuscitation without a barrier device is not recommended, as it will contaminate the airway. Treat HAL® with the same precautions that would be used with a real patient.

Always dispose of system batteries in compliance with local laws and regulations.

Only replace trauma limbs when HAL is powered off or in standby mode.

The lubricants and other accessories provided are for use with the accompanying patient simulator only. The lubricants and other accessories are not suitable for human use or medical treatment/diagnosis and should never be used for such purposes.

MECHANICAL VENTILATION

Always follow the mechanical ventilator’s guidelines and precautions.

HAL is not designed to test the performance, functionality, and accuracy of a mechanical ventilator.

Do not introduce liquids, humidified gases, flammable gases, or administer aerosol medications into the airway. Moisture in the airway will damage the simulator’s internal mechanics.

HAL’s operating limitations are consistent with that of a real human. Treating HAL in a manner that would seriously harm a real person is likely to result in damage to HAL’s internal mechanics. Always treat HAL as a real patient.

IV ARM, DRUG RECOGNITION AND NEEDLE DECOMPRESSION

Only use Gaumard’s provided simulated blood. Any other simulated blood containing sugar or any additive may cause blockage and/or interruption of the vasculature system.
The use of needles larger than 22 gauge will reduce the lifetime of the lower arms’ skin and veins.

The simulator must be powered on when working with the drug recognition arm. This includes calibration, purging, draining, IV infusion, Set Med Id and injecting fluids. Failure to do so will permanently damage the simulator and void the warranty.

You must always have water in the IV vasculature for the drug recognition module to work.

Do not inject fluids into the intramuscular sites.

Do not add liquids to the hemothorax sites. Doing so will damage the simulator and void the warranty.

Maximum amount of fluid injected without draining should not exceed 40 mL and the maximum injection rate is 9999 mL/hr.

At the end of every simulation session, you must purge the IV system with clean water with the simulator powered on. If the drug recognition arm is not going to be used for long periods of time (a week or more), purge the system with 70% isopropyl alcohol solution. Failure to do so may permanently damage the system.

CONSUMABLES

When the arm veins require replacement, contact Gaumard to arrange for a lower arm exchange. For a small fee, we will deliver reconditioned and warrantied lower arm assemblies to your facility. After receiving the replacement arms, use the same box and the enclosed shipping label to return the old arms to Gaumard. For international and express service, additional fees may be charged. Refer to the Consumables and Replacement Parts section of this guide, and contact customer service for more information.

LATEX WARNING

Vein tubing contains latex, which may cause allergic reactions. Users allergic or sensitive to latex should avoid contact. Discontinue use of this product and seek medical attention if an allergic reaction occurs.

CO₂ CARTRIDGE

Always follow the manufacturer’s safety and warning information included with the CO₂ cartridge package.

Never point a CO₂ cartridge at yourself or others

Do not use damaged CO₂ cartridges

Do not puncture the cartridge CO₂ seal manually

Do not expose the CO₂ cartridges to high temperatures as indicated on the product’s packaging

Install only threaded cartridges (3/8”-24UNF-2A). Do not attempt to install a cartridge that does not meet the specifications listed in this document.

Do not over tighten the cartridge into the simulator’s cartridge harness

Always verify that the CO₂ cartridge is empty using the software diagnostics before removing it. Do not remove the CO₂ cartridge if the simulator is not fully operational.

CLEANING

HAL should be cleaned with a cloth dampened with diluted liquid dishwashing soap. If medical adhesives remain on the skin, clean with alcohol wipes. DO NOT USE “GOO GONE” as the citric acid in the formula will cause pitting of the various materials comprising your simulator.

HAL is “splash-proof” but not water-proof. Do not submerge or allow a large volume of fluid to enter the interior of the simulator.

Do not expose the control computer to water or excessive dust unless it is protected by a rugged case (available separately). Ballpoint pens, ink or newsprint, and markers permanently stain the skin.

WARNING:

To avoid damage to the simulator, please store and ship it in the clear poly bag provided.
Electrical therapy

- Only deliver electrical therapy when the simulator is fully assembled, dry, and undamaged.

- Make sure the defibrillation patches on the simulator are in good condition, including removing any and all gel residue on the defibrillation patches from previous use(s). It is a good practice to remove gel residues after every use. Failure to do so will leave behind a film of electrode gel that hardens causing arcing and pitting.

- Do not re-use the gel-adhesive pads. Do not leave them on for next day use.

- Use hard paddles or wet-gel pads preferably. Avoid using solid-gel pads since they present higher risk of burning the simulator’s skin.

- Gel pads have a shelf life. Make sure they are not expired to avoid arcing.

- Make sure the simulator is not in contact with any electrically conductive surfaces.

- Use the simulator only in a well-ventilated area, free of all flammable gases.

- NEVER attempt to service or modify any of the electrical connections, especially those between conductive skin sites and the internal electronics. Discontinue use if any wires are found exposed with damaged insulation.

- Real medical products, especially electrodes, sometimes use powerful adhesives that can be difficult to remove. A gentle, degreasing cleanser may be needed. Refer to Care and Cautions for more information.

- Electrode gel on the skin between any two electrode targets can become a pathway for electrical current, just as in real life. If this occurs, HAL’s skin can be burned.

- Do not allow defibrillation pads to overlap ECG sites. Doing so will may damage the simulator and cause arcing.

- Should dark traces appear on the conductive patches due to gel residue or previous arcing, use a pencil eraser to remove the traces and then clean with alcohol.

**DO NOT SCRATCH** the conductive patches with abrasive objects; doing so will cause irreversible damage to the conductive sites and subsequently cause arcing.
Getting Started
Equipment setup

LEG ASSEMBLY

To install the lower legs:

1. Remove the fixed bolts from the knee joints using the hexagonal wrench included.

2. Connect the red pedal pulse lead and white CO₂ lead to the right lower leg. On the left leg, connect the pedal pulse and secure the trauma power lead for later use.

3. Position the lower legs and insert the knee joint bolt. Tuck any extra wire and the connector into the lower leg.

4. Replace the bolt and use the two provided hexagonal wrenches to secure the knee bolt without over tightening.

BATTERY

HAL is shipped with the internal battery disconnected. Connect the battery lead as part of the first install process.

**WARNING:** Do not remove the chest skin.

To connect the internal battery leads:

1. Locate the connectors on HAL’s right hand side.

2. Gently lift the right corner on the chest skin as shown and connect the battery clip.

3. Slide battery leads inside the cavity.
4. Secure the chest skin. Connect the simulator’s power charger.

Immediately after connecting the battery leads, HAL is on stand-by mode and ready to be initialized by the UNI software.

**BATTERY LIFE**

Battery charge time is approximately **four** hours. The AC adapter’s status indicator light displays red when the battery is charging and green when the process is complete.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Runtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Battery</td>
<td>6 hours</td>
</tr>
</tbody>
</table>

To display the battery level, the UNI software must first establish a connection with the HAL. For more information about the battery indicator, refer to Working with UNI section.

**WARNING:** Do not store the simulator with a discharged battery. It is good practice to re-charge the battery at the end of every simulation session. In addition, re-charged the battery at least once every 3 months even if the simulator is not being used, otherwise permanent loss of capacity might occur because of self-discharge.
Control Tablet PC

The tablet PC is preloaded with the UNI control software used by the facilitator to initialize the simulator and control the vital signs.

Before turning on the computer for the first time, please review the documentation included with the product for important care and warning information.

USING THE STYLUS

The tablet’s stylus is a pen-shaped input used to interact with files and programs.

- Left click - tap the screen with the pointer. Tap twice rapidly to double-click.
- Right click - tap and hold a highlighted item or hold the button near the pointer and tap the item or text.

CALIBRATING THE STYLUS

As part of the initial setup process, calibrate the stylus using the Tablet and Pen calibration tool in the Windows® control panel. Complete the calibration process while holding the pen in a natural writing position for greater accuracy during normal use.

WIRELESS COMMUNICATION USB MODULE

The controlling computer transmits the startup and control commands to simulator through the USB RF communication module.

Connect the RF communication module to an available USB port on the tablet.

Secure the RF communication module to the tablet or PRO+ computer using the Velcro patch. The tablet is now ready to communicate with the simulator wirelessly. For information about the signal strength indicator, go to Working with UNI section.

USB COMMUNICATION MODULE WIRED

The USB communication module is also equipped with a wired communication port for transmitting the startup and control commands to the simulator. The alternate wired configuration should be used in environments that do not allow wireless communications.

Do not connect the simulator to Ethernet cards, LAN networks, or unauthorized diagnostic equipment. Doing so may cause damage to the system.

To connect the simulator to the Tablet PC using the wired option:

1. Connect the RJ45 cable to the USB communication module

2. Connect the RJ45 cable to the communication port on the simulator’s right side

3. Connect the communication module to an available USB port on the tablet PC

The tablet is now ready to communicate with simulator.
STREAMING AUDIO HEADSET

The computer system includes a headset that allows the facilitator to speak as HAL’s voice and listen to the participants reply.

Connect the headset MIC and Speaker connectors to the designated ports on the side of the tablet PC. Go to the digital UNI User Guide under Menu/Help/Instruction Manual for more information about the streaming voice feature.

Always connect the streaming audio headset before starting the UNI software.
Virtual Monitor

The Gaumard Monitors software displays HAL’s simulated vital signs in real time. The interactive monitoring software is preloaded in to the virtual monitors PC.

The virtual monitor PC also allows the facilitator to play back the session recordings stored in the PRO+ PC for debriefing.

VIRTUAL MONITOR PC SETUP

Refer to the manufacturer’s documentation included with the virtual monitor system components for important safety, installation, and start-up information before turning on the PC for the first time.

To setup the virtual monitor PC:

1. Place the all-in-one PC within line of sight of the controlling computer
2. Connect the power supply to the PC and to the wall outlet
3. Connect the USB keyboard and mouse receiver to the PC
4. Turn on the computer

VIRTUAL MONITOR WIRELESS CONNECTIVITY

The control PC and the all-in-one virtual monitor PC establish a wireless link at startup automatically. The wireless connection allows the Gaumard control software to transmit the vital signs information to the Gaumard Monitors software.

To verify the wireless link between the two computers, click the wireless icon located on the task tray. The wireless network name is configured at the factory and may differ from the one seen below. To troubleshoot connection issues between the virtual monitor computer and the controlling tablet, please go to the Appendix.

GAUMARD MONITORS

After the wireless connection is established, double click or tap the Gaumard Monitors icon to start the vital signs software.

The Gaumard Monitors software is now ready to receive the vital signs information generated by the UNI control software.

For more information about the Gaumard Monitors software, please refer to the Gaumard Monitors user guide.
Working with UNI
Initializing the Simulator

After reading the manufacturer’s care and caution information, press the power button to turn on the Tablet PC.

The UNI software initializes the simulator. Double click the UNI icon on the tablet's home screen to start.

The simulator selection menu is shown. Select HAL and click “Start”.

The wireless link between UNI and the simulator is established within 1 minute.
PROFILES AND OPERATING MODES

The UNI control software has two modes of operation: Manual and Automatic. Each mode includes a Quick Start profile with preprogrammed scenarios exercises created in conjunction with experienced healthcare instructors and working medical professionals. Continue to the next section to learn more about each operating mode and the profiles included.

After selecting an operating mode and profile, click "Load" to continue.

MANUAL MODE

In the “Manual” operating mode, the facilitator fully controls the vital signs and physiologic responses.

The Manual mode includes the following profiles:

**Default Profile** – includes one palette with healthy vital signs.

Quick Start HAL – contains ten scenarios

AUTOMATIC MODE

The Automatic mode assists the facilitator by automatically adjusting vital signs in response to caregiver participation, pharmacologic intervention, and manual input. For example, when facilitator increases the heart rate, the Auto mode will calculate the response and adjust the blood pressure automatically. To activate the operating mode as an upgrade option, go to digital UNI user guide

The Automatic mode includes the following built-in profiles:

**Default Modeling** – includes one palette with healthy vital signs.

**Meds Profile** – This profile contains fifty-two pre-programmed drugs to be used on simulations.

**Quick Start Hal Modeling** – includes eight scenarios configured for the Automatic operating mode

MANAGING PROFILES

Use the Manage Profile Menu to create a new profile and edit this profile.

Also the profile folder location will be shown below the “New Profile” icon.
Use the “Map Profiles folder” icon to select the location of the new profile to be created on the server.

Select the server location and click “Make New Folder” to create the profile folder.

Assign a name to the folder and click “OK”

The new profile folder location will show up. Then proceed to create a new profile, see instructions detailed below.

Use the “Home” icon to reset to default profiles folder.

**CREATING A NEW PROFILE**

Profiles store palette, scenario, and option settings independently; changes made to one profile have no effect on the others. Below are some examples on how profiles are used:

- Assign one profile to each user of your Gaumard simulator system
- Use profiles to organize and protect palettes and scenarios
- Create a profile dedicated to a specific academic course taught by multiple instructors
- Devote an entire profile to one particular subject area, or even one particular scenario

To create a new profile, click “New Profile”.

Enter a name for the new profile followed by a description.

Enable the PIN protection to prevent unauthorized users from accessing or making changes to this profile.

Lastly, click “Create” to save the new profile.
Click “Rename” or “Delete” to change the name of delete this new profile.
UNI Interface

The UNI software is used to control the simulator, monitor the vital signs, and evaluate the provider's performance. The simulation technician or instructor carrying out the simulation operates the UNI software.

The UNI control elements and scenario programming procedures are consistent throughout the Gaumard family of high fidelity simulators. Some software controls and features covered in this guide may be hidden depending on the simulator's hardware configuration and optional upgrades.

Connection status

The communication indicator displays the status of the radio link between the tablet's USB RF module and the simulator. Full bars indicate excellent communication (i.e., normal operation).

Battery indicator

The battery indicator displays the battery charge information. An exclamation sign is shown when there is no communication with the simulator and battery information cannot be retrieved.

When the battery icon is depleted, the simulator is set to STAND-BY mode automatically to protect some of the simulator's internal components.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Runtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Battery</td>
<td>Approx. 6 hours</td>
</tr>
</tbody>
</table>

Session clock

The session timer displays the duration of the current session. Click the timer to reset the clock or to start a new session. Event entries in the text log are synchronized with the session timer.

Power/Stand-by

The power button is located at the bottom right corner of the UNI software. Toggle the power button to set the simulator to stand-by mode and then again to resume.
Quick Launch

The UNI interface opens up showing the quick launch page for the scenarios. This page is used to easily access the preprogrammed scenarios saved on each profile.

CLINICAL CONDITION

The scenarios are categorized by clinical condition to the left of this page; i.e. shoulder dystocia, cord prolapse, etc.

Notice that one or more scenario types can be selected at the time and the list of scenarios on the right will display only the scenarios included on the selected categories.

SELECTING THE SCENARIO

Click on one of the scenarios listed to highlight it and the scenario can be started immediately or loaded.

Click on the drop down arrow to the right to read a scenario description.
FAVORITES

There is also a “Favorites” feature added to the quick launch program. This feature allows users to reduce the number of scenarios highlighted to those within the categories that will be used most frequently.

Enable the “Favorites” feature by clicking the star icon. Then select the categories or scenario types to be stored under this feature.
Status / Details Controls

The Status/Details panel is used to monitor and control the simulator’s vital signs. The individual parameter controls displayed on the details tab provide the simplest method for controlling the simulator’s vital signs, sounds, and features.

The Status/Details tab displays the vital signs controls in a list format.

SYSTEMS LIST VIEW

CHANGING VITAL SIGNS

To adjust numerical values click the slider control. (e.g. heart rate, blood pressure, respiratory rate, etc.).

Alternatively, use the keyboard for manual entry and click the green checkmark to confirm the change.

To change patterns, sounds, and rhythms, click on the specific control to display the library (e.g. EKG rhythms, heart and lung sounds, respiratory patterns, etc.)

The Status/Details panel is used to monitor and control the simulator's vital signs. The individual parameter controls displayed on the details tab provide the simplest method for controlling the simulator's vital signs, sounds, and features.
Click the slider control below the sound library to adjust the volume of the sounds.

APPLYING CHANGES

No changes will be made to the simulator’s condition until the new settings are submitted using the “Apply” panel.

After the list of changes is created, click “NOW” to update the vital signs instantly. Alternatively, click a trending timer to update numerical vital sign parameters (e.g. heart rate, blood pressure) gradually.

Vital sign parameters can be edited or removed using the edit and remove parameter tabs.

Enable the “instant apply” option and click the control to change the vital sign to a new value without the need to use “Apply” panel. Vital signs undergoing change blink yellow.
CREATING PALETTE ITEMS

A palette item stores one or more vital sign settings into a single loadable object. Use a palette item to update a set of vital signs quickly. For example, one palette item can be created to update all the cardiac parameters to a healthy state.

To create a new palette item, set the values for the desired vital signs parameters using the details controls and click “Save”.

Enter a name for the palette, a description, and choose color code. Click “Save” to create the new palette item. Palette items are stored in the active profile.

When the palette is needed, click the Load button to select the palette from the library.
Click the apply option to submit the changes.

<table>
<thead>
<tr>
<th>CEPHALIC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye State</td>
<td>15 blinks/min</td>
</tr>
<tr>
<td>Right Pupil Dilation</td>
<td>4</td>
</tr>
<tr>
<td>Left Pupil Dilation</td>
<td>4</td>
</tr>
<tr>
<td>Right Pupil Reaction</td>
<td>On</td>
</tr>
<tr>
<td>Left Pupil Reaction</td>
<td>On</td>
</tr>
<tr>
<td>Pupil Dilation Time</td>
<td>0.5 sec</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>0%</td>
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<table>
<thead>
<tr>
<th>AIRWAY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongue Edema</td>
<td>Off</td>
</tr>
<tr>
<td>Pharyngeal Swelling</td>
<td>Off</td>
</tr>
<tr>
<td>Laryngospasm</td>
<td>Off</td>
</tr>
<tr>
<td>Throat Sound</td>
<td>normal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BREATHING</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Chest Rise</td>
<td>On</td>
</tr>
<tr>
<td>Left Chest Rise</td>
<td>On</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>Off</td>
</tr>
<tr>
<td>Respiratory Pattern</td>
<td>normal</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>13 /min</td>
</tr>
<tr>
<td>Inspiration Percent</td>
<td>33%</td>
</tr>
<tr>
<td>O2 Saturation</td>
<td>97%</td>
</tr>
<tr>
<td>Lung Sounds</td>
<td>Upper Right normal</td>
</tr>
<tr>
<td></td>
<td>Lower Right normal</td>
</tr>
</tbody>
</table>

On Apply: Clear and Close Details Window
Working with the Simulator
Overview

Please reference the simulator model features list for detailed information on the standard and optional features for each HAL series model.

AIRWAY & APPEARANCE

- Intubatable airway and nares, accommodating most popular airway adjuncts
- Difficult airway actuators for tongue edema, pharyngeal swelling, and laryngospasm
- Visible and audible gastric inflation with esophageal intubation or upon forceful bag-valve-mask ventilation
- Surgical site for tracheotomy, needle cricothyrotomy or retrograde intubation
- Head tilt/ chin lift
- Jaw thrust

BREATHING

- Control rate and depth of respiration and observe chest rise
- Automatic chest rise is synchronized with respiratory patterns and lung sounds.
- Select independent lung sounds: upper right front and back; upper left front and back; lower right front and back; lower left front and back
- Accommodates assisted ventilation including BVM and mechanical support
- Gastric distension with excessive BVM ventilation
- Detection and logging of ventilations and compressions
- Simulated spontaneous breathing
- CO2 on exhalation (10 levels) using replaceable cartridge mounted inside the simulator
- Variable respiratory rates and inspiratory/expiratory ratios
- Attach to real mechanical ventilators
- Bilateral chest rise and fall
- Unilateral chest rise simulates pneumothoraces
- Anterior and posterior auscultation sites
- Bilateral needle decompression at second intercostal Dynamic Airway and Lung compliance/resistance
- Ten levels of static compliance, 15-50 ml/cm H2O
- Ten levels of airway resistance
- Use in conventional ventilation modes
- Holds PEEP from 5 to 20 cmH2O
- Exhales real and measurable CO2
- Vary lung mechanics throughout scenario
- Receive real time feedback from real mechanical ventilator
- Capable of assisting the ventilator at variable respiratory rate

CIRCULATION

- Measure blood pressure by palpation or auscultation using a real BP cuff.
- Korotkoff sounds audible between systolic and diastolic pressures
- Oxygen saturation detected using a real monitor on the left index finger.
- Pulse sites synchronized with BP and heart rate
- Bilateral IV arms with fill/drain sites
- Realistic flashback
- SubQ and IM injection sites for placement exercises
- Intraosseous access at tibia
- Chest compressions generate palpable blood pressure wave form and ECG artifacts
- ECG monitoring using real medical equipment
- Defibrillate, cardiovert and pace using real devices
- Multiple heart sounds, rates and intensities
- ECG rhythms are generated in real time
- Heart sounds synchronized with ECG
- Dynamic 12 lead ECG display
- Bilateral carotid, radial, brachial, femoral, popliteal and pedal pulses synchronized with ECG
- Pulses vary with blood pressure, are continuous and synchronized with the ECG even during a paced rhythm
**DRUG RECOGNITION SYSTEM**

- Simulator identifies drug type and volume injected into veins of the right hand and forearm
- Supplied with 20 syringes having wireless tags
- Use drugs from library or choose to model other drugs using software template
- Physiologic models update simulated vital signs monitors
- 22 gauge needle recommended; larger needles will decrease venous life
- Supplied with easily replaceable veins

**SPEECH**

- Wireless streaming audio
- Pre-recorded sounds
- Create and store vocal responses in any language
- Be the voice of the simulator and hear responses at distances up to 100 meters

**SYSTEMIC**

- Articulating body
- Central cyanosis
- Interchangeable genitalia
- Auscultate bowel sounds
- Catheterizable male/female genitalia
- Blinking eyes with reactive pupils
- Optional trauma amputation arm and/or leg
- Seizure/convulsions
- Supine or semi-recumbent positions

**VITAL SIGNS MONITOR**

- All in one touchscreen PC with virtual patient vital sign monitor software
- Use selected configuration or create your own configuration to mimic the real monitors used in your facility
- Customize alarms
- Reflect simulator’s condition during the scenario
- Share images such as ultrasounds, CT scans, lab results
- Display up to 12 numeric parameters
- Select up to 12 dynamic waveforms

**CONTROL**

- Proprietary communications module can be used simultaneously with the tablet computer's integrated wireless (IEEE 802.11b) networking device
- Bluetooth® technology in the tablet computer allows wireless printing to compatible printer and quick connections to other devices
- Touchscreen tablet with UNI™ user interface
- RF communications up to 300 meters in open space; streaming audio 100 meters

**OTHER**

- One year limited warranty
- Installation and training services available.
- Technical support and onsite repair.
## Features

Disclaimer: The section below describes all possible features in the HAL simulator. The content of this table is subject to change without prior notice. Please contact Gaumard Scientific for the most current information.

**Y** = Yes included  
**O** = Optional

<table>
<thead>
<tr>
<th>Category</th>
<th>Feature</th>
<th>HAL S3201</th>
<th>HAL S3101</th>
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<tr>
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<tr>
<td></td>
<td>and tongue edema</td>
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<td>Pro+ recording and debriefing solution</td>
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</table>
Airway

NASAL AND ORAL INTUBATION

Intubate HAL’s airway via the nasal or oral route using an endotracheal tube or an LMA.

**WARNING:** Always lubricate the endotracheal tube and the medical device using mineral oil before intubating. Do not introduce liquids into the airway. Doing so can permanently damage the system.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Recommended Device Size</th>
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</thead>
<tbody>
<tr>
<td>Intubation (Blade size)</td>
<td>Miller 4 or MAC 3.5</td>
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<tr>
<td>LMA</td>
<td>Size 4</td>
</tr>
<tr>
<td>Nasal Intubation</td>
<td>8 mm outer diameter max</td>
</tr>
<tr>
<td>Oral Intubation</td>
<td>ETT 7 or 7.5</td>
</tr>
</tbody>
</table>

AIRWAY COMPLICATION

Use the software controls to enable the airway complications and make intubation more difficult. HAL can display pharyngeal swelling, tongue edema, and laryngospasm.

AIRWAY SOUNDS

The simulator can produce audible airway sounds. Use the software controls to change the sound type and adjust the volume. Auscultate using a standard stethoscope.

INTUBATION SENSOR

Sensors in the airway detect the placement of the endotracheal tube. If the endotracheal tube is inserted too deep, the left lung is disabled automatically demonstrating right mainstem intubation. Correcting the tube position enables the left lung chest rise.

SURGICAL AIRWAY

HAL includes two replaceable surgical airway inserts. The inserts allow users to perform tracheostomy or cricothyrotomy procedures with real medical equipment. The surgical inserts feature anatomical landmarks. Also, a simulated cricothyroid membrane, and trachea skin cover are provided.

A separate ventilation insert is pre-installed, which is designed to maintain a tight air seal during ventilation and intubation exercises. Interchange the airway inserts as needed. The ventilation insert has anatomical landmarks that allow users to perform surgical procedures.

1. Simulated cricothyroid membrane
2. Trachea skin cover
3. Surgical trachea assembly
4. Surgical cricoid insert
5. Ventilation insert

The assembly of surgical cricoid and trachea inserts allows for the use of tactical cricothyrotomy and tracheostomy kits. Perform lateral or medial incisions on the replaceable trachea skin covers.
INSTALLING SURGICAL CRICOID INSERT, CRICOTHYROID MEMBRANE, AND SKIN

To install the surgical cricoid insert and the cricothyroid membrane:

1. Remove the ventilation airway insert by pulling the edges over the pins

2. Pull on the ribbons located on either side

3. Adjust the ribbons to accommodate the surgical neck insert

4. Place the surgical cricoid insert inside the cavity with the opening towards the head and gently press it down into position.

5. Remove the paper cover from the simulated cricothyroid membrane

6. Place the simulated cricothyroid membrane onto the insert and secure it by stretching the precut holes around the pins as shown below

7. Place the trachea skin cover over the assembly inserting the holes around the 4 pairs of pins.
The surgical assembly is ready to perform cricothyrotomy procedures.

**INSTALLING THE SURGICAL TRACHEA ASSEMBLY**

Surgical trachea assembly includes:

- Surgical trachea base
- Surgical trachea insert

1. Place the surgical trachea insert inside the trachea base

2. Remove the trachea skin cover from the simulator

3. Remove the surgical cricoid insert and place the surgical trachea insert instead as shown in the picture below.

4. Reattach the skin cover over the assembly and secure it by stretching precut holes the around the pins.

Trachea skin cover, cricothyroid membrane, and surgical trachea insert are consumable items.
Breathing

BILATERAL CHEST RISE
Bilateral chest rise and fall is automatic. Use the software controls to enable or disable the lungs independently and to adjust the breathing rate and the inspiratory percentage.

VENTILATION
Set the respiratory rate to 0 and ventilate the simulator using a standard bag valve mask. Open the CPR window to monitor the provider’s ventilation performance in real time. Complete the ventilation calibration process before using the ventilation feature for the first time.

VENTILATION CALIBRATION
The ventilation calibration wizard records the performance average of five ventilations as the benchmark for correct ventilation. Perform the actions requested by the calibration wizard following the most current CPR guidelines. The CPR window evaluates provider performance based on the benchmark recorded during the calibration process.

To calibrate the ventilation performance benchmark:
1. Click Setup > Calibration > Ventilations, and click “Next”
The wizard prompts to perform ventilation “#1”
2. Perform the first ventilation. A green filled oval indicates that the ventilation was recorded successfully
3. Perform ventilation # 2 as prompted by the wizard. A green filled oval indicates that the ventilation was recorded successfully
4. Continue through the calibration wizard to record a total of five ventilations
At the end of the calibration process, the wizard reports the average peak, pressure, and duration values for the procedure. Click “Save” to store the calibration settings.

BREATHING PATTERNS
Control the respiratory rate, pattern, and inspiration percentage using the software controls. The breathing patterns are synchronized with the lung sounds and chest rise.

DYNAMIC LUNG (S3201)
HAL’s dynamic lungs can simulate the elastic properties of a real human lung. The adjustable lung properties allow for simulating a variety of respiratory complications. Participants can connect HAL to a mechanical ventilator using standard medical procedures and monitor realistic waveform feedback on the ventilator screen. Adjust the lung parameters and the vital signs to improve or deteriorate HAL’s condition throughout the simulation.

Some of HAL’s dynamic lung features include:
- Connect HAL to a mechanical ventilator directly using a standard ventilator circuit just like a real patient. No proprietary adjuncts, adapters, or intermediary devices are required to connect a ventilator to the simulator.
- Provide mechanical ventilation by volume or pressure
- Provide mechanical ventilation with assist control and other modern ventilation modes
- Use the UNI controls to adjust HAL’s dynamic lung properties on the fly while the simulator is connected to the ventilator.
- Adjust HAL's ten static lung compliance levels (from 15 to 90 mL/cm H2O) and ten levels of independently controlled airway resistance to deteriorate or improve HAL's condition during the scenario
- HAL holds positive end-expiratory pressure (PEEP 2 - 50 cm H2O) even while lung compliance and airway resistance levels undergo a change
- Set HAL’s inspiratory effort rate to trigger the ventilator for an assisted breath
DISCLAIMER: HAL’s operating limitations are consistent with that of a real person. Treating HAL in a manner that would seriously harm a real person is likely to result in damage to the internal lung system.

DISCLAIMER: HAL is not designed to test the performance, functionality, and accuracy of a mechanical ventilator. Always follow the mechanical ventilator’s guidelines and precautions.

WARNING: Do not introduce liquids, humidified gases, or administer aerosol medications into the airway. Moisture in the airway will damage the simulator’s internal mechanics.

INSTRUCTIONS FOR USE

By default, HAL will initialize with healthy respiratory rate of 13 breaths per minute. Connecting the ventilator while the simulator is breathing normally is not recommended. Just as with a real patient, attempting to force air into the airway while Hal is breathing normally will likely trigger the ventilator alarms and put unnecessary stress on the lungs.

Avoid intubating the airway while the simulator is powered off. Doing so will result in inaccurate intubation readings. To reset the intubation sensor, remove the ET tube and restart the software.

To connect HAL to a mechanical ventilator and start assisted ventilation:

1. Using the UNI software controls, set HAL’s respiratory rate to 0
2. For this example, configure the ventilator with the following settings (suggested): breaths per minute frequency: 12-15 bpm, max flow rate 40 L/min, tidal volume 550 mL, patient weight: 75 Kg (165 lbs.), ventilation control by Volume.

3. On the UNI software, toggle the simulator’s lung compliance mode setting to “V” (Adjust lung compliance by Volume). If the ventilator is set to pressure control, set the UNI lung compliance mode to “P” (adjust lung compliance by pressure)

4. Lubricate the endotracheal tube and intubate HAL. Placement procedures and tube sizes follow the specifications of an adult patient.

5. Connect the ventilator to the patient circuit and initialize the ventilator

Please allow up to 60 seconds while HAL’s dynamic lung properties stabilize.

ADJUSTING THE DYNAMIC LUNG CONTROLS

Use the following UNI controls adjust the simulator’s dynamic lung properties. After making a change to a lung parameter (lung compliance and resistance), please allow up to 60 seconds for the lungs properties to stabilize at the new static level. Avoid adjusting the ventilator settings during the brief stabilization period. All other vital signs parameters will continue to trend as specified.

- Lung compliance: Change the lung compliance level to adjust HAL’s lung elasticity. Increase the lung compliance to level 9 to make the lungs more flexible. Decrease the lung compliance to level 1 to make the lungs more rigid.
- Resistance: Adjust the “resistance” control to increase or decrease the resistance to airflow during ventilation and exhalation for each lung.
• Patient Trigger Rate: Adjust the "patient trigger rate control" to set the number of inspiratory efforts HAL will make in 1 minute. The patient trigger rate programs HAL to inspire periodically to simulate a real patient attempting to take a breath. Each inspiratory effort can trigger a ventilator’s assist mode to deliver a full assisted breath or a spontaneous breath on CPAP.

RESPIRATORY SOUNDS
The simulator generates audible upper, lower, anterior, and posterior lung sounds. Use the software controls to select between the available respiratory sounds and to adjust the volume of each lung independently. The respiratory sounds include normal, wheezing, inspiratory squeaks, crackles, and rales.

HEMOTHORAX SITES
Bilateral chest drain sites located in the 5th intercostal space allow for Pneumo or hemothorax exercises. The hemothorax sites support 32 French straight thoracic catheters only.

WARNING: Use the hemothorax sites for placement exercises only. Do not introduce fluid to the hemothorax sites.

NEEDLE DECOMPRESSION
Bilateral needle decompression sites are located at the second intercostal space. To build up pressure in the pleural space, turn the pneumothorax feature on using the software controls. Treat the tension pneumothorax using a needle. Then, turn the pneumothorax feature off to stop the flow of air through the decompression site. Use smaller gauge needles to extend the life of the chest skin and the needle decompression reservoirs.

REAL CO2 EXHALATION
HAL can exhale real CO2 with the use of a CO2 cartridge. Once a CO2 cartridge is installed in the simulator, use the software controls to adjust volume of CO2 exhaled. HAL can also be operated without a CO2 cartridge installed. A virtual CO2 value is displayed on the virtual monitor PC.

Due to shipping regulations, CO2 cartridges are not included with the system. The required 16g threaded CO2 3/8"-24UNF-2A cartridges can be purchased at most bicycle or hardware stores. 12g threaded cartridges are also compatible with the CO2 feature.
CO2 SAFETY AND WARNING CHECKLIST

Review the safety and warning checklist information before using the CO2 feature. Failure to comply with the warnings listed below and those included with the original cartridge packaging may result in serious personal injury.

- Always follow the manufacturer’s safety and warning information included with the CO2 cartridge package.
- Never point a CO2 cartridge at yourself or others.
- Do not use damaged CO2 cartridges.
- Do not puncture the cartridge CO2 seal manually.
- Do not expose the CO2 cartridges to high temperatures as indicated on the product’s packaging.
- Install threaded cartridges only (3/8”-24UNF-2A). Do not attempt to install a cartridge that does not meet the specifications listed in this document.
- Do not over tighten the cartridge into the simulator’s cartridge harness.
- Always verify that the CO2 cartridge is empty using the software diagnostics before removing it. Do not remove the CO2 cartridge if the simulator is not fully operational.

INSTRUCTIONS FOR USE

For maximum duration, connect the CO2 cartridge just before the simulation begins. If a CO2 cartridge is installed and left overnight, it will empty within 24 hrs whether it is used or not.

To install a new CO2 cartridge:

1. Remove the right leg skin cover and the tibia bone insert.

2. Remove the harness adapter located inside the right lower leg chamber.

3. Screw in a new CO2 cartridge into the harness adapter. The harness adapter will puncture the CO2 seal as the cartridge is tightened. The cartridge will feel cool to the touch when the seal is broken. Continue to tighten the CO2 cartridge until is secured.

   Do not unscrew the cartridge once the seal is broken.

4. Insert the adapter into the chamber and replace the tibia insert and skin.
ADJUSTING CO2 OUTPUT

After the cartridge installed, adjust the Lung CO2 parameter to adjust the volume of exhaled CO2.

The graph below outlines the duration of CO2 output for each of the programmable CO2 levels with following parameters: RR=13, Compliance=8, Airway Resistance=0, VT = 550.

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<td>0</td>
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<tr>
<td>1</td>
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<td>2</td>
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<td>5</td>
<td>5.5</td>
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<td>6</td>
<td>6</td>
<td>35</td>
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<td>7</td>
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<td>8</td>
<td>7.3</td>
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<td>9</td>
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<td>25</td>
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<tr>
<td>10</td>
<td>8.5</td>
<td>20</td>
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</table>

Do not remove the cartridge if pressurized CO2 is being reported. Allow the CO2 cartridge to empty before attempting to remove it.

Unscrew the empty CO2 cartridge slowly. If CO2 starts to escape, STOP unscrewing the cartridge and allow the remaining CO2 to escape before removing the cartridge completely.

WARNING: Never point the CO2 cartridge at yourself or others.

REMOVING AN EMPTY CO2 CARTRIDGE

A “Low CO2!” notification is displayed when low CO2 pressure is detected in the cartridge.

Go to Setup> Calibration> Factory Settings and click “CO2 Pressure” to view the cartridge pressure reading. Replace the CO2 cartridge when the pressure reading reports 0.0 psi.
Cardiac

HEART SOUNDS
HAL generates audible heart sounds (normal, distant, systolic murmur, S3 and S4) which are tied to a user defined heart rate and selectable rhythms. Use the software controls to change the heart sound type and volume level.

ECG MONITORING AND ELECTRICAL THERAPY
The simulator is equipped with conductive skin sites that allow the attachment of real electrodes and defibrillator pads. This feature allows the provider to track cardiac rhythms using real medical equipment just like with a human patient.

The simulator’s ECG and defibrillation sites generate waveforms detectable using real medical equipment and standard electrodes. Real automated external defibrillators can detect the simulator’s heart rhythm and treat shockable rhythms.

Defibrillation is only supported on the large sternum and apex sites circled RED below. Do not deliver a shock to ECG electrode sites on the shoulders or waist marked GREEN. The warranty does not cover damaged to the simulator caused by applying electrical therapy to the ECG sites.

For exercises that incorporate real electrical therapy of any kind, always follow the safety guidelines and operating procedures outlined in the medical device manufacturer documentation.

ECG AND ELECTRICAL THERAPY CHECKLIST AND WARNINGS
• Always follow the standard medical guidelines and precautions for handling electrical therapy devices. Improper use of a real electrical therapy device may result in personal injury.
• Operate simulator in a well-ventilated area free of flammable gases.
• Ensure the simulator is fully assembled, fully operational, dry, and undamaged before administering electrical therapy. Never apply electrical therapy if the simulator is in contact with a conductive surface or substance.
• Do not leave electrodes or pads attached to the conductive sites when the simulator is not in use.
• Use hard paddles or wet-gel pads preferably. Avoid using solid-gel pads as they increase the risk of burning the simulator’s skin if arcing occurs. When using gel patches, make sure not to leave air gaps or bubbles between the pads and the conductive area on the simulator’s skin to avoid arcing.
- Clean the conductive sites at the end of the simulation. Refer to the care section for more information on approved cleaning products. Gel residue, adhesive residue, or dirt can increase the risk of arcing during defibrillation.
- Do not reuse gel-adhesive or use expired pads.
- Do not attempt to repair or modify any electrical connections or conductive sites. Discontinue use if wires are exposed, wire insulation is damaged, or if any conductive sites are damaged.
- Electrode gel can become a pathway for electrical current. Do not allow defibrillation pads to overlap ECG sites or gel to carry a current to the ECG sites. Applying an electrical current to the ECG sites will result in damage to the simulator’s internal components.
- Some electrical therapy devices may be sensitive enough to detect the simulator’s electrical current for operation. If the interference is displayed on the ECG reading, please disconnect simulator’s charger and operate the simulator on battery power only.

**ELECTRICAL THERAPY SNAP CONNECTORS (OPTIONAL)**

The chest skin snap connectors with “Snap Adapter Cable” is an optional feature that allows providers to deliver electrical therapy at the sternum and apex sites without the use and frequent replacement of pads or patches.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defibrillation</td>
<td>360 Joules</td>
</tr>
</tbody>
</table>

The snap sites provide the same electrical therapy functionalities as the gold patches. This includes a detectable heart rhythm, cardioversion, pacing, and the detection of electrical therapy by the UNI software.

The snap connections are only functional when the internal “Defibrillation snap harness” is installed between the ECG module connector and the chest skin connector.

When the “Defibrillation snap harness” is connected, the chest skin sternum and apex gold patches are disabled.

**The sternum and apex gold patches on HAL’s chest skin are connected as a standard.**

To install the “Defibrillation Snap Harness” and enable the snap sites:

1. Turn off the simulator, lay it on a flat surface, and extend the left arm over the head.
2. Carefully detach chest skin on the left side and lift it to expose the chest skin connection. Do not fold the skin over.
3. Press the black clip down and disconnect the chest skin from the ECG module

4. Connect the chest skin and ECG module connectors to the “Defibrillator Snap” harness

5. Tuck the cables back into the cavity

6. Insert the skin's placement pin into the guiding hole located on the Velcro®

7. Align the snap aperture and press the skin back into place.

8. Turn the simulator on

To re-enable the gold patches, disconnect the “Defibrillation Snap” harness and re-connect the chest skin directly to the ECG connector.

### USING THE SNAP CONNECTORS

The “Snap Adapter Cable” connects to a real defibrillator and carries real energy to the snap sites. The snaps are color coded to identify the apex and sternum placement.

Gaumard manufactures a variety of modified snap adapter cables compatible with most electrical therapy devices. For more information about snap cables for a particular defibrillator, please contact Gaumard.

<table>
<thead>
<tr>
<th>Snap Cable Adapter</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Connector</td>
<td>Apex Snap</td>
</tr>
<tr>
<td>Black Connector</td>
<td>Sternum Snap</td>
</tr>
</tbody>
</table>

To use the Snap Cable Adapter:

1. Remove the snap connector covers at the apex and sternum sites

2. Connect the “Snap Adapter Cable” to the defibrillator

3. Connect the black snap connector to the sternum connector

4. Connect the red snap connector to the apex connector
### Warnings:

Always follow the guidelines and precautions included with the defibrillator’s “directions for use” documentation.

The snap adapter cables carry real energy. Handle the snap adapter cables with the same care and precautions used with real pads and patches and following the same directions included with the defibrillator’s “directions for use” documentation.

Do not apply electrical therapy or deliver a shock while holding the snap connectors or while the snap connectors are disconnected from the simulator.

Only deliver electrical therapy when the simulator is fully assembled, dry, and undamaged.

Do not use damaged snap adapter cables, connectors, or medical equipment.

1. Click Setup > Calibration > Compressions, and click “Next”

The wizard prompts to perform compression “#1”

2. Perform the first compression. A green filled oval indicates that the compression was recorded successfully

3. Perform compression # 2 as prompted by the wizard. A green filled oval indicates that the compression was recorded successfully

4. Continue through the calibration wizard to record a total of five compressions

At the end of the calibration process, the wizard reports the average peak, pressure, and duration values for the procedure. Click “Save” to store the calibration settings.

---

### CHEST COMPRESSIONS

Set the heart rhythm to asystole and instruct the provider to perform chest compressions. Monitor the depth and frequency of chest compressions from the CPR trainer window. Before using the chest compression feature for the first time, please calibrate the chest compression feature.

### COMPRESSION CALIBRATION

The compression calibration wizard records the performance average of five compressions as the benchmark for a correct compression. Perform the actions requested by the calibration wizard following the most current CPR guidelines. The CPR window evaluates provider performance based on the benchmark recorded during the calibration process.

To calibrate the compression performance benchmark:
Circulation

BILATERAL PULSES

The simulator’s palpable pulses are blood pressure dependent. Use the software controls to disable the distal pulses to simulate severe hypotension.

Non-Invasive Blood Pressure (S3201 H1209613 OR HIGHER)

HAL’s upper left arm can generate palpable oscillations that simulate blood flow. This allows care providers to monitor HAL’s blood pressure using a non-invasive blood pressure cuff and oscillometric monitoring equipment.

Complete the NIBP calibration process before using the feature for the first time. The NIBP feature is calibrated to work with one cuff at a time.

| NIBP Cuff Size | Adult Large |

ENABLING THE NIBP FEATURE

To enable the NIBP feature, go to Setup>Options>Hal Add-ons tab and checkmark “Use automatic NIBP”.

Enabling the automatic NIBP function disables the manual blood pressure method feature.

NIBP CALIBRATION

Locate the “NIBP Calibration KIT” and follow the steps below to connect the kit bulb to the NIBP cuff line. The kit bulb is used to set the NIBP cuff pressure to the pressure intervals requested by the blood pressure calibration wizard.

To setup the NIBP cuff for calibration using the NIBP calibration kit:
1. Disconnect the NIBP cuff from the monitoring equipment.
2. Connect the kit bulb included with the “NIBP calibration kit” to the NIBP cuff line. The kit adapters included fit a number of different type of connectors found on most NIBP cuffs as seen below.

NIBP connector type 1

NIBP connector type 2
NIBP connector type 3

3. Place the NIBP cuff on the left arm following the placement techniques used on a real human patient.

4. Leave the cuff on the arm and calibrate the blood pressure feature using the software blood pressure calibration wizard and the kit pressure bulb.

5. After the calibration process is complete, disconnect the calibration kit and connect the cuff to the electronic automatic blood pressure monitor.

It is recommended that the NIBP cuff stays placed on the arm after the calibration process is complete. Removing and replacing the NIBP cuff on the arm can affect the accuracy of the readings. If the cuff must be placed on the simulator as part of the exercise, the provider should place the cuff on the arm in the same location it was placed during calibration process.

BLOOD PRESSURE (MANUAL)

Measure the blood pressure using a standard sphygmomanometer. Korotkoff sounds are heard between systolic and diastolic pressure readings. Before using the blood pressure feature for the first time, place the blood pressure cuff on the arm and calibrate the blood pressure feature using the blood pressure calibration wizard.

To enable the manual BP feature, go to Setup>Options>Hal Add-ons tab and uncheck “Use automatic NIBP”. Enabling the automatic NIBP function disables the manual blood pressure method feature.

INSTRUCTIONS FOR USE

1. Place the cuff around the simulator’s upper left arm with the cuff mark at the medial site of the bicep brachii, about an inch (two cm) above the anterior elbow.

Place the cuff in the same position used during the calibration process for accurate readings.

2. Inflate the BP cuff, and auscultate Korotkoff sounds just as with normal patient.

MODIFIED BP PORT FOR VIRTUAL BP SYSTEM (HAL S3000)

Connect the modified blood pressure line to the port on the simulator’s left shoulder. Before using the blood pressure feature for the first time, place the blood pressure cuff on the arm and calibrate the blood pressure feature using the blood pressure calibration wizard.
BLOOD PRESSURE CALIBRATION WIZARD

Before starting the calibration process, place the blood pressure cuff on the simulator as it would be placed on a real human patient.

To calibrate the blood pressure feature:

1. Click Setup>Calibration>Blood pressure and click "Next"
2. Set the pressure on the BP cuff to 0 (i.e. cuff valve open) as prompted by the calibration wizard.
3. Click the "OK" button to record the current cuff pressure for the interval. A green filled oval indicates the pressure interval was recorded successfully.
4. Set the pressure on the BP cuff to 20 mmHg as prompted by the wizard and then Click "OK" to record.
5. Continue increasing the BP cuff pressure as indicated by the prompt and recording the pressure intervals.

At the end of the calibration wizard, click "Finish" to close the calibration wizard.

WARNING: The simulator must be on when introducing fluids into the drug recognition arm. This includes calibration, purging, draining, IV infusion, and injecting fluids into the veins or the filling ports. Introducing fluids into the drug recognition arm while the simulator is off will damage the arm and the simulator. Damage caused by improper use is not covered under warranty.

The drug recognition arm is equipped with a black drain port and a white filling port. Do not reverse the ports while introducing fluids into the system; doing so will damage the system. Do not attempt to fill the IV system without the black drain connector in place. Always leave the black drain port connected during high volume infusions.

DRUG RECOGNITION (OPTION)

The drug recognition feature enhances the realism of intravenous drug administration exercises by using tagged syringes programmed with virtual medications. During an IV push administration exercise, the drug recognition system can detect the virtual medication injected, the dosage infused, and the administration rate in real time. This allows UNI to adjust the patient’s vital signs in response to the virtual medication infused automatically. For more information on monitoring medications infused into the drug recognition arm, go to the digital UNI User Guide under Menu/Help/Instruction Manual.

The drug recognition arm can be identified by the black drainage port located on the right forearm.

PRIMING THE DRUG RECOGNITION ARM

The drug recognition sensors are active only when fluid is present in the vasculature. Prime the drug recognition arm by filling the forearm vasculature with fluid. This process should be completed before simulation begins.

The drug recognition arm is equipped with a black port for draining and a white port for filling. Do not reverse the ports while introducing fluids into the arm; doing so will damage the system.

Locate the IV Filling kit, which includes the drainage tube (black tip) and filling tube (white tip) and filling syringe.

WARNING: Use only Gaumard’s artificial blood concentrate or clean water to fill the vasculature. Any other simulated blood brand containing sugar or any additive may cause blockage and/or interruption of the vasculature system.

To prime the drug recognition arm for an IV push exercise:

1. Power on the simulator
2. Attach the drain tube to the black output port and place the end of the drain hose inside a container.
3. Place the collection container below the arm level to siphon the fluids in the next step.

4. Fill the filling syringe with water and connect it to the white port.

5. Insert water in the system until fluids exit through the drainage tube and all air bubbles are purged.

6. Disconnect the drain tube and the fill syringe.

PROGRAMMING THE SYRINGES

The tagged syringes supplied with the Drug Recognition arm must be associated with a virtual medication and a concentration before they are used for the first time. The syringes remain programmed unless the medication properties are deleted manually using the “Set Med ID” menu.

To program a tagged syringe with a medication for use with the drug recognition arm:

1. Power on the simulator

2. From the Setup menu, click “Set Med ID”. The Set Med Id option is only available on simulators equipped with the Drug Recognition Arm.

The Set Medication Identifier dialog box is displayed.

3. Rotate the lower right arm so the palm of the hand is facing up, and place the syringe holder on the simulator’s right wrist as shown below.

4. Place the tagged syringe in the holder. The syringe must be perpendicular to the surface of the forearm as shown in the figure below.

5. Select a drug from the drop-down menu and enter the concentration.
6. Click the "Add" button associate the medication to the syringe. Please wait while process is completed.

The Syringe Identifier displays "Ready!" when the syringe is ready to be programmed.

The syringe is now associated with the medication type and concentration. The medication association is listed in the "Set Medication Identifier" dialog box.

Repeat the "Set Med ID" process to program additional syringes with other medications.

Reuse tagged syringes by reprogramming the associations. To delete a medication associated with a particular syringe, highlight the desired medication from the "Set Med ID" list and click "Delete Selected Medication" button.

Use the labels provided to identify the syringe with the medication name and concentration.

---

**INSTRUCTIONS FOR USE**

To inject fluids into the drug recognition (right) arm using a tagged syringe:

1. Power on the simulator and select the Automatic operating mode
2. Fill the preprogrammed syringe with fluid.
3. Inject a vein on the anterior or posterior right forearm while maintaining the syringe near the arm.

The tagged syringe must be close to the arm for the drug recognition module to detect the medication type.

The medication detection feature can trigger auto responses. Drug auto responses move the scenario to the next stage when the drug type and dosage threshold are detected. To learn more about programming drug auto responses in a scenario, go to the digital UNI User Guide under Menu/Help/Instruction Manual.

**WARNING**

Maximum amount of fluid injected without draining should not exceed 40 mL and the maximum injection rate is 9999 mL/hr.

**IV ARM**

The simulator is equipped with an IV arm that allows for bolus or intravenous infusions as well as for drawing fluids.

**WARNING**

The drug recognition arm is equipped with a black drainage port. Reversing the fill and drain connections on a drug recognition arm will damage the system and void the warranty. Please refer to the Drug Recognition section to prime the drug recognition arm for an exercise.

Do not attempt to fill IV system without the drain connector in place.

Always leave the drain port connected when injecting fluids into the system.

Use only Gaumard’s artificial blood concentrate or clean water to fill the vasculature. Any other simulated blood brand containing sugar or any additive may cause blockage and/or interruption of the vasculature system.
Always flush the IV system with distilled water at the end of every simulation.

INSTRUCTIONS FOR USE

To prime the IV arm for an infusion exercise or to draw fluids:

1. Locate the fill syringe with tubing and the drain tube with pinch-clamp. Fill the syringe with the desired fluid -- water or simulated blood.

2. Connect the syringe with tubing to one port and the drain tube with clamp to the other port as shown.

3. Insert water in the system until fluids exit through the drainage tube into the container and all air bubbles are purged.

The IV arm is now ready for use.

To simulate a patient with no accessible peripheral IV sites, connect only the syringe. Pull the plunger to create suction, which will collapse the veins. Disconnect the syringe tube from the arm port while maintaining suction. The port will seal, and the veins will remain collapsed.

CLEANING THE VASCULATURE

Clean and dry the forearm vasculature at the end of the simulation session to prevent mold or clogs.

To clean and dry the IV arm:

1. Power on the simulator
2. Fill the filling syringe with distilled water
3. Connect the fill syringe and the drain tube to arm
4. Flush the vasculature with distilled water. If the IV arm is not going to be used for a week or more, purge the system with 70% isopropyl alcohol solution.
5. Fill the filling syringe with air and purge the clean water to dry the vasculature.
6. Disconnect the drain tube and filling syringe

Warning:
Do not store the simulator with fluids in the veins. Doing so may lead to molding and damage to the internal electronics. Complete the vasculature cleaning procedure at the end of the simulation sessions.

OXYGEN SATURATION

Use a real oxygen saturation monitor to get an oxygen saturation reading from the left index finger. Before using the oxygen saturation feature for the first time, calibrate the simulator to work with the oxygen saturation monitor to be used during the exercise.
OXYGEN SATURATION CALIBRATION

UNI stores the calibration settings for one device at a time. If the oxygen saturation monitor or the sensor is changed, the simulator must be recalibrated to work with the new device.

Disclaimer: Oxygen saturation monitors that detect carbon monoxide and/or methemoglobin are not supported.

To calibrate the oxygen saturation finger:

1. Turn OFF the oxygen saturation monitor and place the oximeter sensor on the left index finger. Verify that the left index finger is centered inside the finger sensor.
2. Go to Setup>Calibration and select “Oxygen Saturation”. Click “Next” to continue.
3. Turn ON the oximeter and click “OK” on the dialog box.
4. Adjust the reading on the oximeter monitor screen to match the value displayed on the GaumardUI calibration screen using the arrows on the left column of the calibration window. The first calibration point is 98%.

Use the triple arrows to increase or decrease the reading on the oximeter in large intervals, double arrows for moderate changes, and the single arrows for small changes of one or two percent readings. Wait 10-15 seconds after making an adjustment to allow the oximeter reading to stabilize. Doing so ensures proper calibration.

5. After the reading on the OSAT monitor is stable and it matches the value on the GaumardUI calibration window, click “OK”, and then “Next” to continue.
6. Repeat the process to calibrate the following intervals.
7. Click “Finish” at the end of the calibration and remove the OSAT monitor from the finger.

INSTRUCTIONS FOR USE

1. Start UNI and establish communication with the simulator.
2. Connect the oximeter probe to the left index finger of the simulator.

CENTRAL CYANOSIS

Use the software controls to adjust the cyanosis intensity.
Neurologic

REACTIVE EYES
The simulator is equipped with programmable blinking eyes and pupils that dilate. Use the software controls to change the blinking rate and to enable or disable pupil reaction.

PUPIL CALIBRATION
The eye reaction is factory calibrated. Use the “Pupil Sensitivity” controls to recalibrate the pupil reaction for the current room lighting only if needed.

To calibrate the pupil dilation:
1. From the File menu, go to Setup>Options>Tolerances
2. Click “Set ambient light” to recalibrate the pupil diameter to the current ambient light.
3. Cover both eyes from most incoming light and click “Set Dilation Light” to set the low light pupil diameter.
4. Click increase or decrease to adjust the pupil’s sensitivity to light

SEIZURES
The simulator is capable of convulsing to simulate mild or severe seizures. Use the software controls to enable the seizure behavior.
**Other**

**BOWEL SOUNDS**
Use the bowel sound controls to change the bowel sound types and adjust the volume levels. Auscultate the bowel sounds using a real stethoscope.

**GASTRIC DISTENSION**
HAL can exhibit gastric distension if ventilated excessively. To relieve the gastric distension, press down on the stomach gently.

**INTRAMUSCULAR INJECTION SITES**
Intramuscular injection sites are located on both deltoids and quadriceps for injection technique and placement exercises.

**INTRAOSSEOUS ACCESS**
HAL features replaceable tibia bones on the left leg for intraosseous access. The hollow bones allow for the aspiration and infusion of fluid using real medical devices.

To fill the tibia bones with fluid:
1. Remove the skin cover from the right leg to access the two-part tibia.
2. Remove lower half of the tibia.
3. Fill the tibial tuberosity with fluid using the filling syringe.
4. Fill the tibia fluid using the filling syringe.
5. Replace tibia bone in the leg and the skin cover.

**INSTRUCTIONS FOR USE**
Intraosseous access is allowed in the hollow tibia inserts only. To view a list of replacement parts including leg skin covers and tibia bones, go to the Appendix

**RESUSCITATION (CPR)**
The simulator features ventilation and compression sensors for monitoring CPR performance. The CPR window detects ventilations when the respiratory rate is set to zero or apneic and compressions when the heart rhythm is in an unhealthy state.

Complete the ventilation and compression calibration process before using the CPR window for the first time. To learn more about the CPR window, go to the digital UNI User Guide under Menu/Help/Instruction Manual.

**VENTILATION CALIBRATION**
The ventilation calibration wizard records the average performance of five ventilations as a benchmark for a correct ventilation. Perform the actions requested by the calibration wizard following the most current CPR guidelines. The CPR window evaluates provider performance based on the benchmark recorded during the calibration process.

To calibrate the ventilation performance benchmark:
1. Click Setup > Calibration > Ventilations, and click "Next"
2. Perform the first ventilation. A green filled oval indicates that the ventilation was recorded successfully
3. Perform ventilation # 2 as prompted by the wizard. A green filled oval indicates that the ventilation was recorded successfully.

4. Continue through the calibration wizard to record a total of five ventilations.

At the end of the calibration process, the wizard reports the average peak, pressure, and duration values for the procedure. Click “Save” to store the calibration settings.

**COMPRESSION CALIBRATION**

The compression calibration wizard records the average performance of five compressions as a benchmark for a correct compression. Perform the actions requested by the calibration wizard following the most current CPR guidelines. The CPR window evaluates provider performance based on the benchmark recorded during the calibration process.

To calibrate the compression performance benchmark:

1. Click Setup > Calibration > Compressions, and click “Next”

The wizard prompts to perform compression “#1”

2. Perform the first compression. A green filled oval indicates that the compression was recorded successfully.

3. Perform compression # 2 as prompted by the wizard. A green filled oval indicates that the compression was recorded successfully.

4. Continue through the calibration wizard to record a total of five compressions.

At the end of the calibration process, the wizard reports the average peak, pressure, and duration values for the procedure. Click “Save” to store the calibration settings.

**STREAMING AUDIO**

Use the streaming voice to speak as the simulator’s voice and engage the provider in a realistic conversation.

**INSTRUCTIONS FOR USE**

Ensure that the headset and microphone is connected to the PC before starting the UNI software. The headset minimizes echo and environmental noise to improve audio quality.

Click the “talk” icon and speak in to the headset to talk as the simulator’s voice.
To listen to the provider’s response, click “Listen”.

Reference the UNI software User Guide for information on additional streaming voice features and functions.

**TRAUMA LIMBS**

Enhance the realism of a trauma scenario by installing the trauma leg and trauma arm. The interchangeable trauma limbs feature pulsatile bleeding from major arteries consistent with the heart rate and blood pressure. In addition, providers can apply a tourniquet on the limb to reduce the bleeding.

**TRAUMA LEG INSTALLATION**

To install the trauma leg:

1. Power the simulator off or set it to standby
2. Remove the knee bolt and gently separate the lower leg to expose the pulse tube and power cable.
3. Disconnect the leads from the normal leg and secure the pulse and power connections to the trauma leg.
4. Attach and secure amputated lower leg using the original knee bolt.

**TRAUMA ARM INSTALLATION**

To install the trauma arm:

1. Power the simulator off or set it to standby mode
2. Remove the elbow bolt from the left arm and gently separate the lower arm to expose the pulse tubing and power connection.
3. Disconnect the pulse lead.
4. Connect the red pulse tube and black power cable and screw the trauma arm onto the elbow joint.

FILLING THE TRAUMA LIMB

To fill the trauma limb with simulated blood:

1. Connect an empty 50 cc fill syringe to the blood reservoir port located on the trauma limb and vacuum the air inside.

2. Fill the filling syringe with Gaumard’s simulated blood.

WARNING: Use only simulated blood provided by Gaumard. Any other simulated blood brand containing sugar or any additive may cause blockage and/or interruption of the vasculature system.

3. Connect the filling syringe with simulated blood to the blood reservoir port and inject fluid into the reservoir. Do not overfill the reservoir.

| Trauma arm reservoir capacity | 120 mL |
| Trauma leg reservoir capacity | 500 mL |

INSTRUCTIONS FOR USE

Once the trauma limbs are installed and the reservoirs are filled with fluid, set the trauma controls to ON to start the blood flow from the severed arteries.

URINARY CATHETERIZATION

HAL features an internal bladder used for catheterization exercises.

| Bladder reservoir capacity | 240 mL |
| Urinary Catheter | 18 Fr catheter |

To fill the bladder with fluid to perform a catheterization exercise:

1. Unfasten the mid-section skin from the left and ride side.

2. Connect the IV fill Syringe to the one way valve located on the right side of the simulator.
3. Fill the bladder bag with a maximum volume of 240 mL.

4. Remove the syringe and reattach the midsection skin.

INTERCHANGEABLE GENITALIA

The simulator features interchangeable male and female genitalia.

To install the male genitalia:

1. Remove the female catheter adapter.

2. Insert the male genitalia urethra tube into the catheter port. Ensure the connector is secured to prevent leaks.

INSTRUCTIONS FOR USE

Catheterize the simulator using an 18 Fr catheter lubricated with mineral oil. At the end of the exercise, drain the fluid from the bladder reservoir to prevent mold.

Install the female genitalia reducer adapter to prevent leaks around the catheter.
Appendix
Scenarios

THINKING IN TERMS OF PALETTE ITEMS

As described previously, Palette items represent complete or partial groups of settings that have been stored as a single item. We learned how applying partial states will hold constant all settings that are left unspecified.

Not only does it take time to customize the palette, but a very large palette becomes difficult to navigate. So, it is desirable to minimize the number of Palette Items in each Profile. To accomplish this, an experienced facilitator tries to create items that are as generally applicable as possible and can, thus, be applied to a wide range of scenarios. The key is to only include in your Palette Items the settings that are directly related to the physiological event represented by that Palette Item.

SMART SCENARIOS

After reading the Details, Palette, and Scenarios sections of this guide, it should be clear how to build a scenario. You may have already tried building your own or modifying some of the factory presets. The following four guidelines will refine your ability to build the best possible scenarios.

1. **How will the scenario begin?**

The first thing to consider is the initial condition of the patient. Create a Palette Item to describe this condition. Make sure that this first step in the scenario is a complete state. That is, indicate some selection for each and every available setting on the Status/Details panel. Remember that only the settings you specify will cause a change in HAL®, and all other settings will remain constant. So, by starting with a complete state, HAL®'s condition will always be the same when the scenario starts, regardless of what he was doing previously.

Likewise, the "transition duration" of the first step in the scenario should be zero, indicating that changes are applied immediately.

There is one point that can cause confusion and warrants further explanation. It is an extension of the above discussion of partial states. The issue is best illustrated through the following example:

Suppose that you are creating a Palette Item to start your scenario. In this case, you have decided that the patient will be apneic. The question is, "How should the lung sounds be set?"

Most people's first inclination is to set the lung sounds to "none." This is incorrect, despite apnea. Obviously, no lung sounds should be heard during apnea, but since you have already set respiratory rate to zero, none will be. (Sounds are synchronized to the breathing cycle.)

What you are really setting here when you choose a lung sound is the condition of the lungs, given respiratory drive. That is, if the patient's respiratory rate were changed from zero, what sound would be heard? Assuming that the lungs themselves are normal in this scenario, you would choose "normal" for the lung sound setting.

Then, as the scenario progresses, if the patient starts breathing, there will be no need to set the lung sound again. It will already be set. The same principle applies to the heart sound and other settings.

2. **Include notes to guide the facilitator during the simulation.**

It is common for scenario designers, especially those who act as facilitators, to neglect the importance of notes in the scenario. They think that they will remember the learning objectives, patient history, and other details at the time they are ready to conduct the simulation. They usually don't, especially when revisiting a scenario months after creating it.

When you add "Wait" and "Wait Indefinitely" steps to a scenario, you have an opportunity to edit the item description. Use this description field to hold notes to the facilitator. Typically, scenario designers write notes in that space to indicate what the provider(s) or facilitator should be doing at that point.
Further, when saving the scenario, you may edit the scenario description. This is the best place to put patient history and any other longer notes and instructions.

3. Assume that providers will do the right thing.

Usually, you should create a scenario with the assumption that the providers will perform correctly. As long as they do, the scenario can simply be allowed to continue.

Naturally, you must be prepared for what might happen to HAL® when providers deviate from expectations. The consequences of such deviations can sometimes be included in the scenario, punctuated by "Wait Indefinitely" items. In other cases, the simulation will require more direct control by the facilitator via either the Palette or Status/Details panel.

4. Choose auto-response settings based on the scenario content and the objectives.

As you've seen, auto-responses can be used to free the facilitators' attention. They also enhance realism by presenting instant reactions to the care providers. On the other hand, sometimes it is not possible or desirable to determine the responses before the simulation begins. Different environments and applications call for different settings.

Some teaching practices are best done with the auto-response settings in Prompt mode. Responses must be triggered by a vigilant facilitator. Though it is slower and requires more attention, the benefit of Prompt over other modes is that the simulation can be allowed to go in any direction, and it will be possible to choose the response on a case-by-case basis.

Other learning exercises require a higher degree of automation. For such applications, most facilitators choose Auto mode for the auto-response settings. The key issue is standardized timing of symptom presentation. A consistent, repeatable simulation is essential for fair assessment of that care provider in relation to others and for the broader interpretation of results in the context of training validation studies.

When in doubt, it is best to choose Prompt mode, in which the facilitator will be given direct control of the responses as events are detected.
# Factory Preset Scenarios Flowcharts

## MANUAL MODE

<table>
<thead>
<tr>
<th>Scenario Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
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<td>1</td>
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<tr>
<td>2</td>
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<td>Gerard</td>
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<td>Bradycardia</td>
</tr>
<tr>
<td>9</td>
<td>Pulseless Arrest</td>
</tr>
<tr>
<td>10</td>
<td>Tachycardia</td>
</tr>
</tbody>
</table>
77-yr old man is found pulseless and apneic.

Anthony
HR 0
BP 0/0
RR 0
O2 Sat 50%

Wait Indefinitely
Drug therapy expected

V Fib, Coarse

Wait Indefinitely
Electrical therapy expected
300J threshold

V Tach, Stable
HR 120
BP 100/50
RR 16
O2 Sat 90%
Transition Time: 10 sec

Wait Indefinitely
Hold in stable V Tach

Healthy Resting
HR 75
BP 120/80
RR 13
O2 Sat 99%
Transition Time: 30 sec

End
55-year old male complains of substernal chest pain radiating to the jaw. Patient is diaphoretic, trembling, and has a waxing and waning mental status.
18-yr old college freshman calls EMS after taking a caffeine preparation prior to exams. He is short of breath and says that his heart is “beating fast and funny.”
65 year-old complains of dizziness and shortness of breath. He has a history of emphysema and does not know how much "breathing medicine" he has taken. During the interview, his eyes roll back and he slumps in his seat, unresponsive. (No peripheral IV sites are available.)
72 year-old is found tachycardic and tachypneic. He is disoriented and barely responsive. Patient's wife says that he has both heart and lung trouble and that they have been unable to afford his medicine in the past month. (After “apnea” item, facilitator should set scenario auto-response to pacing to “none” to simulate loss of capture.)
50 year-old found at home complains of weakness and fatigue. He is conscious and alert but slightly short of breath. An empty bottle of digoxin sits on his bedside table. (He will claim not to have taken any in several days. Pharmacological rate control will only be effective briefly.)

**Frank**
- HR 180
- BP 90/50
- RR 22
- O2 Sat 93%

Wait Indefinitely
Drug therapy expected

**HR Drop**
- HR -40%
- BP +20%/+20%
- Transition 0:20

Wait
Patient remains stable
Transition 2:00

**HR Spike**
- HR +50%
- BP -30%/-30%
- Transition 0:30

Wait Indefinitely
Cardioversion Expected

End
35 year-old man calls for help at local restaurant after onset of alarming respiratory symptoms.
(Patient experiencing allergic reaction to food, asthma attack, or exposure to inhaled toxin.)

Gerard
HR 85
BP 130/90
RR 20
O2 Sat 98%

Respiratory Allergy
Stridor, biphasic
RR 30
Tongue Edema
Wheezing
O2 Sat 91%
Transition 4:00

Closed Airway
Toungue Edema
Laryngospasm
Pharyngeal swelling

Wait Indefinitely
Drug therapy expected

Healthy Resting
HR 75
BP 120/80
RR 13
O2 Sat 99%
Transition 2:00

End
An in-hospital patient is diagnosed with Bradycardia and requires immediate attention. Note: for this scenario to function as intended the instructor should enable automatic pacing capture in the ‘Setup -> Auto-Responses’ menu.

Bradycardia
HR 50
BP 90/60
RR 10
O2 Sat 96%

Wait
No changes made
Transition 2 min

Complaint – “Feel dizzy”

Confusion – “What happened?”

Cardio Drop
HR -15%
BP -10%/-10%
O2 Sat -5%

Atropine Administered
HR +10%
BP +7%
1:00

Epi Infusion
HR +5%
BP +8%
1:00

Dopamine
HR +5%
BP +5%
1:00

Atropine
HR +10%
BP +7%
1:00

Epi Infusion
HR +5%
BP +8%
1:00

Dopamine
HR +5%
BP +5%
1:00

Urgency – “OUCH!!!” “That Hurts.” “OUCH!!!”

Wait Indefinitely

Pace Response
BP 100/70
O2 Sat 97%
1:00

Pace

End
A young male was found unconscious.

**Pulseless Vtach 1**
- HR 168
- BP 50/30
- RR 0
- OSat 85%
- Unconscious
- Cyanotic

**Osat Increase 1**
- O2Sat 2%

**VF rhythm**
- BP 0/0
- Inspiration 0%
- OSat -5%

**SVT rhythm pulseless**
- SVT
- HR 160
- BP 50/35

**SVT rhythm**
- HR 180
- BP 80/55
- RR 9
- OSat +5%

**Healthy Resting**
- NSR
- HR 75
- BP 120/80
- RR 13
- OSat 99%

**SVT rhythm with Brief Sinus Pause**
- SVT
- HR 180
- BP 80/55
- RR 9
- OSat +5%

**Asystole rhythm**
- BP 0/0

**Adenosine Therapeutic Response**

**Adenosine Non-Therapeutic Response**

**Wait Indefinitely**

**Progress To Vfib**

**Progress To PEA (SVT)**

**Progress To Healthy Patient**

**Progress To VTach**

**Progress To Healthy Patient**
## AUTOMATIC MODE

<table>
<thead>
<tr>
<th>Scenario Name</th>
<th>Patient Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pulseless and Apneic</td>
<td>Anthony</td>
<td>Linear</td>
</tr>
<tr>
<td>2 Chest Pain</td>
<td>Brent</td>
<td>Linear</td>
</tr>
<tr>
<td>3 Overdose Caffeine</td>
<td>Christian</td>
<td>Linear</td>
</tr>
<tr>
<td>4 Apnea</td>
<td>Darrell</td>
<td>Linear</td>
</tr>
<tr>
<td>5 Cardiac Resp. Failure</td>
<td>Evan</td>
<td>Linear</td>
</tr>
<tr>
<td>6 Drug Overdose</td>
<td>Frank</td>
<td>Linear</td>
</tr>
<tr>
<td>7 Respiratory Allergy</td>
<td>Gerard</td>
<td>Linear</td>
</tr>
<tr>
<td>8 Unexpected OSat Drop</td>
<td>Nicolas</td>
<td>Linear</td>
</tr>
<tr>
<td>9 Cardiac Arrest</td>
<td>Brent</td>
<td>Branching</td>
</tr>
<tr>
<td>10 Sudden Collapse</td>
<td>Darrell</td>
<td>Branching</td>
</tr>
<tr>
<td>11 Pulmonary Edema</td>
<td>Ira</td>
<td>Branching</td>
</tr>
<tr>
<td>12 Trauma</td>
<td>Jim</td>
<td>Branching</td>
</tr>
<tr>
<td>13 Bradycardia</td>
<td>Kevin</td>
<td>Branching</td>
</tr>
<tr>
<td>14 Diving Accident</td>
<td>Lloyd</td>
<td>Branching</td>
</tr>
<tr>
<td>15 Tamponade</td>
<td>Matthew</td>
<td>Branching</td>
</tr>
<tr>
<td>16 Airway Obstruction</td>
<td>Nicolas</td>
<td>Branching</td>
</tr>
</tbody>
</table>
77-yr old man is found pulseless and apneic.

- **Start State**
  - HR 0
  - BP Auto
  - RR 0
  - O2 Sat: Auto

- **Wait Indefinitely**
  - Drug therapy expected

- **V Fib, Coarse**
  - HR 0
  - BP 0/0
  - RR 0
  - O2 Sat Auto

- **Wait Indefinitely**
  - Electrical therapy expected
  - 300J threshold

- **V Tach, Stable**
  - HR 120
  - BP Auto
  - RR 16
  - O2 Sat 90%
  - Transition Time: 10 sec

- **Wait Indefinitely**
  - Hold in stable V Tach

- **Healthy Resting**
  - HR 75
  - BP Auto
  - RR 13
  - O2 Sat 99%
  - Transition Time: 30 sec

- **End**
55-year old male complains of substernal chest pain radiating to the jaw. Patient is diaphoretic, trembling, and has a waxing and waning mental status.
Christian is short of breath and says that his heart is "beating fast and funny."
The patient is found tachycardic and tachypneic. He is disoriented and barely responsive. (After "apnea" item, facilitator should set scenario auto-response to pacing to "none" to simulate loss of capture.)

Start State
HR 140
BP Auto
RR 30
O2 Sat 93%
Contractility 80%

Wait
No changes are made to Hal
Transition 2:00

Cardiopulmo Decline
HR -70%
BP Auto
RR -70%
O2 Sat Auto

Wait Indefinitely
Hold until action is taken

Apnea
BP Auto
RR 0
O2 Sat Auto
Contractility 50%

Decreased BP
BP Auto
RR Auto
O2 Sat Auto
Contractility 30%

Wait
No changes are made
Transition 3:00

Asystole
HR 0
BP Auto
RR Auto
O2 Sat Auto

End
Frank was found at home and complains of weakness and fatigue. He is conscious and alert but slightly short of breath. An empty bottle of digoxin sits on his bedside table. (He will claim not to have taken any in several days. Pharmacological rate control will only be effective briefly).
Patient calls for help at local restaurant after onset of alarming respiratory symptoms. (Patient experiencing allergic reaction to food, asthma attack, or exposure to inhaled toxin.)

Slightly Allergic
- HR 85
- BP 130/90
- RR 20
- O2 Sat Auto
- Inspiratory Stridor

Severe Allergy
- BB Auto
- RR 30
- O2 Sat 91%
- Biphasic Stridor
- Tongue Edema

Closed Airway
- BB Auto
- RR 30
- O2 Sat 91%
- Biphasic Stridor
- Tongue Edema
- Laryngospasm
- Pharyngeal swelling

Wait Indefinitely
Hold until action is taken

Healthy Resting
- HR 75
- BP Auto
- RR 13
- O2 Sat Auto
- Throat Sounds Normal

End
Patient is intubated and connected to breathing circuit. But the vitals start to drop because of the blocked airway. When the problem is recognized and the correct action is taken, the patient goes to a stable state.
Brent complains of substernal chest pain radiating to the jaw. Patient is diaphoretic, trembling, and has a waxing and waning mental status.

Start State
HR 140
BP Auto
RR 20
O2 Sat Auto
Acute Inferior MI

Start O2
Administer drug

Deterioration
BP Auto
RR Auto
Cardiac Irriability
(slight deteriorate)

Cardiac Deterioration
10 seconds time out

Wait Indefinitely

No

Healthy State
HR 80
BP Auto
RR 16
O2 Sat Auto

End

Yes

Healthy Resting
HR 80
BP Auto
RR 16
O2 Sat Auto

V-Tach
HR 180
BP Auto
Contractility RA/LA 50%
Contractility RV/LV 20%
Unresponsive

Unstable V-Tach
Times out in 10 seconds

V-Tach
HR 140
BP Auto
RR 16
O2 Sat 90%
Contractility RV/LV 80%
Responsive

Stable V-Tach
Times out in 10 seconds
Darrell complains of dizziness and shortness of breath. During the interview, his eyes roll back and he slumps in his seat, unresponsive. (No peripheral IV sites are available.)
The patient is found complaining of chest discomfort and shortness of breath. She is weak, lightheaded, and diaphoretic.
The victim was found in a building collapse accident. His left leg is amputated and bleeding.

Bleeding
HR 70
RR 15
BP Auto
RR Auto
O2 Sat Auto
Bleeding (Left Leg)

Stop Bleeding
BP Auto
RR Auto
O2 Sat Auto
Bleeding stopped

Wait Indefinitely

Stopped Bleeding
To Asystole

Asystole
HR 0
BP Auto
Cyanosis
Radial pulse Absent
Brachial pulse Absent

END
Note: for this scenario to function as intended the instructor should enable automatic pacing capture in the ‘Setup -> Auto-Responses’ menu. A in-hospital patient is diagnosed with Bradycardia and requires immediate attention.

Bradycardia
- HR 45
- BP Auto
- RR 10
- O2 Sat Auto
- Contractility 70%

Wait Indefinitely

Speech – Feel dizzy
Speech – What happened

Cardio Drop
- HR -15%
- BP Auto
- RR Auto
- Contractility 60%

Wait
- Wait for student action
- Transition 2 min

Wait
- Pacing expected
- Transition 2 min

Pace

Pace Response
- BP Auto
- RR Auto
- O2 Sat Auto
- Contractility 80%

Asystole
- HR 0
- BP Auto
- RR Auto

Speech – Ouch, that hurts, Ouch

END
Patient was just rescued from a diving accident. He is unconscious and unresponsive while the boat crew clears his equipment. He has a pulmonary edema that won’t heal until he is placed in a hyperbaric chamber.
A young male was found injured in a high speed collision after drag-racing on the expressway. He lost control of vehicle and crashed into a highway divider. BAC: 0.10.
Patient is intubated and connected to breathing circuit. But the vitals start to drop because of the blocked airway. When the problem is recognized and the correct action is taken, the patient goes to a stable state.
## Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication never gets established or is lost</td>
<td>Battery is discharged or damaged</td>
<td>Plug the charger and if communication is established then charge battery as per procedure explained in the manual.</td>
</tr>
<tr>
<td>(blinking communication indicator is consistently red)</td>
<td>Computer is too far away from simulator</td>
<td>Get simulator closer to computer</td>
</tr>
<tr>
<td>Trying to communicate with a different simulator</td>
<td>Make sure to select the right simulator when opening the software.</td>
<td>In a multiple simulator environment (“Setup/Options” menu), make sure to enter the right Serial Number</td>
</tr>
<tr>
<td>Starting more than one simulator simultaneously</td>
<td>Select different channels for each of the simulators, and then try to turn them on one at a time, which means to wait until a link have been established between the tablet and the first simulator. Only after that, start the User Interface software in the second tablet, and so on for the rest of the simulators. To do so go to menu Setup -&gt; Options-&gt; Environment -&gt; Select ‘Auto change to channel: X’ (X = number from 1 – 11).</td>
<td></td>
</tr>
<tr>
<td>All others</td>
<td>Close the User Interface software and unplug the RF module for at least 5 seconds, then plug it back in. Restart the software and wait for initialization</td>
<td></td>
</tr>
<tr>
<td>Simulator doesn’t run for the time specified on the manual</td>
<td>Battery not charge properly</td>
<td>Make sure that LED indicator on battery charger goes thru the sequence described in its label, usually red or orange after plugging it, and then green when charge is completed. If LED does not go thru label’s indications, then: • Check plug connection making sure it is all the way in. • Make sure you are using the appropriate charger, which is labeled with its simulator name.</td>
</tr>
<tr>
<td>Simulator doesn’t respond to any command even that blinking communication indicator is consistently green</td>
<td>The computer is properly communicating with a simulator, but not necessarily the one you intend to control</td>
<td>If you have more than one simulator in your facility, make sure that your computer is properly set-up to control the simulator that you wish to control. Go to Options... on the Setup pull-down menu and check the Environment preferences</td>
</tr>
<tr>
<td>Commands are taking longer than usual to take effect or simulator is not</td>
<td>Distance between computer and simulator is reaching its limit, or there are too many obstructions in between</td>
<td>Get simulator closer to computer or move away from obstructions.</td>
</tr>
<tr>
<td>Symptom</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>reporting every action (Signal strength indicator is low)</td>
<td>(walls, etc.)</td>
<td>Try changing the RF channel by going to (menu) Setup - &gt; Options-&gt; Environment -&gt; Select ‘Auto change to channel: X’ (X = number from 1 – 11).</td>
</tr>
<tr>
<td>Sound quality while streaming audio is poor</td>
<td>Noisy channel or another Gaumard tetherless simulator is nearby</td>
<td>Select a different channel (see “Options and more” section). When more than one simulator is in the vicinity, allow one channel between simulators.</td>
</tr>
<tr>
<td></td>
<td>Computer too far from simulator</td>
<td>Streaming audio can’t reach as far as normal data with a range of up to 150 ft. / 50 meters line of sight between simulator and PC. Keep antenna upright for maximum range.</td>
</tr>
<tr>
<td></td>
<td>Sound too low or too loud</td>
<td>Sound volume at PC side is managed from PC”s volume control. Simulator sound volume is managed thru “Output Gain” slider under the “Speech/Streaming Options” tab. Always talk as close as possible as microphone in order to improve quality. Using a headset is recommended.</td>
</tr>
<tr>
<td></td>
<td>Respiration and other undesirable sounds are heard by instructor</td>
<td>Since simulator’s microphone sensitivity is high in order to capture the voice of providers, it also captures all surrounded noises on or around the simulator. This is normal and it is not a malfunction. Disable the tablet’s onboard microphone and enable the headset input using the Windows audio setting.</td>
</tr>
<tr>
<td>Streaming audio does not work; streaming voice controls are not shown.</td>
<td>“Single” simulator is checked under “Setup/Options” menu.</td>
<td>Make sure to select multiple simulator environment (“Setup/Options” menu), and enter the Serial Number of the simulator you are trying to communicate. Streaming audio does not work when “Single” simulator is checked.</td>
</tr>
<tr>
<td>UNI has set the power mode to STAND-BY automatically</td>
<td>The battery on the simulator is depleted</td>
<td>In Hal Revision 14 and lower, replace battery for a charged one. For S3004, S3009, and S3010, plug the external power supply. For all others including Hal Revision 15 and above plug in the charger.</td>
</tr>
<tr>
<td>“RF module not found” message is displayed when UNI is started</td>
<td>RF module not connected</td>
<td>Connect the RF module to any USB port.</td>
</tr>
<tr>
<td></td>
<td>RF module not identified by the computer.</td>
<td>Close the software and disconnect the RF module for 10 seconds, then plug it back in and restart the software.</td>
</tr>
<tr>
<td>Chest compressions are not properly detected or not detected at all</td>
<td>Is the communication signal strength indicator consistently low?</td>
<td>See “Scan RF Channels” section</td>
</tr>
<tr>
<td></td>
<td>Is the respiratory rate set to</td>
<td>Set respiration rate to zero</td>
</tr>
<tr>
<td>Symptom</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>&quot;0 / min&quot;? Chest compressions are only detected when</td>
<td>Is the communication signal strength</td>
<td>See “Scan RF Channels” section</td>
</tr>
<tr>
<td>the respiratory rate is set to 0 per minute (0 / min).</td>
<td>indicator consistently low?</td>
<td></td>
</tr>
<tr>
<td>Otherwise they are ignored</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All others</td>
<td>See “Calibration” section</td>
<td></td>
</tr>
<tr>
<td>Artificial ventilations are not properly detected or</td>
<td>NIBP is disabled or not installed</td>
<td>Go to Setup&gt;Options&gt;HAL Add-Ons and check mark “USE NIBP”. Continue to</td>
</tr>
<tr>
<td>not detected at all</td>
<td></td>
<td>the NIBP hardware section to calibrate the NIBP feature.</td>
</tr>
<tr>
<td>All others</td>
<td>See “Calibration” section</td>
<td></td>
</tr>
<tr>
<td>NIBP values are not accurate</td>
<td>BP sensors are offset</td>
<td>Recalibrate BP cuff sensors on the simulator as per “Calibration”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>section</td>
</tr>
<tr>
<td></td>
<td>NIBP feature is enabled</td>
<td>Go to Setup&gt;Options&gt;HAL Add-Ons and un check “USE NIBP”. Continue to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the hardware section to calibrate the manual blood pressure.</td>
</tr>
<tr>
<td></td>
<td>Wrong placement of BP Cuff (only for</td>
<td>See correct cuff placement under section “Circulation”</td>
</tr>
<tr>
<td></td>
<td>simulators with tetherless BP cuff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>feature)</td>
<td></td>
</tr>
<tr>
<td>Simulator’s chest does not rise with artificial</td>
<td>Simulator is not running</td>
<td>In some simulators, the trachea is disconnected from the lungs when they</td>
</tr>
<tr>
<td>ventilation (e.g. BVM)</td>
<td>Disable lung/s</td>
<td>are not on</td>
</tr>
<tr>
<td></td>
<td>Surgical insert is installed</td>
<td>The ventilation trachea insert provides a better seal for ventilation.</td>
</tr>
<tr>
<td>Low chest rise (or no chest rise at all) while</td>
<td>Wrong settings or disable lungs</td>
<td>Make sure lungs are enabled and both respiration rate and inspiration</td>
</tr>
<tr>
<td>breathing</td>
<td></td>
<td>percent are different than ‘0’. Try changing the respiration rate to a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>different value or turn the simulator off and then on again.</td>
</tr>
<tr>
<td>Loss of brachial pulse</td>
<td>Brachial pulses disable</td>
<td>Make sure to enable brachial pulse on “Status/Details” panel go to the</td>
</tr>
<tr>
<td></td>
<td>Wrong reading of corresponding BP</td>
<td>Brachial pulse is cut off when BP cuff pressure is above Systolic. If</td>
</tr>
<tr>
<td></td>
<td>sensor</td>
<td>it is not connected, then recalibrate BP cuff sensors on the simulator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>as per “Calibration” section.</td>
</tr>
<tr>
<td>Symptom</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>Reporting intubation when it is not</td>
<td>Wrong sensor reading</td>
<td>Reset “ET Tube” sensor on simulator as per “Calibration” section. Do not turn on (or power cycle) the simulator while being intubated, doing so would cause the sensor to report wrong intubations.</td>
</tr>
<tr>
<td>Pre-built scenarios don’t show up</td>
<td></td>
<td>Select “Quick Start Scenarios” when starting the software. Should user forget to do so, there’s no need to shut down the software and open it again in order to load the pre-built scenarios. Go to “File/Profile” menu and then select “Modeled Scenarios”</td>
</tr>
<tr>
<td>A sound is not heard or heard not at desired volume level</td>
<td>Volume not set to user’s criteria</td>
<td>Every sound has a volume control. Play with volume control to get it to desired level</td>
</tr>
<tr>
<td>Cyanosis intensity is too much or too little</td>
<td>Cyanosis intensity not set to user’s criteria</td>
<td>Set Cyanosis level to a desired level by playing with the “Set Max cyanosis level” control</td>
</tr>
<tr>
<td>Pupils (either one or both) dilating either while blinking or when not supposed to</td>
<td>Wrong dilation calibration</td>
<td>Set pupil dilation level properly by following procedure described in the manual under section “Options and more…” (see Tolerances Tab)</td>
</tr>
<tr>
<td>Pupils constricting-dilating constantly</td>
<td>This might happen either when the simulator is under intense light or wrongfully calibrated</td>
<td>Try the “Set to Ambient Light” feature under “Options/Tolerances” (see section “Tolerances ”).</td>
</tr>
</tbody>
</table>
| Oximeter reading does not coincide with value set | Using a different Oximeter/Sensor for which the simulator was calibrated | • The simulator must be calibrated with the Oximeter instrument that it is going to be used (including the Pulse Oximeter Sensor). Oximeter Sensors cannot be swapped even with same kind of oximeter’s brand and model.  
• An oximeter which includes carbon monoxide and/or methemoglobin sensing cannot be used.  
• Oximeter has been placed on the arm that doesn’t have the O2Sat feature. Check in the Diagnostic if that arm has the feature installed |
<p>| Pulse Oximeter Sensor not properly placed | Make sure to slide the Pulse Oximeter Probe all the way into the simulator’s finger. Make sure the emitter part (the red light) of the probe is on the nail side of the finger. If user is sure that the probe is properly placed, it means that it was not when calibration was performed, then re-calibration is necessary. See O2Sat calibration section for more info. |</p>
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>offset value within +/- 2</td>
<td>User should expect a +/- 2 discrepancy between value set and Oximeter reading for O2Sat values above 80%, and +/-3 below 80%.</td>
<td></td>
</tr>
<tr>
<td>Drug ID is not being read</td>
<td>Syringe has not been programmed</td>
<td>See “IV Medication Infusion” section</td>
</tr>
<tr>
<td></td>
<td>Syringe is not in the field of the RFID reader</td>
<td>This could happen when injecting the cephalic vein close to the hand and having the syringe sideways to the plane of the forearm.</td>
</tr>
<tr>
<td></td>
<td>Wrong calibration</td>
<td>Calibrate the drug arm as per calibration instructions</td>
</tr>
<tr>
<td></td>
<td>Injecting too fast</td>
<td>Maximum injection rate is 9999 ml/hr. This rate won’t be exceeded when injecting into the veins using a 22 g needle.</td>
</tr>
<tr>
<td></td>
<td>Not reading the syringe ID</td>
<td>If RFID tag on syringe is not read, the system tends to read fewer amounts than actually injected. This could happen when infusing the drug thru the side port on the arm. When doing so, place a tagged syringe on the syringe holder. See “IV Medication Infusion” section</td>
</tr>
<tr>
<td></td>
<td>Fluid reservoir is full</td>
<td>The maximum amount of fluid injected properly read before purging the internal reservoir is 50 cc. Make sure to purge the reservoir or permanently connect a purging line (see instructions)</td>
</tr>
<tr>
<td>CO₂ not being exhaled</td>
<td>Empty CO₂ cartridge</td>
<td>Make sure the CO₂ cartridge is in place. For S3201, the User Interface displays the “Low CO₂” message when CO₂ pressure is low. Notice that CO₂ cartridge must be plug just before the training section starts to get maximum duration. If left overnight, the cartridge will slowly empty. (See “CO₂ exhalation” section). The CO₂ cartridge once it is plugged, will empty within 24 hours whether it is used or not.</td>
</tr>
<tr>
<td></td>
<td>CO₂ pressure regulator is “OFF”</td>
<td>For S3201, go to “Calibration/Factory Settings” and then press the “CO₂ Pressure” button. In the window to the right a value between 3-6 psi (ideal 4.5 psi) indicates good level. Should not be the case, call tech support for advanced troubleshooting.</td>
</tr>
<tr>
<td>Mechanical Ventilator is not triggered when assisting the simulator</td>
<td>Settings exceeding the simulator’s capabilities</td>
<td>The simulator is able to trigger the ventilator either when:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Flow ≤ 1 Lts/min, or Pressure ≤ 1 cmH2O</td>
</tr>
</tbody>
</table>
REFERENCE LUNG COMPLIANCE VALUES

The graph below shows the relation between HAL’s nine lung compliance levels and the resulting peak inspiratory pressure readings on the ventilator. At compliance level 9, the lung is most compliant so the PIP is relatively low, while at compliance level 0 the lungs are least compliant resulting in higher PIP. For this example, the ventilator was set with the following parameters:

- Ventilation type: Volume controlled
- Tidal volume of 550 mL
- Flow of 40 l/min
- Patient weight is 75 Kg (165 lbs.)

To accommodate for fluctuations in the results as seen on ventilators, values on the graph may differ by +/- 2.
**Pro+ System Offline Updater**

**INSTRUCTIONS FOR USE**

2. Click the **Software Updates** button located on the middle right, under the slideshow.
3. Select the **Pro+** button from the software downloads menu. Also you may scroll down until you reach the Pro+ download section.
4. Select Download Update to download the Pro+ update file
5. Plug a USB Drive that is greater than 2GB into your Windows computer.

6. Locate the downloaded file and place onto the root of the USB (Not in any folders)
7. Remove USB device from your PC and plug into the ETC Pro+/micro+ computer.

8. Unplug the network cable from the ETC Computer.

9. Start up the ETC laptop and click the **Update System** Icon.
10. Wait for the update screen to arrive.
11. Click Update (Update may last about an hour)

12. Reboot ETC after a successful update.
13. Plug in the network cable and the off-line update procedure is completed.
Wireless Network  
(Without USB Router)

For Windows XP and Windows 7
UNI generates the vital signs information displayed on the virtual monitor PC. The information is transmitted through a wireless ad-hoc connection between the two computers in real time.

Use the “Create an ad-hoc Wireless network” tool to configure the wireless ad-hoc link between the two computers. Then, configure the connection between UNI and the Gaumard Monitors software.

UNI NETWORK CONFIGURATION

Complete the next steps using the “Controller - Create Ad-Hoc Wireless Network” tool built in to UNI software.

1. From the menu bar, go to the Gear> Help> “Create ad-hoc Wireless Network”
   
   The “Controller - Create Ad-hoc Wireless Network” window is displayed

2. Click “Clear previous network settings”

3. Select the “Wireless Network Adapter”. If the wireless adapter is not listed, first enable the adapter using the Windows® network menu and then return to this window.

4. Enter a wireless network name (case sensitive). Use the same wireless network name to configure the Gaumard Monitors PC. “GaumardNet” is the required name for Windows® 7 computers.

5. Click “Set Dynamic IP”. to set the wireless network dynamic.

6. Click “Apply Wireless Network Settings” to save the settings.

7. Exit the UNI software
8. In the case of Windows 7 computers, Navigate to Wireless Network Connection icon on the right lower corner of the desktop to select “Open Network and Sharing Center”.

9. Select “Manage Wireless Networks” and make sure that only GaumardNet is listed as shown below.

Notice that steps 8 and 9 only applies for a Windows 7 computer

10. Restart the computer.

GAUMARD MONITORS NETWORK CONFIGURATION

After the UNI control computer is configured, complete the next steps using the “Create an ad-hoc network tool” included in Gaumard Monitors software.

1. On the virtual monitor computer, click the Gaumard Monitors icon to start the vital signs software.

2. Click the V menu near the top left corner and select “Create Ad-Hoc Network”.

3. Select “Wireless Network Adapter”. If the wireless adapter is not listed, first enable the adapter using the Windows® network menu and then return to this window.

4. Enter a wireless network name (case sensitive). Use the same name entered in the controller computer. “GaumardNet” is the required name for Windows® 7 computers.

5. Click “Set Dynamic IP” to set the wireless network dynamic.

6. Click “Apply Wireless Network Settings” to save the settings.

7. Restart the computer.
CONFIGURE THE VITAL SIGNS BROADCAST

After the wireless ad-hoc link is established between both computers, complete next steps to configure the transmission of the vital signs information.

1. Verify that both computers are connected to the GaumardNet network using Windows® wireless connection menu. If the computers are not connected, select the “GaumardNet” network and click “Connect” manually.

2. Start the UNI control software.
3. On the UNI menu bar, click the Gear> Monitors> Configuration. The “Virtual Monitor Setup” window is displayed.

4. Set the adapter to “Wireless network connection”

5. Verify the network status and network name, then click “Connect” to begin transmitting the vital signs information.
6. Write down the “IP address” and “Port number”.
7. Start the Gaumard Monitors software on the virtual monitor PC.
8. Click the “V” menu near the top left corner, and then select “Comm Setup”.

The “TCP Comm Setup” window is displayed.

9. Click “Show IP” to display the IP address.

10. Confirm that the IP address matches the IP address of the UNI
11. Click “Connect”

To connect both computers using a local internet network, follow the steps below:

1. Verify that both computers have applied “Set Wireless Network Dynamic”. Refer to UNI and Gaumard Monitors network configuration sections for instructions.

2. Disconnect both computers to the GaumardNet network and connect them to the local network manually using Windows® wireless connection menu.
3. Repeat the same steps listed above to connect the UNI software to the Gaumard Monitors software.
Wireless Network Instructions (With USB Router)

For Windows 8

These first steps of the instructions will apply to customers receiving the router as an upgrade. If you received the Gaumard Monitor computer with the router already attached, please proceed to step number 4:

1. Add Velcro to TPLINK router and VM

2. Connect Router to USB power supply (Computer can be packaged with router connected)

3. Open the Wireless Network Connection on the Monitor Computer and connect to the default network, which name will be (GaumardSimulatorSerialNumber)
   a. (example) GaumardN0000001

4. Open the Wireless Network Connection on the simulator control computer and connect to the same network name (GaumardN0000001)

CONFIGURE THE VITAL SIGNS BROADCAST

Complete next steps to configure the transmission of the vital signs information, after the wireless connection is established between both computers.

1. Verify that both computers are connected to the GaumardV0000001 network using Windows® wireless connection menu. If the computers are not connected, select the network name and click "Connect" manually.

2. Start the UNI control software on the control computer

3. On the UNI menu bar, click the Gear> Monitors>Configuration

4. The simulator “Virtual Monitor Setup” window is displayed now

5. Set the adapter to "Wireless network connection" or WiFi

6. Verify the network status and network name, and then click “Connect” to begin transmitting the vital signs information

7. Verify that the IP Type is set to automatic

8. If not, from the menu bar, go to the Gear> Help> "create ad-hoc Wireless Network"

The “Controller-Create Ad-hoc Wireless Network” window is displayed.
9. Select the “Set Dynamic IP” to set the IP automatic and close this window.

10. On UNI menu bar, click again the Gear> Monitors> Configuration
11. Write down the “IP Address” and “Port number”
12. Start the Gaumard Monitors software on the virtual monitor PC
13. Click the “V” menu near the top left corner, and then select “Comm Setup”.
14. The “Comm Setup” window is displayed.
15. Click “Show IP” to display the IP Address
16. Enter the IP Address from the UNI software and verify the port number
17. Click “Connect” to accept the incoming connection
# Selected parts list S3201

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3201.001</td>
<td>A/C Virtual Monitor</td>
<td>R</td>
<td>A/C Powered 17&quot; Touch Screen monitor and desktop, VM software included</td>
</tr>
<tr>
<td>S3201.002</td>
<td>D/C Virtual Monitor</td>
<td>R</td>
<td>D/C Powered 12&quot; Touch Screen Mobile Monitor with stylus, VM software included</td>
</tr>
<tr>
<td>S3201.003</td>
<td>D/C Virtual Monitor Upgrade</td>
<td>A</td>
<td>D/C Powered 12&quot; Touch Screen Mobile Monitor with stylus upgrade</td>
</tr>
<tr>
<td>S3201.004.L</td>
<td>Traumatic Leg Amputation</td>
<td>A</td>
<td>Trauma Amputation Leg for HAL, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.005.L</td>
<td>Traumatic Arm Amputation</td>
<td>A</td>
<td>Trauma Amputation Arm for HAL, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.006</td>
<td>Casualty Simulation Kit</td>
<td>A</td>
<td>Bleeding and non-bleeding wounds</td>
</tr>
<tr>
<td>S3201.009</td>
<td>Power Package</td>
<td>R</td>
<td>100-240 V AC battery charger with rechargeable battery</td>
</tr>
<tr>
<td>S3201.018.L</td>
<td>Chest skin</td>
<td>R</td>
<td>12 lead chest skin, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.024L.R2.L</td>
<td>Lower Left Osat Arm Revision 2</td>
<td>M</td>
<td>Lower left Osat arm with Osat index finger and microphone, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.027L.D</td>
<td>Lower left leg</td>
<td>R</td>
<td>Lower left leg assembly, dark color (also available medium or light)</td>
</tr>
<tr>
<td>S3201.028R.L</td>
<td>Right I/O leg</td>
<td>R</td>
<td>Lower Right I/O leg assembly, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.029R.L</td>
<td>I/O Leg Skin Cover</td>
<td>C</td>
<td>Light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.030</td>
<td>Reservoir bone</td>
<td>R</td>
<td>Reservoir bone used in I/O leg access</td>
</tr>
<tr>
<td>S3201.031</td>
<td>I/O Bones</td>
<td>C</td>
<td>Replacement bone for I/O leg</td>
</tr>
<tr>
<td>S3201.032.D</td>
<td>Surgical Trachea</td>
<td></td>
<td>Surgical trachea insert, dark color</td>
</tr>
<tr>
<td>S3201.032.L</td>
<td>Surgical Trachea</td>
<td></td>
<td>Surgical trachea insert, light color</td>
</tr>
<tr>
<td>S3201.032.M</td>
<td>Surgical Trachea</td>
<td></td>
<td>Surgical trachea insert, medium color</td>
</tr>
<tr>
<td>S3201.054L.M</td>
<td>Real BP Upper Left Arm</td>
<td>M</td>
<td>Medium color upper left arm assembly with real BP for use with normal cuff, medium color (also available light or dark)</td>
</tr>
<tr>
<td>S3201.060</td>
<td>Simulator Transport Case</td>
<td>R</td>
<td>Soft storage and transport case with wheels</td>
</tr>
<tr>
<td>Item ID</td>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>S3201.078</td>
<td>CO₂ Exhalation</td>
<td>A</td>
<td>CO₂ Exhalation feature ordered at the time of initial purchase</td>
</tr>
<tr>
<td>S3201.080</td>
<td>Simulated Blood Concentrate</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>S3201.081</td>
<td>Mineral Oil</td>
<td>C</td>
<td>Oil-based mineral lubricant</td>
</tr>
<tr>
<td>S3201.087</td>
<td>Wireless Streaming Audio Headset</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>S3201.104</td>
<td>ECG/Pacer Module</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>S3201.211</td>
<td>ETC Pro+</td>
<td>A</td>
<td>Recording and debriefing solution. Includes two wireless and hard-wired camera for multiple video and audio stream.</td>
</tr>
<tr>
<td>S3201.211.U</td>
<td>ETC Pro+ Upgrade</td>
<td>U</td>
<td>Recording and debriefing solution upgrade. Includes two wireless and hard-wired camera for multiple video and audio stream.</td>
</tr>
<tr>
<td>S3201.224L.R2.L</td>
<td>Lower Left Osat Arm Rev 2 Reveining</td>
<td>M</td>
<td>Lower left Osat arm with Osat index finger and microphone reveining, light color (also available medium or dark)</td>
</tr>
<tr>
<td>S3201.410</td>
<td>Drug Recognition Syringes</td>
<td>R</td>
<td>Set of 10 drug recognition syringes with tags</td>
</tr>
<tr>
<td>S3201.411</td>
<td>Replacement Antecubital Veins</td>
<td>R</td>
<td>Set of 10 veins 21&quot; long and 10 veins 7&quot; long</td>
</tr>
<tr>
<td>S3201.412</td>
<td>Drug Recognition Filling Kit</td>
<td>R</td>
<td>60cc syringe with fill and drain tubes</td>
</tr>
<tr>
<td>S3201.413</td>
<td>Syringe Programming Holder</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>S3201.INST</td>
<td>In-Service Training</td>
<td>A</td>
<td>Day of in-service training and installation</td>
</tr>
</tbody>
</table>
### Selected parts list S3101/S3000

<table>
<thead>
<tr>
<th>Item ID</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3101.001</td>
<td>A/C Virtual Monitor</td>
<td>A</td>
<td>A/C Powered 17&quot; Touch Screen monitor</td>
</tr>
<tr>
<td>S3101.002</td>
<td>D/C Virtual Monitor</td>
<td>A</td>
<td>D/C Powered 12&quot; Touch Screen Mobile Monitor with stylus</td>
</tr>
<tr>
<td>S3101.004.L</td>
<td>Traumatic Leg Amputation</td>
<td>A</td>
<td>Trauma Amputation Leg for HAL®, lite color</td>
</tr>
<tr>
<td>S3101.005.L</td>
<td>Traumatic Arm Amputation</td>
<td>A</td>
<td>Trauma Amputation Arm for HAL®, lite color</td>
</tr>
<tr>
<td>S3101.006</td>
<td>Casualty Simulation Kit</td>
<td>A</td>
<td>Bleeding and non-bleeding wounds</td>
</tr>
<tr>
<td>S3101.009</td>
<td>Power Package</td>
<td>R</td>
<td>100-240 V AC battery charger with rechargeable battery</td>
</tr>
<tr>
<td>S3101.016.L</td>
<td>Neck Collars</td>
<td>C</td>
<td>Lite color neck collars, set of 6</td>
</tr>
<tr>
<td>S3101.018.L</td>
<td>Chest skin</td>
<td>R</td>
<td>Lite color</td>
</tr>
<tr>
<td>S3101.023.L.L</td>
<td>Lower Left Arm</td>
<td>C</td>
<td>Lower left IV arm, lite color</td>
</tr>
<tr>
<td>S3101.023R.L</td>
<td>Lower Right Arm</td>
<td>C</td>
<td>Lower right IV arm, lite color</td>
</tr>
<tr>
<td>S3101.024.L.L</td>
<td>Lower Left Osat Arm</td>
<td>C</td>
<td>Lower left IV arm with Osat index finger, lite color</td>
</tr>
<tr>
<td>S3101.024R.L</td>
<td>Lower Right Osat Arm</td>
<td>C</td>
<td>Lower right IV arm with Osat index finger, lite color</td>
</tr>
<tr>
<td>S3101.025.L</td>
<td>Abdominal skin</td>
<td>R</td>
<td>Lite color</td>
</tr>
<tr>
<td>S3101.027L.D</td>
<td>Lower left leg</td>
<td>R</td>
<td>Lower left leg assembly, lite color</td>
</tr>
<tr>
<td>S3101.027L.L</td>
<td>Lower left leg</td>
<td>R</td>
<td>Lower left leg assembly, lite color</td>
</tr>
<tr>
<td>S3101.028R.L</td>
<td>Right I/O leg</td>
<td>R</td>
<td>Lower Right I/O leg assembly, lite color</td>
</tr>
<tr>
<td>S3101.029R.L</td>
<td>I/O Leg Skin Cover</td>
<td>C</td>
<td>Lite color</td>
</tr>
<tr>
<td>S3101.030</td>
<td>Reservoir bone</td>
<td>R</td>
<td>Reservoir bone used in I/O leg access</td>
</tr>
<tr>
<td>S3101.031</td>
<td>I/O Bones</td>
<td>C</td>
<td>Replacement bone for I/O leg, set of 7</td>
</tr>
<tr>
<td>S3101.043.L</td>
<td>Intramuscular Thigh Injection Sites</td>
<td>R</td>
<td>Lite color, set of 2 (one per leg)</td>
</tr>
<tr>
<td>S3101.048</td>
<td>Adult IV Filling Kit</td>
<td>R</td>
<td>Fluid dispensing syringe with filling tube</td>
</tr>
<tr>
<td>S3101.049</td>
<td>Adult I/O Filling Kit</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>S3101.060</td>
<td>Simulator Transport Case</td>
<td>R</td>
<td>Soft storage and transport case with wheels</td>
</tr>
<tr>
<td>S3101.061</td>
<td>Simulator Transport Case</td>
<td>A</td>
<td>Hard storage and transport case with wheels</td>
</tr>
<tr>
<td>S3101.080</td>
<td>Simulated Blood Concentrate</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>S3101.081</td>
<td>Mineral Oil</td>
<td>C</td>
<td>Oil-based mineral lubricant</td>
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<tr>
<td>Item ID</td>
<td>Name</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------</td>
<td>------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>S3101.200</td>
<td>Audio &amp; Video Recording System</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>S3101.400R.L</td>
<td>Automatic Drug Recognition System</td>
<td>A</td>
<td>Automatic Drug Recognition light color right arm</td>
</tr>
<tr>
<td>S3101.400R.M</td>
<td>Automatic Drug Recognition System</td>
<td>A</td>
<td>Automatic Drug Recognition dark color right arm</td>
</tr>
<tr>
<td>S3101.400R.U.D</td>
<td>Automatic Drug Recognition System</td>
<td>U</td>
<td>Automatic Drug Recognition dark color right arm UPGRADE</td>
</tr>
<tr>
<td>S3101.400R.U.L</td>
<td>Automatic Drug Recognition System</td>
<td>U</td>
<td>Automatic Drug Recognition light color right arm UPGRADE</td>
</tr>
<tr>
<td>S3101.INST</td>
<td>In-Service Training</td>
<td>A</td>
<td>Day of in-service training and installation</td>
</tr>
</tbody>
</table>
Warranty

EXCLUSIVE ONE-YEAR LIMITED WARRANTY

Gaumard warrants that if the accompanying Gaumard product proves to be defective in material or workmanship within one year from the date on which the product is shipped from Gaumard to the customer, Gaumard will, at Gaumard’s option, repair or replace the Gaumard product.

This limited warranty covers all defects in material and workmanship in the Gaumard product, except:

1. Damage resulting from accident, misuse, abuse, neglect, or unintended use of the Gaumard product;
2. Damage resulting from failure to properly maintain the Gaumard product in accordance with Gaumard product instructions, including failure to properly clean the Gaumard product; and
3. Damage resulting from a repair or attempted repair of the Gaumard product by anyone other than Gaumard or a Gaumard representative.

This one-year limited warranty is the sole and exclusive warranty provided by Gaumard for the accompanying Gaumard product, and Gaumard hereby explicitly disclaims the implied warranties of merchantability, satisfactory quality, and fitness for a particular purpose. Except for the limited obligations specifically set forth in this one-year limited warranty, Gaumard will not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory regardless of whether Gaumard has been advised of the possibilities of such damages. Some jurisdictions do not allow disclaimers of implied warranties or the exclusion or limitation of consequential damages, so the above disclaimers and exclusions may not apply and the first purchaser may have other legal rights.

This limited warranty applies only to the first purchaser of the product and is not transferable. Any subsequent purchasers or users of the product acquire the product “as is” and this limited warranty does not apply.

This limited warranty applies only to the products manufactured and produced by Gaumard. This limited warranty does not apply to any products provided along with the Gaumard product that are manufactured by third-parties. For example, third-party products such as computers (desktop, laptop, tablet, or handheld) and monitors (standard or touch-screen) are not covered by this limited warranty. Gaumard does not provide any warranty, express or implied, with respect to any third-party products. Defects in third-party products are covered exclusively by the warranty, if any, provided by the third-party.

Any waiver or amendment of this warranty must be in writing and signed by an officer of Gaumard.

In the event of a perceived defect in material or workmanship of the Gaumard product, the first purchaser must:

1. Contact Gaumard and request authorization to return the Gaumard product. Do NOT return the Gaumard product to Gaumard without prior authorization.
2. Upon receiving authorization from Gaumard, send the Gaumard product along with copies of (1) the original bill of sale or receipt and (2) this limited warranty document to Gaumard at 14700 SW 136 Street, Miami, FL, 33196-5691 USA.
3. If the necessary repairs to the Gaumard product are covered by this limited warranty, then the first purchaser will pay only the incidental expenses associated with the repair, including any shipping, handling, and related costs for sending the product to Gaumard and for sending the product back to the first purchaser. However, if the repairs are not covered by this limited warranty, then the first purchaser will be liable for all repair costs in addition to costs of shipping and handling.

EXTENDED WARRANTY

In addition to the standard one year of coverage, the following support plans are available:

- Two-Year Extension (covers second and third years)

Call for pricing (USA only)
Contact Us

On the web
www.Gaumard.com

Technical Support
support@gaumard.com

Sales and Customer Service
sales@gaumard.com

Phone:
Toll-free in the USA: (800) 882-6655
Worldwide: 01 (305) 971-3790
Fax: (305) 667-6085

Before contacting Tech Support you must:
1. Have the simulator’s Serial Number (located in the left leg under the IM site)
2. Be next to the simulator if troubleshooting is needed

Gaumard Scientific
14700 SW 136 Street
Miami, FL 33196-5691 USA
Office hours: Monday-Friday, 8:30am - 4:30pm EST (GMT-5, -4 Summer Time)

Always dispose of this product and its components in compliance with local laws and regulations.

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