SimMan 3G

Directions for Use

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SimMan 3G Help

Regulatory Information
FCC Rules: 15.105(a)
1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
   1. This device may not cause harmful interference, and
   2. This device must accept any interference received, including interference that may cause undesired operation.

Caution
Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC-ID: QHQ-212-00001

SimMan 3G Patient Manikin

For Advanced Clinical Simulation
SimMan 3G is an advanced patient simulation system that facilitates training of Basic and Advanced Life Support. The system allows the instructor to effectively assess the learner’s individual and team skills based on a realistic clinical situation.

SimMan 3G allows observation and recognition of most vital signs. This is achieved through direct interaction with the manikin and observation of the manikin’s status as viewed on the SimMan 3G Patient Monitor PC.

The SimMan 3G simulation system features include:
• An advanced configurable airway comprises a adjustable lung compliance and resistance – allowing simulation of difficult airway management cases.
• Eyes that respond to light and react according to the clinical state of the manikin.
• RFID Technology for automatic recognition of drugs and airway devices.
• Auto-measurement of volume and concentration for drugs and IV fluids.
• Bleeding and Wound Modules are fed from an internal blood reservoir. An external Blood Fill Unit may be connected for extended bleeding cases.
• Simulated Secretions: Sweat, tears, froth, urine and ear fluids are fed from an internal fluid reservoir. An external Fluid Fill Unit may be connected for extended use.
• Convolutions simulate seizures or small hand movements.
• Focus on Quality CPR (QPCR) measurement and feedback according to the 2000 and 2010 Guidelines.
• Vascular Access (intra-osseous) via the tibia and sternum.
• Automatic Simulation Control based on pre-programmed and validated Patient Cases.

The Main Components of the SimMan 3G System:
SimMan 3G is an adult life-size wireless manikin, with internal battery power, internal air compressor and fluid reservoirs. Interventions by learners are registered by the system in the session log, and used for later debriefing.

Patient Monitor PC can be configured to replicate most patient monitors. The web-camera records video and sound from the simulation for use during the debriefing session. The Patient Monitor PC also doubles as a display for other functions, such as 12-lead ECGs, X-ray images and lab results to view the patient’s case history.

The Instructor PC controls the simulation. The headset allows the instructor to simulate interactive voice communication between the patient and the learner.

The simulation can run autonomously using pre-defined Patient Cases. The development of the patient’s condition is pre-programmed and automatically responds according to the learner interventions.

Also included are PC software programs for creating and editing Scenarios, as well as an application for debriefing simulation sessions with video capture from a web-camera and the SimMan 3G Patient Monitor PC.

WLAN Communication
Communication between the SimMan 3G manikin and the laptop PCs is based on WLAN communication. The manikin and PCs can also be connected to a LAN cable network, and WLAN disabled.

Disclaimer
Use of the SimMan 3G patient simulation system to train personnel should be undertaken under supervision of suitably trained medical personnel with an understanding of educational principles as well as recognized medical protocols. As with all manikins or other such training devices there may be approximations, variations and inaccuracies in anatomical features and the physiological modeling. This being the case, Laerdal does not guarantee that all features are completely accurate.

Global Warranty
See the Laerdal Global Warranty, or see www.laerdal.com

Country of origin - SimMan 3G is made in Norway

Printed in Norway

Manufactured by Laerdal Medical AS
Tanke Svelvågåsgr. 30
PO Box 377
4002 Stavanger
Norway

Software Help files
The software Help files are accessible from the SimMan 3G software Help menu.

For first-time Instructors:
– Instructor application Auto Mode
– Patient Monitor for learners
– Voice Conference application
– Debrief Viewer

Additional features for Advanced Instructors:
– Instructor application Instructor Mode
– Scenario Editor
– Handlers Editor
– Trend Editor

For System Administrators:
– Network configuration (WLAN setup)
– Profile Editor

Technical Assistance
For technical assistance, contact your local Laerdal Technical Service Center.

Web Downloads
Visit www.laerdal.com to download the latest Directions for Use and Software.
Important

It is important to follow the instructions below in order to maintain optimum performance and longevity of the manikin components.

**General Manikin Handling**

The SimMan 3G manikin should be operated by trained personnel only. Treat the SimMan 3G manikin as you would treat a real patient.

**Hygiene**
- To maintain manikin skins, wash hands before use and place the manikin on a clean surface.
- Wear gloves as required during simulation scenarios.
- After using the fluid and/or blood system, follow the instructions in Cleaning the Fluid and Blood System.
- After using the SimMan 3G Hound Kit, remove glue residue from the manikin skin with Laerdal Medical Wipes.
- Use only Laerdal Airway Lubricant in the manikin’s airway. Do not spray airway lubricant into the manikin. Lubricate tools only.

**Prevent Stains on Manikin Skins**
Avoid using colored plastic gloves, as they may cause discoloration of the manikin skin.

Do not use felt-tipped markers, ink pens, acetone, iodine or other staining medications near the manikin. Take care not to place the manikin on newspapers or colored paper. All staining may be permanent.

**Transportation and Storage**

SimMan 3G is heavy; ensure that the manikin is properly secured during transportation to prevent personal injury or damage to the product.

For storage—flush the manikin’s fluid system with a solution of 60% isopropanol alcohol or 70% ethanol to inhibit algae. Follow cleaning procedure for fluid and blood system.

**Anti-virus and Firewalls**

The SimMan 3G manikin and PCs are not supplied with anti-virus programs. Windows firewall is activated by default. It is the customer’s responsibility to protect the simulation system components from unauthorized access.

The manikin will revert to factory settings each time the power is disconnected.

**File Security and Backup of Data**

The customer is responsible for file security and backup routines for all data. The customer should install all recommended Windows updates from Microsoft. General security measures should be taken before connecting to the internet.

**Defibrillation Hazards**

SimMan 3G allows for defibrillation in accordance with 2000 and 2010 international guidelines for CPR. A conventional defibrillator may be used on the SimMan 3G. During live defibrillation, the defibrillator and manikin may present a shock hazard. All standard safety precautions must be taken when using a defibrillator on the manikin. For more information, consult your defibrillator’s Directions for Use.

**Manikin Setup**

For more information sections: Manikin Setup - Battery Use and Other Battery Warnings, for more information on battery use and battery hazards, please see the battery manufacturer’s Directions for Use.

**Servicing the Manikin**

A full service, including cleaning of the base board, should be performed at regular intervals.

**Cautions and Warnings**

**General Manikin Handling**

- Warning: Do not ventilate the manikin with oxygen enriched air or flammable gases.
- Do not introduce fluids into or onto the manikin (except as directed in the SimMan 3G Directions for Use) as this may damage the manikin and its components.
- Do not introduce humidified air into the system during ventilation.
- Never perform mouth-to-mouth rescue breathing on the manikin. The manikin’s airways are not designed for cleaning or disinfection.
- Do not use the manikin if it is not functioning normally.
- Do not defibrillate the manikin when it is turned OFF or if it is not functioning normally.
- Do not defibrillate the SimMan 3G manikin outdoors in wet conditions, as this may pose a shock hazard or damage the manikin.
- Never use the SimMan 3G manikin outdoors in wet conditions, as this may pose a shock hazard or damage the manikin.
- Never use the SimMan 3G manikin in temperatures exceeding 40°C (104°F), as this may cause overheating and shutdown.
- The manikin should never be stored in temperatures below -15°C (5°F).
- The manikin will automatically shut down if the battery temperature exceeds 60°C (140°F).
- Using a defibrillator in temperatures over 35°C (95°F) may cause overheating and shutdown.
- Do not use the manikin on soft mattresses and/or under heavy blankets. This may cause overheating and reduce the lifetime of the compressor.

**Defibrillation Hazards**

SimMan 3G allows for defibrillation in accordance with 2000 and 2010 international guidelines for CPR. A conventional defibrillator may be used on the SimMan 3G. During live defibrillation, the defibrillator and manikin may present a shock hazard. All standard safety precautions must be taken when using a defibrillator on the manikin. For more information, consult your defibrillator’s Directions for Use.

- Warning: De-energize must be performed on the defibrillator
- ECG connectors only.

**Mechanical or Electrical Hazards**

- Warning: Do not ventilate the manikin in flammable or oxygen enriched atmosphere.

**Battery Use**

Warning: In hot conditions, intensive defibrillation may cause thermal shutdown of the manikin.

Warning: The manikin torso must always be kept dry. Allow the manikin to acclimate before defibrillating. Sudden changes in temperature (moving the manikin from a cold environment to a warm environment and vice versa) may result in condensation collecting on the base board and pose a shock hazard.

- Take care to avoid spillage when using the manikin fluid systems while the manikin is under defibrillation.

To prevent torso skin electrode pitting, do not apply conductive gel or conductive defibrillation pads intended for patient use.

Pressing down too hard on the Defibrillation connectors during defibrillation may also cause arcing and pitting.

- Warning: Do not defibrillate the manikin when it is turned OFF or if it is not functioning normally.
- Warning: Do not defibrillate the manikin if the torso skin is not in place.
- Warning: Do not use automated chest compression machines on the manikin.

**Safety and Warning:**

- Warning: Avoid pinch hazards. Do not remove protective bushings from the manikin’s ports or use the manikin without the external skins.
- Warning: Avoid all sharp edges on the manikin to prevent personal injury.
- Do not use the SimMan 3G manikin if:
  - Limbs are not attached to the torso.
  - Skins are torn or not properly fastened.
  - Internal or external cables, tubes or connectors are damaged.
  - There is fluid leakage inside the manikin torso.
  - There are unusual sounds indicating air leakage or mechanical damage.
  - There are signs of electrical malfunction, such as an unresponsive manikin or unusual smell or smoke.
Transporting SimMan 3G

The SimMan 3G Simulation System consists of two cases for easy transport and storage: one for the manikin legs and one for the torso.

Each case has an extendable handle and may be stacked onto the integrated wheel frame for increased mobility.

The SimMan 3G System exceeds the weight allowance on most commercial airlines. Some parts may have to be transported separately. For more information on weight restrictions contact the relevant airline.

Disassemble the legs from the torso and pack them into their respective cases before transportation or storage.

For instructions on how to disassemble the legs, see: Manikin Setup - Attaching the left and Attaching the right leg.

Warning: The suitcases are heavy. Always ensure that they firmly secured during transportation and storage so as not to cause personal injury or damage to the product.

Please be aware that both cases appear identical. Each case contains compartments for all accessories.

For more information on SimMan 3G accessories, see section: Spare Parts, Consumables & Accessories.
**Opening the Torso**

Open the manikin torso for the following procedures:

- **Attaching or replacing limbs**
  - Attaching or dismantling the manikin legs and arms.
  - Replacing default arms for optional IV or trauma arms.

- **Maintenance tasks**
  - Replacing the pneumothorax bladders, chest-rise bladders, lung bladders, IO modules and chest drain modules.
  - Replacing the torso skin.
  - Performing a general inspection.
  - Removing WLAN adapter.

To open the torso skin

1. Unzip the zippers on the manikin’s left shoulder and torso.
2. Remove the genitalia pad and release the skin flap from the pelvis.
3. Fold the torso skin over to one side.
4. Open the stomach foam to one side, taking care not to tug on the connecting tubes and cables.
5. Replace the stomach foam and close the torso skin, perform steps 1 - 4 in reverse.

**Attaching the Left Leg**

- **Note:** Assemble the manikin on a large flat surface. Attach the left leg before the right leg.

1. Open the torso to access the hip joint connectors. To open the torso follow steps 1 - 4, Opening the Torso.
2. Align the left leg bolt and cables with the pelvis socket.
3. Feed the leg bolt and cables through the socket and into the torso. Do not pull the leg by the cables and/or tubes.
4. Carefully push the leg in towards the pelvis to form a snug fit.
5. Position the connector rounded end facing downward. Place the leg cables and tubes into the side slot of the connector.
6. Screw the connector onto the leg bolt. Avoid twisting the tubes and cables. Tighten the connector so that the leg is able to rotate freely around the hip joint connector.
7. Connect the corresponding leg tubes and cables as shown in the following table:

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Right leg</td>
<td>Transparent red tube</td>
<td>Black twist and lock connector</td>
</tr>
<tr>
<td>Right leg</td>
<td>Black harness cable</td>
<td>Black rectangular connector, 6 lead</td>
</tr>
<tr>
<td>Fluid from leg</td>
<td>Tube, blue</td>
<td>White twist and lock connector</td>
</tr>
<tr>
<td>Air from leg</td>
<td>Colourless transparent tube</td>
<td>White twist and lock connector</td>
</tr>
</tbody>
</table>

**Left Leg to Pelvis – Cable and Tube Descriptions**

**Attaching the Right Leg**

1. Align the right leg bolt and cables with the pelvis socket. Feed the leg bolt and cabling through the pelvis socket.
2. Carefully push the leg in towards the pelvis to form a snug fit.
3. Secure the cables and tubes in the connector. Screw the connector in place on the leg bolt.
4. Connect the corresponding tubes and cables as shown in the table below:

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA Pulses</td>
<td>Grey cable</td>
<td>Black rectangular connector, 8 lead</td>
</tr>
<tr>
<td>BP</td>
<td>Grey cable</td>
<td>Black rectangular connector, 6 lead</td>
</tr>
<tr>
<td>LA Conv</td>
<td>Black harness cable</td>
<td>Black rectangular connector, 8 lead</td>
</tr>
</tbody>
</table>

**Right Leg to Pelvis – Cable and Tube Descriptions**

**Attaching the Left Arm**

1. Align the left arm axle with the shoulder socket.
2. Ensure that the shoulder screw is loose enough to allow the arm axle to slide easily into place.
3. Feed the cables from the arm axle through the shoulder socket.
4. Carefully push the arm axle into the shoulder bracket, so that the axle is flush with the inside of the bracket.
5. Tighten the shoulder screw with the Allen wrench.
6. Connect the arm cables to the corresponding connection points in the torso.

**Left Arm to Torso – Cable and Tube Descriptions**

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA Pulses</td>
<td>Grey cable</td>
<td>Black rectangular connector, 6 lead</td>
</tr>
<tr>
<td>BP</td>
<td>Grey cable</td>
<td>Black rectangular connector, 2 lead</td>
</tr>
<tr>
<td>LA Conv</td>
<td>Black harness cable</td>
<td>Black rectangular connector, 8 lead</td>
</tr>
</tbody>
</table>
Attaching the Right Arm

Open the torso as described in steps 1 - 4, Opening the Torso. Follow the procedures listed below in reverse to attach the arm.

1. Align the arm axle with the shoulder socket.
2. Feed the cables from the arm axle through the shoulder socket.
3. Push the axle into the bracket until it is flush with the inside of the bracket.
4. Tighten the shoulder screw with the Allen wrench.
5. Connect the corresponding cables as shown below.

Right Arm to Torso – Cable and Tube Descriptions

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Arm</td>
<td>Black harness</td>
<td>Black rectangular</td>
<td>Black rectangular</td>
</tr>
<tr>
<td>Jaw Ant</td>
<td>Coax</td>
<td>Round silver connector</td>
<td>Black rectangular connector, 6 lead</td>
</tr>
<tr>
<td>To LA Conv</td>
<td>Black insulation</td>
<td>Black rectangular</td>
<td>Black rectangular connector, 8 lead</td>
</tr>
</tbody>
</table>

Attaching the Trauma Module/IV Arm

Please see the instructions supplied with the Arm adapter kit for information on attaching the Trauma Module or IV Arm.

Inserting and Connecting the Batteries

Open the torso as described in steps 1 - 4, Opening the Torso, follow the procedures listed below in reverse to remove the batteries.

1. Release the battery clamp by unhooking the clips on either side.
2. Insert both batteries into the battery tray.
3. Snap the battery clamp back into place over the batteries.
4. Connect the corresponding battery cables from the batteries to the torso.

Inserting the Batteries

Open the torso as described in steps 1 - 4, Opening the Torso, follow the procedures listed below in reverse to insert the batteries.

1. Release the battery clamp by unhooking the clips on either side.
2. Insert both batteries into the battery tray.
3. Snap the battery clamp back into place over the batteries.
4. Connect the corresponding battery cables from the batteries to the torso.

After connecting the batteries, connect the manikin to the external power supply (12V to 24V) while the manikin is OFF.

The batteries will charge if the manikin is ON and connected to and external power supply in the range of (20V - 24V).

Battery - Cable and Tube Descriptions

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery 1</td>
<td>Black harness</td>
<td>Black rectangular</td>
<td>Black rectangular</td>
</tr>
<tr>
<td>Battery 2</td>
<td>Black harness</td>
<td>Black rectangular</td>
<td>Black rectangular connector, 6 lead</td>
</tr>
</tbody>
</table>

For more information on charging the batteries see section, Manikin Setup, Battery Charging and Use.

The Power Panel

The power panel is found on the right side of the manikin, under a loose skin flap. Lift the skin flap and pull out the protective cover.

Power Panel Overview

1. Power ON / OFF button
2. Power status indicator
3. Battery status indicator
4. Charging status indicator
5. LAN network cable connector
6. External power supply connector

Power Panel LEDs Description

<table>
<thead>
<tr>
<th>LED Color</th>
<th>Power Status</th>
<th>Battery Status</th>
<th>Charge Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Power save*</td>
<td>0% - 20%</td>
<td>Not charging**</td>
</tr>
<tr>
<td>Yellow</td>
<td>Start up</td>
<td>20% - 70%</td>
<td>Charging</td>
</tr>
<tr>
<td>Green</td>
<td>Running</td>
<td>70% - 100%</td>
<td>Charge almost complete***</td>
</tr>
<tr>
<td>No light</td>
<td>Off</td>
<td>Off</td>
<td>No charge****</td>
</tr>
</tbody>
</table>

* Blinking light
** One or both batteries missing, overheated, damaged or otherwise not able to charge
*** Not recommended to charge the batteries too long
**** No power input, batteries are charged. Power Save is activated when ever manikin is paused.
Charging the Batteries

**INSIDE THE MANIKIN**

1. Connect the manikin to the external power supply with a power cord and plug that meets local specifications.

2. Plug the power supply into a wall outlet and connect the power cable to the power inlet on the manikin’s power panel.

3. Press the ON button to power on the manikin.

- Note: During start-up, the manikin’s eyes will blink and the power status indicator light will be yellow.
- Caution: After manikin is turned off, wait 20 seconds before restarting. If not, manikin may not function properly.

**WITH AN EXTERNAL CHARGER**

Charging batteries inside the manikin

1. Connect the manikin to the external power supply.

2. The battery indicator on the power panel shows the charge status of any of the internal batteries.

External battery charging

The battery charger comes with 5 international plugs. Connect the appropriate plug to the charger:

1. Connect the charger to a power outlet and connect the manikin battery to the charger.

2. The indicator light on the battery charger shows charge status.

3. Battery charging time is approximately 3 hours.

- The external battery charger should only be used with SimMan 3G batteries.

**Charger light showing battery sign**

<table>
<thead>
<tr>
<th>Light Code</th>
<th>Light Color</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>Yellow</td>
<td>Steady</td>
</tr>
<tr>
<td>Pre-charge</td>
<td>Yellow</td>
<td>Normal Blink</td>
</tr>
<tr>
<td>Rapid charge</td>
<td>Green</td>
<td>Rapid</td>
</tr>
<tr>
<td>Maintain</td>
<td>Green</td>
<td>Normal Blink</td>
</tr>
<tr>
<td>Ready</td>
<td>Green</td>
<td>Steady</td>
</tr>
<tr>
<td>Wait</td>
<td>Alternating</td>
<td>Alternating</td>
</tr>
<tr>
<td>Error</td>
<td>Yellow</td>
<td>Rapid</td>
</tr>
</tbody>
</table>

**Battery Use**

- Always use two SimMan3G batteries to power the manikin.
- Ensure that the batteries are properly connected.
- Charge the batteries regularly.
- Check LEDs on manikin’s power panel for battery status.
- Charge both batteries before the battery charge drops below 15% or the battery light indicator is red. This can be monitored in the technical status window on the Instructor PC.
- The manikin will automatically shut down if battery temperature rises above 60°C (140°F) or the remaining charge falls below 6% on one of the two batteries.

**View Battery Status via Instructor Application**

When the AC battery symbol in the <Technical status> window is visible, the manikin is connected to an external power source.

1. Press <Pause Session> on Instructor PC. Access the batteries as described in Section: Manikin Setup Inserting and Connecting Batteries.
2. Replace one battery at a time to avoid loss of simulation data.

**Storage and transportation**

- Never store fully charged batteries for longer than a month.
- Never store the batteries inside the manikin.
- Store batteries in a refrigerator; i.e. temperature 0°C - 4°C (32°F - 40°F).
- The two manikin batteries can be transported in the manikin during air freight.
- When transporting spare batteries please contact the airline or freight company for the latest transport regulations.

**Battery maintenance**

- On approximately every 30th charge cycle, drain the battery completely before recharging. To drain the batteries run the manikin on both batteries until automatic shutdown.
- Expected battery life: 200 charge cycles.
- Only replace with Laerdal SimMan3G batteries.

**Other Battery Warnings**

- Warning: Do not run the manikin for more than 1 minute on a single battery.
- Warning: If both batteries are removed while the simulation is paused, the manikin will shut down and simulation data will be lost.
- Warning: Dispose of batteries in accordance with local regulations.
- Warning: The external battery charger is for indoor use only.
- Warning: The batteries should only be charged in temperatures ranging from 0 °C - 40°C (32 °F - 104 °F).
- Warning: Inserting and connecting batteries incorrectly, short circuiting or exposure to fluids pose an explosion hazard.
- Warning: Do not mistreat, disassemble or attempt to repair the battery.
- Warning: Do not use the batteries if they are visibly damaged, malfunction or appear to leak electrolyte.
- Warning: Take extreme care to avoid direct contact with electrolyte, hot or smoking parts. In case of the above, disconnect and remove the battery when it is judged safe to do so.
RFID Tag Setup

The SimMan 3G RFID (Radio Frequency Identification) system, features two antenna locations. One in the mouth and another in the right arm. Whenever a RFID tagged device comes within range of the antenna, it is automatically registered by the system. For automatic drug recognition to function, ensure that all syringes or devices carry an RFID tag.

RFID tagging Syringes / Airway devices

The RFID tags come as part of the SimMan 3G Drug and Airway Tag Kit. Tags are pre-printed with information to identify drugs, drug concentration or device names.

Using RFID Tags

See the Instructor Mode help file for more information on how drugs and drug concentrations can be registered manually by the instructor.

RFID tag use for Airway Devices

For reliable RFID recognition in the mouth region, ensure that the RFID tagged device is brought within range of the antenna. The range of the mouth antenna is approximately 10 cm.

IV Setup for RFID recognition

You and your own equipment to set IV extension tubing. Keep in mind that the point of insertion but be within range of the antenna located around the IV port. If the point of insertion is out of range, drugs will not be registered.

See the correct and incorrect IV setup for SimMan 3G, US catheter below:

Correct

Incorrect

It may take some seconds before the RFID tag is registered.

Note: Only one RFID device can be registered at a time. Allow only one device at a time to come within range of the antenna.

Preparing for Simulation

Unpack the laptop PCs and connect them to their respective power supplies to charge the batteries.

Instructor PC with Headset

Patient Monitor PC with Web-camera

SimMan 3G Manikin

1. Unpack the manikin torso and legs. Assemble the legs and torso as described in Manikin Setup.
2. Fill the bleeding and fluid system if necessary. See Blood and Fluid System.
3. Connect the manikin batteries and close the torso skin. See: Inserting and Connecting Batteries.
4. Connect the external power supply to the manikin to charge the manikin batteries. See Battery Charging and Use.
5. Press the start button on the manikin. Wait until the manikin begins breathing before switching on the Instructor PC. Start the Instructor PC and connect the headset.
6. Start the Patient Monitor PC, if applicable, and connect the Web-camera to the USB port of the PC.
7. Start the Patient Monitor Application software, if applicable, attach the SPO2 probe to the patient monitor PC. See: Starting the Patient Monitor Application.
8. Start the Instructor Application software. The application will search for all available manikins. See: Launching Instructor Application.
9. Select a patient case in Auto Mode or pre-programmed scenario via Instructor Mode to start the simulation.
10. The simulation system is now ready for use. Power cables may be disconnected when batteries are charged.

SimMan 3G PCs

The SimMan3G simulation system includes one Instructor PC with the pre-installed Instructor Application and one Patient Monitor PC to simulate an actual patient monitor. The Patient Monitor PC runs the Patient Monitor Application.

ACTIVATING THE INSTRUCTOR SOFTWARE LICENSE

The Instructor Application license need only be activated once. Instructor computers shipped from Laerdal Medical will have a pre-activated license included. Two spare licenses are provided for use on other computers. Should the software need to be re-installed, it is not necessary to re-install the software license.

Activate the software via the Internet or select <Activate> using <other options> in the License key dialog box.

The SimMan 3G software comes with 3 license keys. For more information on the license keys please contact your local customer service office.

Activate the license manually by following the on-screen instructions.
WIRELESS AND LAN CONFIGURATION

The SimMan3G Network Configuration Tool (SNCT) allows you to configure the network behavior of the SimMan3G manikin.

For more information on Wireless and LAN configuration, see the SimMan3G Network Configuration Tool Help file (Press the <F1> key on the PC keyboard).

Configuring Your Network

The SimMan3G is equipped with a small router that provides WLAN connectivity. This router can be configured two ways: Either the manikin creates a wireless network (Access Point mode) or the manikin is hooked up to an already existing network (station/client mode). The mode of operation is selected by changing a switch on the router located inside the manikin’s pelvis.

Manikin created network (Access point mode) [default]

The default operation is AP, i.e., where manikin creates a wireless network. The switch on the router is set in AP mode. The manikin is set up to create a network called SimMan3G. WPA2/PSK-AES is the preferred security/encryption setting and also the default. The default pre-shared key is SimMan3G. This should however, be changed with the SimMan 3G Network Configuration Tool.

Connecting to an Existing Network

If you would like to connect your manikin and the instructor PCs to an already existing network, please move the switch on the router to the client mode, refer picture above. Please use the SimMan3G Network Configuration Tool to enable connection to an already existing network.

Wired operation (disabling/enabling WLAN)

The wireless network may be disabled in AP mode. This can be achieved by using the SimMan3G Network Configuration Tool. When using manikins in environments where use of WLAN transmitters are prohibited, contact your local service representative for instructions on how to turn off radio transmission.

Removing/Changing router

The router may be changed or removed. Turn off the manikin before doing so.

Open the pelvis and locate the router. Remove the two Ethernet cables and black power cable.

If you would like to operate the manikin without a router, then attach a through-adapter between the two Ethernet cables.

If you would like to install a new router, attach the power cable to the router and plug the Ethernet cables back into the router again.

The router may be changed or removed. Turn off the manikin before removing/Changing router.

5 - PERFORMANCE

<Performance> window shows the effectiveness of learner ventilations and compressions during the simulation.

Learner performance data can be viewed either as an average or in real-time.

The performance window below the manikin figure, is minimized as default. Click the expand button to open the window.

6 - INSTRUCTOR’S PATIENT MONITOR

<Instructor’s Patient Monitor> shows the status of patient’s vital signs throughout the simulation.

7 – AIRWAY STATUS

<Airway Status> window shows the status of the patient’s airway in a real-time animation with a list of symptoms.

Indicators also show the resistance of the left and right lungs, and total lung compliance.

8 - NEUROLOGY

<Neurology> - The Neurology status list shows information about the patient’s position on the Glasgow Coma Scale and Visual Analog Scale.

<Eyes> - animation is a real-time representation of the status of the eyes of the patient/manikin and is shown when clicking on the Neurology tab.

9 - CIRCULATION & FLUIDS

<Circulation & Fluids> - Displays information about the health of the patient with regards to pulse, rate of bleeding, secretions and convulsions.

10 – BODY SOUNDS

Clicking <Body Sounds> button calls up <Body Sounds> dialog box. The dialog shows the current sound scheme and volume for each speaker attached to the various body parts: heart, bowel, and anterior/posterior view of the lungs.

11 - TECHNICAL STATUS

<Technical status> window provides information about the technical status of the SimMan 3G manikin system, including battery life, wireless (WLAN) connection signal strength, blood tank drainage, communication channels in use and video recording.
Instructor Mode Overview

1 - COMMON LEARNER EVENTS
<Common Learner Events> window typically lists the learning objectives specific for the current scenario. It also lists the learner events required to proceed from one scenario frame to another, as well as Learner events included in any rules from an active Handler. Clicking the events in the list records them in the Session Log, indicating the time that each event was performed by the learner.

All other events can be found in <All Learner Events>.

2 - SIMULATION CONTROL AND SESSION LOG
In <Instructor Mode>, the Simulation control is used in managing all pre-programmed aspects of the selected patient case:

Scenario progress
• Trends
• Handlers

<Session Log> records information about patient responses and Learner events that occur during simulation. This information is then made available in debrief files at the end of the simulation session.

* For more information on Trends and Handlers, see section: Customizing Scenarios.

3 - ALL LEARNER EVENTS
<All Learner Events> menu is used to register the events performed by learners during a simulation, and contains all events which can be registered. For easy access, the events necessary to treat the selected scenario correctly are listed in <Common Learner Events>.

4 - PERFORMANCE
<Performance> window, below the manikin figure, shows the effectiveness of learner ventilations and compressions during the simulation.

Learner performance data can be viewed either as an average or in real-time. The window is minimized as a default. To view the full display, click <Expand> button to open the window.

5 - INSTRUCTOR PATIENT MONITOR
<Instructor’s Patient Monitor> shows the current physiological state of the patient.

In <Instructor Mode> only, the patient monitor waveforms and parameters can be set directly by selecting and clicking the individual waveform or numeric parameter with the mouse pointer arrow.

6 - EYES
<Eyes> window is used to configure the state of the eyes of the patient during simulation.

The Eyes animation is a real-time representation of the eyes of the Manikin. For more information on configuring the eyes see section: <Clinical Features>.

7 – AIRWAY / BREATHING
<Airway / breathing> tab shows the airway/breathing status of the patient, and is used to configure these settings. For more information on configuring the airway and breathing see section: <Clinical Features>.

8 – CIRCULATION & FLUIDS
The settings of <Circulation & Fluids> tab are used to control the secretion of fluids and blood from the Manikin during simulation. Convulsions are also controlled from <Circulation & Fluids> tab.

If <Airway / breathing> is hidden, click on the tab name to access the window. For more information on configuring fluids see <Clinical Features>.

9 – SOUNDS
The settings of <Sounds> tab are used to control the body sounds and vocal sounds from the manikin.

To open <Sounds> menu, click on the tab name. For more information on configuring sound settings see <Clinical Features>.

10 – TECHNICAL STATUS
<Technical Status> window provides information about the technical status of the SimMan 3G manikin system, including battery life, wireless connection signal strength, blood tank drainage, communication channels in use and video recording.

3G View and Classic View

There are two view options when running a simulation in <Instructor Mode>:

INSTRUCTOR MODE 3G VIEW
Scenarios made for SimMan 3G and will display the 3G view.

INSTRUCTOR MODE CLASSIC VIEW
Recommended for experienced users of older SimMan versions

Classic view makes use of the Learner event libraries of previous SimMan versions; so that custom-made scenarios made with older SimMan software can be used seamlessly with SimMan 3G. Therefore SimMan Scenarios made before SimMan 3G will by default display the Classic view after conversion.
Opening an Auto Mode Patient Case

To start a simulation in Auto Mode:

1. Launch the <Instructor Application> on the Instructor PC.
2. Select the Manikin you wish to connect to and click ‘OK’.
3. Click Start Auto Mode Patient Case. This will open the Patient Case Library.
4. Browse the patient cases using the library menu on the left. The menus can be expanded and collapsed by clicking on the ‘+’ and ‘–’ buttons.
5. Choose a patient case and click ‘OK’.
6. The patient case will open with the simulation being PAUSED. When you are ready to begin the simulation, press the spacebar. OR click the ‘Start session’ button in the bottom left corner of the screen.

RUNNING A SESSION IN AUTO MODE
Launch the Instructor Application, open an Auto Mode patient case and start the session as described in Opening an Auto Mode Patient Case.

MONITOR AND ADJUST PATIENT PARAMETERS DURING SIMULATION
Throughout the simulation session, the instructor should monitor and control the patient’s status as exhibited by the Manikin. The severity of symptoms can be modified using the master patient controls. Move the appropriate slider to the left to decrease the severity of the symptoms exhibited by the Manikin or to the right to increase severity. Click the appropriate restore button to restore the Manikin to its original state.

Patient status and simulation progress are displayed in the following areas:
- The Simulation control graph shows the patient status in terms of past, current, and predicted future trends throughout the simulation. The timer shows the time elapsed since the start of the simulation.
- The Instructor’s Patient monitor shows the patient’s current vital signs and clinical parameters.
- The patient status and the <Airway status> window provide at-a-glance data about the patient’s current status.

MONITOR AND REGISTER LEARNER EVENTS DURING SIMULATION
As the learner responds to the patient case, the instructor should register learner events as they are performed using the <Common Learner Events> list and/or the <Learner events menu>.

Some events are registered automatically by the SimMan 3G manikin. These events are highlighted blue and are marked with a wireless manikin icon.

NOTE: When a simulation is running, the ‘Start session’ button becomes the ‘Pause session’ button. Click this button at any time during a simulation to pause the session.

System Setup

Opening an Instructor Mode Scenario

Use Instructor Mode to simulate isolated medical procedures. The Instructor Mode enables full manual control of all manikin features and parameters.

When setting up simulations manually using Instructor Mode, the user is responsible for the clinical accuracy of the simulation.

1. Click <Start> from the Windows <Start> menu to launch the Instructor Application.
2. Select a manikin from the list to connect to and click <OK>. You may use the <Virtual manikin> entry if you want to run without connecting to a real manikin. This will start a manikin simulation program on your computer.
3. Click Start <Instructor Mode> Scenario. This will open the Scenario Library.
4. Browse the Scenarios using the library menu on the left. Click the ‘Begin Scenario’ button to select it and then press <OK>. The chosen scenario will open with the session paused.
5. Start the simulation session when ready by pressing spacebar on your keyboard. OR click the <Start Session> button in the bottom left corner of the screen.
6. When a simulation is running, the <Start Session> button becomes the <Pause Session> button. Click this button at any time during a simulation to pause the session.

Common Learner Events
The <Common Learner Events> window lists the required events/learning objectives for the selected patient case. To register that a learner has performed an event, click the relevant item in the list. A check-mark appears to the left of the item when it has been registered.

Learner Events Menu
The Learner events menu contains all Learner events. To register that a learner has performed an event using the Learner events menu:
- Click the relevant body part of the clickable Manikin figure and select the event from the drop down list.
- For events not specific to a particular anatomical area of the Manikin, click the <General Events> button and select the event from the drop down list.
- Search for an event using the Event search field, then select the event from the drop down list.

Session Log
All learner events added both automatically by the manikin system and manually by the instructor are recorded in the Session Log. This information is available at the end of the simulation session in the <debrief file>. To add a comment on learner performance to the Session Log, click the <Add Comment> button.

3 INTERACT WITH THE LEARNERS
Open the Voice Conference Application on the Instructor PC. Use the USB headset to listen in on the learners’ communication with the manikin, and respond back through the microphone.

On request or when appropriate, provide Radiology Lab results or background media files to the learners via the Learner’s Patient Monitor using the <Transfer Media Files> menu.

END SIMULATION SESSION
When the simulation session is complete, click the <End Session> button.

SAVE FILES AND DEBRIEF LEARNERS
Save the Session log for later debriefing or documentation. Click <Debrief> to start the Debrief Viewer.
RUNNING A SCENARIO IN INSTRUCTOR MODE

MONITOR AND CONTROL THE SCENARIO

The instructor should monitor and control the patient’s status as represented by the manikin.

The simulation control graph shows the patient’s status in terms of past, current and predicted trend lines. The timer in the top right corner shows how long the simulation has been running.

Depending on the scenario, pre-programmed trends become active and affect the predicted trend lines. The instructor can also add trends to the scenario, and can decide to freeze or delete active Trends. The trend lines will be updated accordingly.

ADJUST PATIENT PARAMETERS DURING SIMULATION

The Instructor’s Patient Monitor shows the patient’s current status. To manually adjust the patient parameters:

1. Click the individual graphs or numeric parameters. Pop-up menus appear. Select a manikin in the list and click <OK>.

2. Hold cursor over a numeric parameter for 1 second. The selected parameter’s background will go grey and the mouse pointer will change appearance, to indicate that the scroll wheel can be used to increase or decrease the value.

3. Click <Zero Press> button opens a submenu from which you can select zeroing of the ABP, PAP or CVP transducers.

4. Selecting the <Pause Alarms> button turns all sound alarms off for 3 minutes.

5. Selecting the <Graph Trends> button opens the Graphical Trends window. By using the menu buttons, you can review the history of the available Trend parameters.

STARTING THE PATIENT MONITOR APPLICATION

1. First click the Windows <Start> button, and then select the Patient Monitor Application. The Patient Monitor PC will start and remain connected to the scenario.

2. The Patient Monitor application will open in full screen mode.

3. If the SimMan3G program folder or the Patient Monitor PC has a touch-display and is used to run the Patient Monitor Application, the Patient Monitor hardware simulates a real patient as found in hospitals and ambulances. During a simulation, learners can observe and monitor changes in a patient’s clinical status via the Patient Monitor software.

Video capture from the monitor display and the web-camera can be stored for use in the Debrief Viewer.

The Patient Monitor PC must be started and remain connected throughout the simulation, in order to record video and allow screen capture for debrief files.

The Patient Monitor Interface

The patient monitor software emulates a real patient monitor as found in hospitals and ambulances. During a simulation, learners can observe and monitor changes in a patient’s clinical status via the Patient Monitor software.

Video capture from the monitor display and the web-camera can be stored for use in the Debrief Viewer.

The Patient Monitor PC must be started and remain connected throughout the simulation, in order to record video and allow screen capture for debrief files.

STARTING THE PATIENT MONITOR APPLICATION

1. First click the Windows <Start> button, and then select the Patient Monitor Application.

2. Select the Patient Monitor Application program from thePatient Monitor programs list.

3. The Patient Monitor application will open in full screen mode.

4. If the SimMan3G program folder or the Patient Monitor Application program is not on your computer, see the SimMan3G Help files.

SAFETY FEATURES

Some events are registered automatically by the SimMan 3G manikin.

As the learner responds to the patient case, the instructor should register <Learner Events> as they are performed using the <Common Learner Events> list and/or the <Learner Events Menu>.

The Laerdal Debrief Viewer is included in the current scenario are shown.

The Patient Monitor Interface

The Patient Monitor PC can be purchased separately. The Patient Monitor PC has a touch-display and is used to run the Patient Monitor Application.

The Patient Monitor software emulates a real patient monitor as found in hospitals and ambulances. During a simulation, learners can observe and monitor changes in a patient’s clinical status via the Patient Monitor software.

Video capture from the monitor display and the web-camera can be stored for use in the Debrief Viewer.

The Patient Monitor PC must be started and remain connected throughout the simulation, in order to record video and allow screen capture for debrief files.

STARTING THE PATIENT MONITOR APPLICATION

1. First click the Windows <Start> button, and then select the <Laerdal SimMan3G> program folder from the Windows programs list.

2. Select the Patient Monitor Application program from the <Laerdal SimMan3G> program folder.

3. The Patient Monitor application will open in full screen mode.

4. If the SimMan3G program folder or the Patient Monitor Application program is not available on your computer, see the SimMan3G Help files.

System Setup

END SIMULATION SESSION

When the simulation session is complete, click the <End Session> button in the bottom left of the Instructor screen.
Transferring Media Files

ORDERING RADIOLOGY, MEDIA OR LABS
The learner can order Radiology, Media or Labs by clicking on any of the relevant menus in the Patient Monitor Application.

During a session, the Instructor can make media files available to learners. Media files include Radiology, Video and Lab reports.

To transfer media files to the learner’s patient monitor:
1. In the Instructor Application, click <File> <Transfer media files>.
2. The Instructor may upload any of the existing media files or browse to upload their own media files.
3. To add media files: Click <Add files> and browse to select a file.
4. The Instructor can upload as many media files as required.
5. The Instructor may wish to display the media file(s) immediately, or after a pre-selected time delay.

FOR A DELAYED DISPLAY:
Click the drop down menu icon below <Delay> to select a time delay.

INSTANT DISPLAY:
Media files show immediately when transferred.

Accessing the Voice Conferencing Application
The Voice Conference Application will launch automatically when connecting to a manikin.

The Voice Conference Application can also be accessed in two other ways:
1. From an Open simulation session (Instructor Application)
   - From the <Tools> menu, select <Voice Conf App…>.
2. From the Windows Start menu
   - Click the Windows <Start> button.
   - Select the <Laerdal SimMan3G> folder from the program list.
   - Select the Laerdal Voice Conference Application program.

ON/ OFF BUTTON
Click the on/off button to activate or deactivate the communication channel.

MICROPHONE BUTTON
The connected microphone for the communication channel becomes active by clicking the <SPEAK> button or by pressing the F5 key on the keyboard.

The channel is outlined with green, to clearly identify when the microphone is active.

LOUDSPEAKER OUTPUT VOLUME
Adjust the loudspeaker or headset volume for an individual channel with the volume slider. The volume bar indicates the received signal strength.

For more information on using the Voice Conferencing Application, see the Voice Conference software Help file.

INSTRUCTOR CHANNELS
Click the empty channel bar to add an Instructor channel. This channel allows communication with other instructors who are connected to the network and have the Voice Conference Application active on their computer.

ADD MEMBERS
To add members to an Instructor channel, click the icon to select from the available members in the list.

THE LAERDAL DEBRIEF VIEWER
The Debrief Viewer is a debriefing tool that allows you to open and review a saved simulation session.

The debriefing file consists of the following information logged during a simulation:

SESSION LOG
Data and events are recorded and time stamped throughout the simulation session. Instructor comments are included.

PATIENT MONITOR
Patient Monitor display can be recorded as a video file.

WEB-CAMERA
Video signals can be recorded.

MICROPHONE INPUTS
Voice and sound recording from the Web-camera’s built-in microphone is recorded.

REVIEW COMMENTS
Comments can be edited or added to the <Session Log>, during review in the <Debrief Viewer>.

Note: The sources are all recorded to the same timeline and are always played back simultaneously.
Accessing the Debrief Viewer

The Laerdal Debrief Viewer can be accessed in two ways:

1 - From the Instructor Application:
   - Click <End Session>
   - Click the <Debrief> icon in the <End Session> dialog box.
   - The Debrief files from the session are then transferred and made available in the <Laerdal Debrief Viewer>

2 - From Windows Start menu:
   - Click the Windows <Start> button.
   - Go <All Programs>
   - Select the <Laerdal Debrief Viewer> program folder
   - Click the <Laerdal Debrief Viewer> icon.

Help Files

Software Help files can be accessed as follows:
   - Click the Windows <Start> button
   - Select the <Laerdal SimMan 3G> folder from programs
   - Select the <Documentation> folder
   - Select the help file of your choice

Most applications will also display the corresponding Help file when pressing the <F1> key.

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Using the Internal Compressor

The SimMan3G manikin’s chest movements, airway modes and fluid systems are driven by compressed air. The right leg contains a compressor and tank with separate reservoirs for clear and simulated blood fluids.

For extended periods or stationary use, it is recommended to connect to an external source of compressed air. This reduces wear on the internal compressor and extends battery life of the manikin.

For instructions on connecting an external compressor and adjusting compressor default settings see – Connecting external Air and CO₂ Supply.

To avoid overheating and reduce wear
   - If using the manikin in high temperatures, always allow the manikin to cool down between training sessions.
   - If the manikin is placed in a bed, it should never be covered with a comforter, duvet or quilt as these prevent heat transfer from the manikin.

Turning the Internal Compressor OFF

Switch OFF the internal compressor to conserve the manikin batteries and reduce wear:

Turn OFF the internal compressor from the Instructor Application:
1. Select the <Tools> menu.
2. From <Manikin Setup>, click the Turn off internal compressor.

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Changing Default Compressor Settings

Change default compressor settings via the Profile Editor.
1. Open the Profile Editor from the <Tools> menu in Instructor Application.
2. Select the <General> tab in the Profile Editor.
3. From the compressor setup option, choose the Internal or External compressor as default.
Air/CO2 Panel

The Air/CO2 panel is located on the left side of the torso. To access the panel, lift up the manikin skin flap and remove the protective covering. Connect external Air/CO2.

Air/CO2 panel has 2 connection ports

Connecting External Air and CO2 Supply

An internal compressor is located in the right leg of the manikin. It is recommended to use an external source of compressed air whenever the manikin is stationary over extended periods of use.

If the manikin is required to exhale CO2 with each ventilation, connect external CO2.

Connect CO2 only if the manikin is required to exhale CO2 with each ventilation. Exhaled CO2 can be detected with a real capnographic device. The manikin will only exhale CO2 when a capnograph is connected to the system.

SIMMANN 3G RIGHT LEG FILL PANEL

The right leg fill panel is located at the top of the right leg near the pelvis. The fill panel contains connectors for filling the blood and fluid reservoirs.

Blood and Fluid System

The manikin has two internal reservoirs, one for blood and one for fluids/secretions. SimMan 3G is also supplied with two fill units - one Blood Fill Unit for blood and one Fluid Fill Unit for fluids/secretions.

Filling the internal reservoirs:

1. Roll the right leg skin down to expose the fill panel.
2. Connect blood fill unit tubes to the blood and air connectors in the right leg panel.
3. Push the fill button on the panel. The button will light up and fluid will flow into the manikin.
4. When the flow stops, disconnect the fill unit.
5. Push the fill button on the panel. The light will go out.

Note: Disconnect tubes from the manikin before pushing the fill button. Pushing the button before disconnecting the tubes will initiate draining of the tank.

Empty Internal Fluid Reservoir

1. Connect an empty fluid fill unit to fluid connector in the right leg panel.
2. Fluid from the internal reservoir will drain into the bottle.
3. When the flow stops, disconnect the fluid connector.

Empty Internal Blood Reservoir

1. Connect an empty blood fill unit to blood connector in the right leg panel.
2. Blood from the internal reservoir will drain into the bottle.
3. When the flow stops, disconnect the blood connector.

Mixing of Blood and Fluid

To simulate clear fluids and secretions:
Fill the Fluid Fill Unit with de-ionized water (approx 1/4 full) and tighten the cap.

To mix simulated blood:
Fill the Blood Fill Unit with de-ionized water. Add 5-10 drops of Laerdal Blood colored concentrate, mix and tighten the cap.

Run Manikin with External Blood

1. Drain the internal reservoir. Follow instructions for “Empty Internal Fluid Reservoir”.
2. After draining the internal reservoir, fill the fluid fill unit and connect to the manikin.
3. Push the fill button on the panel. The button will light up and fluid will flow into the manikin.
4. Charge the system for 60 seconds before starting bleeding simulation.

Warning: Connecting a full blood fill unit to a manikin with a full internal reservoir will result in system overflow. Blood will drain out of the right leg. Repeatedly overflowing the system may damage the product.
Cleaning the Fluid and Blood System

After using the bleeding and fluid system, the system must be cleaned to prevent residue from clogging the valves and tubes. Keep any wounds used connected while flushing the system with a cleaning solution.

1. Ensure the manikin power is on.
2. Ensure the manikin’s internal reservoirs are drained. See procedure for emptying.
3. Fill a bottle with a 60% isopropanol solution or 70% ethanol solution.
4. Connect the bottle containing the alcohol solution to either the blood or fluid fill connector and air connector to fill the manikin with cleaning solution. Perform this action for both reservoirs. If the manikin will be stored for long periods of time or transported in freezing conditions, it is recommended to fill the reservoirs with one of the recommended alcohol solutions to prevent damage and preserve the integrity of the blood and fluid systems.

CLEANING THE FLUID SYSTEM

Note: To speed up the flushing process, follow the instruction for Unclogging Fluid Tubes.

1. From the Instructor Application, open <Circulation and fluids> tab, check the Secretions box for urine, and then select polyuria. Check the Secretions boxes for Sweat, Ears, Eyes, Nose and Mouth.
2. Allow the Fluid system to flush with the cleaning solution until the internal reservoir is empty.
3. When finished, uncheck all of the Secretions boxes.

Adjusting Fluid Flow

1. Remove the neck skin.
2. Locate the restrictor valves in the left and right clavicle area.
3. Activate secretion in the Circulation and Fluids Tab, then tighten or loosen the actual valve as until desired flow rate is achieved.

Connecting Wounds Kit

SimMan3G comes with a wounds kit that includes 2 wounds and double-sided tape to attach wounds to the manikin skin. Connect wounds to the bleeding ports on the manikin torso to simulate a bleeding patient.

1. Select a wound from the wound kit.
2. Connect the tube from the wound to the nearest blood port.

Note: Do not unscrew completely. Please note that only slight adjustment should be necessary.
Removing Wounds
Flush all ports and tubes with 60% isopropanol alcohol or 70%
ethanol while the wounds are still attached. When the fluid runs
clear, disconnect the tube from the fluid outlet. After the wound is
removed, any tape residue can be cleaned from the manikin skin with
Laerdal Manikin Wipes.

Note: When removing Wounds from the blood ports, cover the
manikin skin with a cloth to prevent staining.

Trauma modules can be purchased separately to replace default
limbs to add realism to simulation.

Simulate Severe Bleeding
Start a Bleeding patient case from the Instructor Application.

To extend bleeding patient simulations, a scale factor can be used.
Ensure, when the external Blood fill Unit is empty; replace it with
another Blood fill Unit filled with simulated blood. Repeat this process
for as many times as is necessary.

If the external fill unit runs empty, during a bleeding scenarios, air
will be introduced to the blood system, causing inaccurate readings.

The IV Catheters
The right IV arm comes with a US catheter type as default. This can
be replaced with an international catheter type (commonly used in
Europe) with an extra flush port.

US Catheter / International Catheter

Note: remove arm skin before changing the catheter. Use caution
when handling the manikin skins.

Changing IV Catheters
1 Unzip and fold down the IV arm skin to expose the IV catheter
module.

2 Using a #4 Phillips screwdriver; unscrew the two screws of the
module and pull the IV module out of the arm.

3 Disconnect the two fluid tubes from the IV module.
4 Discard the old module and insert it into the IV arm.
5 Fasten the two screws and zip the skin back into place.

Identifying IV Catheter Sizes
The IV modules come with colored IV caps for US and International
IV modules. This simulates different catheter sizes.

US IV caps / International IV caps

Administering IV Fluids
To prevent clogging of the IV system, use only purified water to
simulate IV drugs with SimMan 3G.

Acceptable types of purified water:
• Distilled water OR
• De-ionized water.

Priming the IV Arm System
It is essential to prime the IV arm before first session each day. Before
administering any simulated drugs and to prevent backflow, inject
purified water in a continuous stream into the IV system.

Major movement/transportation of the manikin can result in air
pockets being introduced into the IV system and may require
additional priming.
Draining Excess IV fluid
The IV fluid system is an open system. IV fluids are drained as they are administered.

Before Each Session
1. Attach the IV overflow tube to the fluid drain under the manikin’s right arm.
2. Allow excess fluid to drain into a container during the simulation.

Cleaning the IV Arm
Flush the IV arm with 60% isopropanol or 70% ethanol at the end of each day.

1. The manikin must always be powered on when injecting fluids into the IV arm.
2. Do not apply force when administering drugs to the IV arm.
3. Fill a syringe with alcohol and administer it through the IV catheter.

Calibrating the IV Arm Flowmeter
To calibrate the flow meter in the IV arm:
1. Click on the <Tools>, <Maintenance> menu in the Instructor Application, then select the <Calibrate IV flow meter…> option.
2. Follow the on screen instructions in the Flowmeter calibration wizard.
3. A confirmation message will appear if the calibration was successful.

Connecting Defibrillation Adapter Plates

**ADDING DEFIBRILLATION ADAPTER PLATES**

The manikin torso is fitted with two stud connectors for defibrillator cables. Foam pads may be fitted around the defibrillator studs during the session as illustrated below.

1. The defibrillator studs must be fitted in place before using a live defibrillator with defibrillation paddles or adhesive pads.

DURING DEFIBRILLATION

A conventional defibrillator may be used on SimMan 3G. During live defibrillation, the defibrillator and manikin may present a shock hazard. All standard safety precautions must be taken when using the defibrillator on the manikin.

- **Note:** Defibrillation must be performed on the defibrillator connectors only.
- To prevent overheating during defibrillation, do not exceed a defibrillation sequence of 3 shocks in 45 seconds followed by 1 minute of CPR.
- After 30 minutes there must be at least 15 minutes with no shocking before starting a new sequence.
- **Note:** Do not repeat this more than a 4 hour period.

- **Caution:** The manikin must not be in contact with electrically conductive surfaces or objects during defibrillation.
- **Caution:** In hot conditions, intensive defibrillation may cause thermal shutdown of the manikin.
- Special care should be taken when using the manikin fluid systems.

- **To prevent torso skin electrode pitting,** do not apply conductive gel or conductive defibrillation pads intended for patient use.
- **Note:** Do not defibrillate the manikin when it is OFF or if it is not functioning normally.
- **Note:** Do not press too hard over the defibrillation adapters as this may cause arcing and pitting.
- **Note:** Do not defibrillate the manikin without the torso skin.

- A full service, including cleaning of the base board and its compartments should be performed at regular intervals.

Connecting the Blood Pressure Cuff

The manikin is delivered with a specially adjusted blood pressure cuff. Connect the tube to the white BP connector at the side of the manikin before use.

Calibrating the Blood Pressure Cuff
1. Select <Tools> <Maintenance> and choose <Calibrate BP…>
2. Follow the on screen instructions to perform the calibration.

Connecting the SpO₂ Probe

The SimMan 3G SpO₂ probe is made up of a light diode and light sensor. When the beam between the diode and sensor is broken, the Patient Monitor Application registers that the SpO₂ probe is connected.

1. Connect the probe’s USB plug to the Patient Monitor PC.
2. The probe can be placed on any suitable area on the manikin. Ensure that the probe is always firmly fixed in position.
Changing Genitalia Modules

The SimMan 3G is shipped with a neutral genitalia pad as its default. The pad can be exchanged for a male or female genitalia pad with urine catheter to simulate urine flow and catheterization.

1. Remove the manikin’s genitalia pad by gripping the pad at the top and pulling forward and down.

2. Disconnect any tubes or cables.

3. Connect the new genitalia module’s urine tube and the catheterization sensor cable from inside the manikin pelvis to the urine bladder module.

4. Place the new genitalia module back into the manikin’s pelvis.

Inserting Urine Catheter

Always use a water-based lubricant liberally when inserting a urine catheter.

Use the following catheter sizes:
- Female genitalia – Foley 14Ch and Lofric 16Ch
- Male genitalia – Foley 16Ch and Lofric 16Ch

Changing the Upper Dentures

The SimMan 3G manikin comes with a set of soft upper teeth as default. The soft set may be replaced with a hard set of teeth.

1. Remove the teeth from the mouth.

2. Align the new set of teeth with the gums and push them back until the teeth engage and lock onto the gums.

3. Ensure that the new set of teeth is properly aligned with the gums before pushing them into place.

Replacing and Filling Tibial IO Module with Blood

1. Attach the Tibial IO bag to the Tibial tube and close off the pinch clamp.

2. Roll the leg band, to expose the Tibial IO module.

3. Remove the IO tape. Then remove the Tibial IO unit from the leg.

4. Remove the tube from the Tibial IO module.

5. Remove the Tibial IO Pad from the Tibial IO chassis.

6. Before replacing the new Tibial IO, ensure that the nipple is retracted in the Tibial IO Pad.

7. Fit the new Tibial IO pad into the chassis.

8. Secure the Tibial IO pad in place by pressing the rear of the pad with thumbs until the nipple moves forward and locks the unit in place.
Simulation Setup

9 Fill the Tibial IO unit with 30 - 35ml of blood. Ensure the Tibial Pad is completely full.

10 Connect the Tibial tube to the Tibial IO unit.

11 Replace the Tibial IO Pad and chassis, into the leg cavity.

12 Affix the tape to keep the module in place.

Roll the leg skin up over the Tibial module. The Tibial IO is now ready for simulation.

The following devices have been tested and are approved for use with the simulator:

- BIG Automatic Intraosseous Device
- EZ-IO-G3, 15G x 1", 1.8mm x 25mm
- Jamshidi® Illinois Bone Marrow Aspiration/Intraosseous Infusion Needle. 18 Ga. 9/16" (14mm)-1 ½" (38mm).

NOTE: In some cases, there will be no backflow when using the BIG Automatic Intraosseous Device.

Clinical Features

General

Main anatomical features
- Dimensions (manikin only): 1800mm (l) x 550mm (w) chest (5.90 ft x 1.80 ft)
- Weight (patient manikin only): 38.5kg (85 lbs)
- Weight (with clothes): 40 Kg (88 lbs)
- Default male body with interchangeable genitalia pads

Configurable Anatomical Features

Genitalia
- The manikin comes with a neutral genitalia pad as default. Pad can be changed for a male or female module, included with the SimMan 3G System. See section, Changing the Genitalia.

Teeth
- Manikin comes with a set of soft teeth as default. These can be exchanged for a hard set of teeth, included with the SimMan 3G System. See section, Changing upper dentures.

Trauma Modules/Limbs
- Left leg – amputation and bleeding module (optional accessory).
- Right arm – amputation and bleeding module (optional accessory). The SimMan 3G arm adaptor kit is used to connect the trauma arm modules.

Contact your local Laerdal representative to enquire about other trauma modules compatible with SimMan 3G.

Mobility of joints
- Neck: movement can be on a 3-axis movement of head. Range of movement can be restricted. See Airway section under Clinical features.
- Shoulders: 3-axis rotation
- Lumbar: 1-axis rotation
- Elbows: fixed, no mobility
- Wrists: 3-axis rotation
- Thumbs: free mobility
- Hip joints: 3-axis rotation
- Knees: 1-axis rotation
- Ankles: 1-axis rotation

NOTE: Do not remove protective bushings at shoulder or lower back. These are present to protect users from pinch points.
SimMan 3G Clothing

Included with the SimMan 3G manikin is a custom designed set of clothing – with full-length zippers designed for easy removal. Washing instructions are found on the label inside each article of clothing.

- Shirt, with side zippers
- Trousers, with full-length side zippers
- Boxer shorts underwear
- Belt
- Trousers, with full-length side zippers
- Shirt, with side zippers
- Suctioning (oral & nasopharyngeal)

Simulated removal of the clothes

Unzip the full length zippers found along the seams of the manikin’s clothing to simulate removal by cutting with a pair of scissors.

Airway Features

The airway is anatomically modeled as far as the bronchi.

The airways can be manipulated by a learner:
- Head tilt/Chin lift
- Jaw thrust w/ articulated jaw
- Cricoid pressure and manipulation
- Suctioning (oral & nasopharyngeal)

If the tongue fallback feature is enabled, head tilt is required to open the airways for mask ventilations. The manikin may be ventilated by normal and emergency methods:
- Bag-mask ventilation
- Orotracheal intubation
- Nasotracheal intubation
- Tracheostomy intubation

Prior to using airway adjuncts, apply a small amount of Lucent Airway Lubricant to the equipment. Do not spray lubricant directly into the airway.

The following equipment or methods are suitable to secure the manikin’s airway:
- Laryngeal mask airway
- Endotracheal tube intubation, Size ID 7.5 - 8.5 is suitable, but using the smaller size reduces wear of the manikin’s airways.

Use of a malleable stylet is recommended – make sure it does not extend beyond the ET tube.
- i-Gel
- Fiberoptic intubation
- Combitube (size small adult is suitable)
- Retrograde intubation
- Needle cricothyrotrony
- Surgical cricothyrotrony

The following manikin features indicate incorrect tube placement:
- Right main stem intubation – unilateral chest rise
- Stomach distention
- Lack of chest sounds, CO2 exhalation (see Breathing section)

Instructor Mode Airway / breathing Tab

The Airway / breathing tab shows the status of the patient’s breathing and allows configuration of <Airway / breathing> settings.


to set compliance for both lungs: select one of the 4 compliance levels

3 - right Lung Compliance
Select from 4 compliance levels from 0(Normal) - 3 (Extreme).

4 - left Lung Resistance
Select from 4 compliance levels from 0(Normal) - 3 (Extreme).

5 - Total Lung Compliance
To set compliance for both lungs select one of the 4 compliance levels 0(Normal) - 3 (Extreme).

6 - Allow Stomach Distention
Check or uncheck the box to allow stomach distention or uncheck the box to allow trapped air to exit.

7 - Exhale CO2
Check or uncheck the box to enable or disable CO2 exhalation. (Requires connection to an external CO2 reservoir)

8 - Tongue Fallback
Check the box to simulate tongue fallback. Uncheck the box to disable this function. Tongue fallback symptoms will occur unless head is tilted back or jaw thrust maneuver is applied.

If the patient suffers from insufficient breathing the animation remains blue.

Note: The lung compliance function cannot be changed while the manikin is being actively ventilated.

Clinical Features

CONFIGURABLE AIRWAY FEATURES

Manikin features may be configured to present various airway scenarios:
- The airway may be closed automatically or manually. There are four levels of resistance and compliance within the airway:
- Tongue edema - multiple levels
- Pharyngeal swelling
- Laryngospasm
- Decreased cervical range of motion
- Trismus
- Teeth - soft upper dentures may be replaced with a hard set of teeth for enhanced realism while practicing intubations.

During simulation, the following conditions can be set:
- Can’t intubate / can ventilate
- Can’t intubate / can’t ventilate
- Can’t intubate / can’t ventilate

The following information is automatically registered in the SimMan3G simulation session:
- Detection of proper head position.
- Intubation device used (if fitted with RFID tag)
- Jaw Thrust
- Pneumothorax decompression
- Ventilations
- Stomach distention

1 - Animation and Settings

The airway/breathing animation is a real-time movie of the airway/ breathing status of the patient.

Healthy breathing with low resistance is shown by an inhalation in blue which then turns white.
Breathing Features
The SimMan3G can simulate spontaneous breathing.

A 22 (or smaller) gauge needle is recommended for decompression of the chest. Using a smaller gauge needle increases the longevity of the chest skin and bladders. However, a too small gauge prevents automatic detection of the decompression event in the simulation model.

Chest Tube Insertion
Chest tube insertion can be simulated, and exploration and cut can be made at left or right mid-axillary line at 4th and 5th intercostal space.

Patient Monitor features - Breathing
- $\text{SpO}_2$
- Airway respiration rate (awPR)
- End-tidal CO$_2$ (etCO$_2$)
- End-tidal $O_2$ (etO$_2$)
- $\text{inO}_2$
- pH

Lung specifications
- Max tidal volume: 1.2 liters
- Max tidal volume registered in the Instructor Application is 900ml. All volumes higher than 900ml will register as 900ml
- Max airway pressure: 80 cm H$_2$O
- Simulated stomach inflation starts from approximately 40cmH$_2$O airway pressure.

Note: Lungs are not intended for use with PEEP valves.

Pneumothorax
Tension pneumothorax with needle decompression can be performed at bilateral mid clavicle line, 2nd intercostal space. The pneumothorax bladders may be pierced +/-10 times; the pressure inside the bladder will drop after repeated puncturing.

Circulation
Cardiac features:
- Extensive ECG library, pulses from 0-220.
- Heart sounds - for every anterior location
- ECG rhythm monitoring (4-connector, 3-lead ECG)
- 12-lead ECG display
- Pacing
- Defibrillation and cardio version using live defibrillators

Defibrillation
- With live defibrillators; energy level and waveform model is registered by the manikin.
- The energy levels and number of shocks required for automatic conversion are set in each simulation Patient Case.

Defibrillation Studs
- 3-lead eCG Studs
- 12-lead ECG display
- ECG rhythm monitoring (4-connector, 3-lead ECG)

Pulse palpation is detected and logged
- Pulse strength variable with BP
- Carotid, brachial, radial, femoral, popliteal, dorsalis pedis, and posterior tibialis pulses synchronized with ECG

BP measured manually by auscultation of Korotkoff sounds
- Pulse strength manually
- Pulse palpation is detected and logged

CPR
- Compliant with 2000 and 2010 Guidelines
- Compressions generate palpable pulse, blood pressure wave form, and ECG artifacts
- Realistic compression depth and resistance
- Detection of depth, release and frequency of compressions
- Real-time view of Quality of CPR on the Instructor’s PC

Patient Monitor features - Circulation
- ECG (12-lead) and heart rate (HR)

Circulation features
- BP measured manually by auscultation of Korotkoff sounds
- Carotid, brachial, radial, femoral, popliteal, dorsalis pedis, and posterior tibialis pulses synchronized with ECG
- Pulse strength variable with BP
- Pulses are synchronized with ECG when the instructor sets the pulse strength manually
- Pulse palpation is detected and logged

Circulation fluids settings and configuration
The possible circulation fluids settings and details of how to configure them are outlined below.

- 1 - Convulsions
  Select convulsions using the drop-down menu:
  - None
  - Tonic
  - Tonic-Clonic

Convolutions
Convolutions may be seen in both hands.
- Seizure/Fasciculation

- 2 - 6 Pulses
  Move the slider to the appropriate position. Moving the central slider (5) sets the overall pulse limit shown by the red line.

- 7 - Secretions
  Check or uncheck the boxes to activate/deactivate secretions.
  When froth is activated, all other secretions are deactivated to ensure correct fluid pressure.

Secretions (clear fluid)
- Sweat on forehead / diaphoresis
Clinical Features

- Tears, both eyes
- Ear, both
- Nose, right side
- Mouth, right side
- Frot from mouth, right side.
- Urine output

Urine
Check the box for urine
- Normal
- Polypnea
- Micturition
Uncheck to disable urine.

Urine output
- Foley catherization
- Urine (variable)

8 – Bleeding / Flow Rate
The number shown in the Flow box indicates the total bleeding rate for both upper and lower bleeding ports. Flow rate is shown in ml per min.

9 - Bleeding rate scale factor
1:1 to 1:10
To conserve blood from the manikin’s internal reservoir set a higher scale factor to scale down the manikin bleeding in relation to the blood loss presented on the Instructor screen.

10 - Upper Port Bleeding
Activate the checkbox to open the upper bleeding port open. Move slider to the left or click the ‘–’ button to decrease bleeding rate. Move slider to the right or click the '+' button to increase bleeding rate.

11 – Connecting Wound Modules
Wound modules can be placed on the skin. Connect the wound modules to bleeding outlets. For information on wound setup see section Setup (for Simulation - Connecting Wound Kit).

The percentage shown in the box indicates the valve opening. The percentage can also be entered by typing the desired percentage into the box.

12 - Select Upper Port Bleeding Type
Select bleeding type using drop down menu.
- Venous
- Arterial

13 - Lower Port Bleeding
To adjust lower port settings follow instructions as stated under item 10.

The percentage shown in the box indicates the valve opening of the lower bleeding port. The percentage can also be entered by typing the desired percentage into the box.

14 - Select Lower Bleeding Port
Select bleeding type using drop down menu.

Bleeding Treatment:
- Bandage
- Pressure point
- Tourniquet
- Surgical Clamps

Vascular Access:
- IV access (right arm)
- Intravenous access
- (tibia and sternum)
- Drugs - use of Automatic Drug Registration System (identifies drug & measures dose) and pre-programmed drug responses.

Consumables and Spare Parts:
- Laerdal Artificial
- Fill Units
- Wound modules
- Replacement trauma arm / leg

Sounds
The settings of the <Sounds> tab are used to control the body sounds and vocal sounds from the manikin. To view the <Sounds> menu click on the <Sounds> tab.

Sounds settings and configuration
Overview of sound settings in Instructor Mode

1 - Heart Sounds
Select one of the following from the dropdown menu:
- No Sound
- Normal
- Aortic Stenosis
- Mitral valve Prolapse
- Diastolic Murmur
- Combined aortic insufficiency and stenosis
- Pericarditis
- Systolic Murmur
- Aortic insufficiency

2-3 Left and Right Lung Sounds
Select one of the following from the dropdown menu:
- Normal
- Stridor
- Wheezes
- Crackles
- Basal crackles
- Bronchopneumonia
- Lower lobar pneumonia
- COPD exacerbation

4 - Bowel Sounds
Select one of the following from the dropdown menu:
- Normal
- Hyperactive
- Hypoactive
- Borborygus
- Hypoactive postop
- Hyperactive diarrhea
- Hypoactive constipation
- Paralytic ileus

5 - More Body Sounds
Click the <Adv Sounds Control> to open the sounds control popup. From here you can control sound settings and volume for each speaker.

6 - Auscultation Focus
This will disable features generating mechanical noise in the manikin for 30sec. This includes stopping the compressor and preventingchest rise.

7 - Vocal Sounds
The manikin can vocalize sounds:
- Automatically via playback of pre-recorded sound clips
- The instructor can communicate and interact directly through the loudspeaker in the manikin’s head.

Select from the list of Vocal Sounds by clicking on the name.

8 - Controlling Sounds
Click the same button to <Play> or <Pause> sounds.

9 - Repeat Vocal Sounds
To loop selected sounds, click <Loop sound vocals>. The loop symbol turns green when sound loop is activated.

10 - More Sounds
A wider selection of sounds can be selected from the <More Sounds...> button.

Clinical Features

- Eyes Settings and Configurations
The calculated Glasgow Coma Scale score for the Patient Case is displayed in the Instructor Application - Auto Mode. In Instructor mode, the following sources of information help the learner to judge the state of disability:

Eyes
- Blinking eyelids
- Eyelids Open, closed and partially open
- Eyelids can be opened for examination by the learner
- Pupil dilation: constricted, dilated or in between

- Drapes and draping
- Nasal drape
- Soundproofing
- Bandage
- Earplugs
- Moustache
- Nipple
- Nose
- Eyebrows
- Cheeks
- Chin
- Tongue
- Lip
- Eyelid
- Eye
- Ear
- Nose
- Mouth
- Neck
- Forehead
- Skull
1 - Right Pupil Size
Select one of the following settings from the drop down menu:
- Small
- Normal
- Large

2 - Link Pupil Sizes
Select either linked or unlinked by clicking on the link icon:
- Linked: When the right pupil size is adjusted, the left also changes accordingly.
- Unlinked: Right and left pupil size can be changed independently.

3 - Left Pupil Size
Select one of the following settings from the drop down menu:
- Small
- Normal
- Large

4 - Eyelid Status
Select one of the following settings from the drop down menu:
- Wide open
- Half open
- Closed

5 - Blinking Frequency
Select one of the following settings from the drop down menu:
- Off
- Infrequently
- Normal
- Frequently
- 1 left
- 1 right
- 1 both
When activated, these settings will cause the manikin to blink one time.

Drugs and IV
There are two RRD antenna locations in the manikin. One near the mouth and the other in the right IV arm. When RRD tagged syringes and airway devices come within range of the antennas, they are automatically registered by the system.

The IV arm antenna registers drug type and concentration.

The RRD antenna in the mouth can also be used to register RRD tags used for drugs administered into the sternum IO module. Always ensure that the RRD tag comes within range of the antenna.

Drugs and drug concentrations can also be registered manually by the instructor in the SimMan 3G Instructor Application.

Manual Registration of Administered Drugs
To manually register when a learner has administered drugs to the manikin:
1. Click the relevant area of the manikin figure and select Drugs from the pop-up menu.
2. In the Register Drug dialog box, use the Select category drop down menu to filter drugs according to type. View the results in the <Select Drugs> window.
3. Use the Quick Search function to find specific drugs quickly and easily. Type the first letters of the drug name and choose a drug from the drop down list.
4. When a drug is selected from the <Select Drug> list, icons showing route of drug administration appear directly below the window. Select administration route by clicking the appropriate icon.
5. Change the dosage and concentration values under <Select concentration> and <Select amount>.

6 - Light Sensitivity
Select one of the following settings from the drop down menu:
- Slow
- Normal
- None
- R Direct only, None
- R None, Direct Only

Patient Monitor features – Drugs:
- Tran-f-of-Four (TOF)
- iv in H2O e.t H2O
- Anesthesia agents
- Lab reports
- User replaceable items, spare parts:
  - IV catheter (US and International versions)
  - IV Fluid filter
  - Intra-muscular pad

Vascular Access (IV and IO) Locations
Intraosseous access with needle insertion is possible through the sternum and left tibia. The IO pads may be punctured numerous times before being replaced.

To replace the IO modules see the section: Maintenance section.

Intra-muscular (IM) injection
The right buttck has a pad under the torso skin, for training intra-muscular injections.

Maintenance After Each Simulation Session
The following preventive measures are required to ensure longevity of the SimMan 3G manikin.

After Every Simulation Session
IV-arm system (manikin power on)
After each session where the IV-arm has been used, flush the IV arm with 60% isopropanol alcohol solution or 70% ethanol solution. See Cleaning the IV-arm.

Blood and fluid system (manikin power on)
After sessions where blood and fluid systems have been used, flush the reservoirs with 60% isopropanol alcohol solution or 70% ethanol solution. See Cleaning the Blood and Fluid System.

Power off the manikin and PCs
Charge batteries if necessary.

Installing and Upgrading SimMan 3G software
SimMan 3G software comes pre-installed.

INSTRUCTOR PC AND PATIENT MONITOR PC
1. Power on computer and ensure no SimMan 3G applications are running.
2. DO NOT uninstall the SimMan 3G software from your computer. Visit www.laerdal.com/downloads to download the latest version of SimMan 3G and Laerdal DebriefView. Select SimMan 3G and press “Click to Download” to begin the installation wizard.
   - Note: That the copying process takes approximately 2-3 minutes.

Troubleshooting
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MANIKIN UPDATE

Caution: Do not switch OFF the manikin during the following. Never update the simulator over WLAN (wireless).

Note: Please note that the version shown in these screenshots are subject to change.

1. Make sure you have installed the software on the Instructor PC as described in the previous section.
2. Turn off the WLAN.
3. Switch on the manikin. Restart the manikin if it has been in use. Do not start the Instructor Application or Patient Monitor Application.
4. Connect a network cable from the manikin to the Instructor PC. Allow 60 sec from the time the manikin starts breathing, for a connection to be established.
5. Execute <Start><All Programs><Laerdal SimMan 3G><Manikin Update>.
6. Identify your manikin in the <Select Manikin> dialog and select <Software update>, press <OK>.
7. The Manikin Update program will start identifying software versions currently installed. This will take about 2 minutes.
8. All programs and software versions are listed. The update status for each program is displayed under <Update>.
9. Click <OK> to begin updating the software.
10. Complete the update wizard.

Note that some components might fail updating on first attempt. Please ignore this and allow the update process to continue.

The <SimMan3G> <Update Manager – Report> will show all updates and show which ones were performed successfully or failed.
- Repeat from step 5 until all components are successfully updated.
- Allow manikin time to save changes and reboot. Do not power off manikin until it starts breathing again.

TROUBLESHOOTING

1. Should the following message appear on the screen during the update, click <Yes> to continue the installing updates.

2. If a module fails to update, run the <Manikin Update> again. Should the same module fail repeatedly, check to see whether all internal wiring is connected and functioning properly.

Replacing IV Arm Catheter / Filter

Replace the IV catheter module if it is damaged or if resistance is unrealistically high when injecting fluids.

1. Unclip and fold down the IV arm skin to expose the IV catheter module.
2. Using the no. 4 Phillips screwdriver; remove the 4 screws and pull the IV module out of the arm.
3. Lift the IV catheter up and out, exposing the recess where the filter is located.
4. Lift out the IV filter and replace with a new filter.

Replacing Crico Tape / Neck Skin

After creating an emergency airway through the cricothyroid membrane, replace the perforated membrane before starting a new simulation session.

1. Remove the neck skin (velcro fasteners behind the neck).
2. Remove the old strip of Crico tape.
3. Replace with a new Crico tape.
4. Ensure Crico-tape completely covers and seals the opening to prevent leakage while ventilating the manikin.
Replacing Chest Drain Pleura

The chest drain module’s pleura skin should be replaced after each use.

1. Open the torso skin and remove the module from the chest.

2. Remove the old pleura skin, and replace with a new skin and replace the module.

Replacing Pneumothorax Bladders

After multiple pneumothorax decompressions, the bladders may need replacement:

1. Open the torso skin to expose the chest plate.
2. Lift the chest plate to reveal the pneumothorax bladders located in slots in the side of the chest plate assembly.
3. Slide out the used pneumothorax bladder.
4. Insert the new bladder into the slot.
5. Reconnect the tube to the new bladder.

Replacing Chest Rise Bladder

If the chest rise bladders leak or are damaged:

1. Open the torso skin to expose the chest plate.
2. Disconnect the tube from the bladder.
3. Discard the used bladder.
4. Insert new bladder.
5. Reconnect the tube to the new bladder.

Left Leg to Pelvis – tube descriptions

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneum L</td>
<td>Silicon</td>
<td>Barb connector</td>
</tr>
<tr>
<td>Pneum R</td>
<td>Silicon</td>
<td>Barb connector</td>
</tr>
<tr>
<td>Chest L</td>
<td>Silicon</td>
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</tr>
<tr>
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</tr>
</tbody>
</table>
Replacing Lung Bladders

If leaking occurs, the chest rise bladders (in the chest cavity) should be replaced.

1. Open the torso skin and put the stomach foam to the side.
2. Open the hinged chest plate upwards, to access the lungs.
3. Remove the chest compression spring for easier access to the lungs.
4. Unhook the yellow Lung Compliance bands from each side of the lung assembly.
5. Open the hinged lung plate.
6. Pull the old lung out from its socket.
7. Reverse this process to insert a new lung.

Note: Ensure that the compliance bands intersect between the two flaps of the lung.

Replacing Manikin Skins

The manikin skins may need to be replaced if they become torn, perforated, or stained.

1. Unzip and unsroll the skin.
2. Applying powder to the inside of arm, torso and leg skins will help reduce friction and make replacing the skins easier.

To prevent the zippers from separating from the skin, make sure to properly position the skin halves and hold them together while zipping them closed.

Replacing Blood System Filter

If reduced blood flow is experienced, the filter may be clogged and needs replacement.

⚠️ Never run the manikin without a filter.

1. Turn off the manikin.
2. Remove genitalia with the catheterization assembly for easy access.
3. Disconnect the filter from the right leg and pelvic blood tubes and remove it.
4. Connect a new filter by reversing the steps above.
Troubleshooting

SYSTEM SETUP

Problem
- Lost data or total system failure (General System failure).

Solution
- Should system shutdown or all data is lost or corrupted please contact your local Laerdal Service Center.

STABILITY AND CONNECTION IN MANIKIN CREATED NETWORK

Problem
- Connection between the Instructor Application and/or Patient Monitor and manikin is lost.

Causes
- Other software on PCs may interfere with our Instructor Application or Patient Monitor.
- Multiple network connections may interfere with transmissions between our software and manikin.

Possible Solutions
- Remove unnecessary software on PCs.
- Disable other networks.

STABILITY AND CONNECTION IN CLIENT MODE

Problem
- Connection between Instructor Application and Patient Monitor and manikin is lost.

Causes
- Manikin has been positioned where limited connectivity to external network exists.
- Other software on PCs may interfere with our Instructor Application and/or Patient Monitor.

Possible solutions
- Move manikin to improve connectivity to external network.
- Remove unnecessary software on PCs.

CHANGING MANIKIN WIRELESS NETWORK DISPLAY NAME

If operating more than one manikin, ensure that each manikin has its own unique SSID name. For more information see, section Wireless and LAN configuration.

VOICE CONFERENCE APPLICATION

Problem
- Sound from manikin to Instructor Application not working.

Possible Solutions
- Check that the microphone has not slipped out of place. Open the head skin zipper, located at the back of the head, enough to reveal the ears.

- Ensure that the microphone is positioned in the cup located towards the top of the ear with the black surface facing outwards.

VOICE CONFERENCE APPLICATION

Problem
- Instructor microphone not picking up sound.

Possible Solutions
- Unplug and re-plug the headset to your computer.
- Ensure correct sound device is selected in Voice Conference Application main menu, select <Options> - <Select Device>.
- Check volume settings in Windows. Ensure microphone is not muted.

THE DEBRIEF VIEWER

Problem
- Missing video capture. If the web-camera does not record video for debriefing.

Possible Solutions
- Check that the web-camera’s USB-cable is plugged into the Patient Monitor PC.
- Check the web-camera settings via the Profile Editor. Ensure settings match the web-camera setup.
- Ensure you use the correct profile file.
- Ensure that there is only one USB web-camera connected to the PC.
- The video recordings will be stored on the PC connected to the web-camera. Ensure the computer connected to the web-camera is available when transferring to the debrief viewer.

Problem
- Patient Monitor video capture is not included in the debriefing.

Possible Solutions
- Check that the name of the Patient Monitor PC being used corresponds with the setting in the profile in use.

MANIKIN

Problem
- Unpredictable behavior.

Possible Solutions
- Manikin malfunctions may be caused by loose cables, tubes or connectors. Open the torso and check if any items appear to have become disconnected or are leaking. See section Manikin Setup - Opening the Torso.
- In case of fluid leakage, power off the manikin and contact Laerdal Technical Service.

Problem
- Identifying a single manikin when there are multiple manikins on a network?

Solutions
- When checking the manikin’s pulse, the <Select Manikin> dialog of the Instructor Application will indicate which manikin is pulse palpated.

AIRWAY CONTAMINATION

Problem
- Manikin airways have become contaminated from mouth-to-mouth rescue breathing.

Solution
- Clean the outside of the manikin with manikin wipes. Clean the inside of the oral cavity with manikin wipes. Change the lung bladders; see Maintenance - Replacing Lung Bladders.

Note: The manikin airways are not designed for mouth to mouth rescue breathing or to be disinfected.

CHEST MOVEMENT

Problem
- No chest rise on manikin.

Solution
- Check that manikin is switched ON.
- Check that manikin is not in sleep mode due to inactivity. Reactivate the manikin.
- Check that the two lung compliance O-rings are fitted correctly.
- Check for flaws or ruptures in the lung bladders.
- Check that the lung bladders are in a horizontal position and that the air tube is disconnected from the manikin.
- The internal compressor may have overheated. Wait approximately 20 minutes for it to cool down. Remove blankets or covers from the manikin, open the torso skin to facilitate cooling.
- Chest-rise is set to bilateral (for example if ET-tube is inserted too far into the bronchi).
- Chest-rise bladder is leaking or tubing to chest-rise bladder is twisted kinked or disconnected. Replace chest-rise bladder if it is leaking. See Maintenance: Replacing Chest Rise Bladders.
- Check-air tubing for leaks. Check all connections are intact. Replacing tubing if necessary.
- Shallow chest movements and the internal compressor runs continuously. The internal compressor may be worn - contact Laerdal Technical Service.

BLOOD SYSTEM

Problem
- No blood flow.

Solution
- Make sure that the internal reservoir is filled with fluid.

Problem
- Too low flow.

LUNGS

Problem
- Lungs not functioning properly.

Possible Solution
- Check that the airway resistance is not set to maximum in the Instructor Application.
- Open the torso and chest plate. Check that the lungs are free to expand and are not restricted by any cables.
- Check that the lung bladders are properly connected, and that the tubes are not twisted.
- Check that the lung bladders are in a horizontal position and inserted correctly. Ensure that the lung compliance O-rings lies between the folds of the lung bladders.
- Check for flaws or ruptures in the lung bladders.
- Check that the two lung compliance O-rings are fitted correctly. Replace O-rings if they appear to be damaged.
- Check that there are no obstructions inside the manikin airways which may block air flow.
- If there is no change when adjusting lung compliance, contact Laerdal Technical Service.
- If there is no change in lung resistance, contact Laerdal Technical Service.

MANIKIN LIMBS

Problem
- Lack of motion in the legs.

Possible Solution
- Loosen and re-adjust the hip joint nuts on the inside of the pelvis. See: “Manikin Setup” for details on how to attach the legs.

Note:
- Mouth rescue breathing or to be disinfected.
- The manikin airways are not designed for mouth to

Troubleshooting
Troubleshooting

Main Specifications

- **Size, weight:**
  - Dimensions (manikin only): 1800mm (l) x 550mm (b) chest (5.90 ft x 1.80 ft)
  - Weight (patient manikin): 38.5kg (85 lbs)
  - Weight (with clothes): 40 Kg (88 lbs)

- **Manikin power**
  - External power: Input voltage 24VDC, 6.25A
  - Internal batteries (two): Each 14.8V, 4.6Ah, Lithium-Ion

- **Air & CO₂ Pressure**
  - Internal air tank: Max 0.85 bar
  - External air connection: Max 1.4 bar
  - External CO₂ to manikin: Max 1.4 bar

- **Temperature Limits**
  - Operating temperatures: +4 ºC to 40 ºC (39 ºF to 104 ºF)
  - Storage temperatures*: -15 ºC to 50 ºC (5 ºF to 122 ºF)

  * Clean the blood and fluid systems as indicated prior to long term storage.

- **Environment - Manikin only**
  - Relative humidity: 20% -90% (non-condensing)
  - Do NOT use outdoors in wet conditions.

- **RF Communication**
  - WLAN frequency ranges: 2.4 GHz: WLAN, channels 1-11.
  - Operation range: 100 m (300 ft) outdoors.
  - RFID frequency ranges: 13.56 MHz
  - Operation range: < 0.2m

- **Material Chart for Manikin**
  - Clothes: Cotton, Nylon
  - Skins and airways: PVC (DEHP Free)
  - External hard plastics: PP, PA, PC, PC/PET
  - Inner plastics: Silicone, TPU, TPE, PVC, Nitrile, PA, PA+GF, PC, ABS, POM, HDPE, PET,
  - Metal components: Aluminum, Brass, Steel

- **Minimum Hardware Requirements:**
  - Core 2 Duo or better
  - 1GB RAM (2 GB recommended)
  - 1GB hard disk space,
  - 1024x768, 1280x800, 1280x1024 or better
  - 16bit color resolution or better
  - 100% DPI required
  - Optical drive required for installation

Minimum Software Requirements

- Windows XP or Windows 7
- DotNet 3.5.1

Acceptable Fluids for Manikin

- **Clearing fluids**
  - To clean the manikin’s fluid system use one of the following:
    - 60% Isopropanol Alcohol
    - 70% Ethanol

- **Simulated IV Fluids**
  - Only use purified water to simulate IV fluids:
    - Distilled Water
    - Deionized Water

Spare Parts

**Spare Parts and Accessories**

**Catalogue Numbers**

Substitute XX with the number for your local language version

**Transport and Storage Cases**

- 212-17950 Case soft, torso
- 212-18050 Case soft, legs
- 212-07150 Carry Case, Rugged

**Manikin Parts**

- 212-00050 SimMan 3G Manikin - Standard Version
- 212-11350 Arm bushing (left and right)
- 212-13050 Arm right, IV arm complete
- 212-14050 Arm left, BP Arm complete
- 212-16060 Leg right, complete
- 212-16050 Leg left, complete
- 380460 Neutral Genitalia (default)
- 212-12050 Genitalia Kit with Urine Catheterization module
- 212-12250 Battery manikin, internal (plug 2)
- 212-12350 Thigh-joint connector
- 212-12450 Battery clip, manikin internal
- 212-12550 Panel cover (left and right)
- 381107 Soft Teeth
- 212-14350 Arm Adaptor SimMan/SimMan 3G

**Power cords**

- 260305 US cord
- 260306 EUR cord
- 212-18650 PC Power Pack (110-240V)
- 260307 UK cord
- 212-07050 External Battery Charger

**PCs and Equipment**

- 212-18250 Sleeve Instructors PC
- 212-090XX Instructor PC, 12”
- 212-18150 Sleeve Patient Monitor
- 212-092XX Patient Monitor, 12”
- 212-19650 Headset with microphone
- 245-9650 WebCam

**SimMan 3G Clothing**

- 212-17450 Shirt
- 212-17650 Boxer Shorts
- 212-17550 Belt
- 212-17550 Trousers

**Fluid and Blood System Equipment**

- 212-17150 Blood Fill Unit
- 212-18950 Fluid Fill Unit
- 300-00750 Blood Concentrate
- 210-20050 Wound Tape Kit
- 212-18550 Wounds Kit
Drugs and RFID Tags
210-70050 Drug / Airway Tag Kit
212-17850 Sleeve Medication / Airway Tags
212-23150 IV Filter (pkg. 6)
212-23250 Velcro hooks for RFID base
212-23350 Val Kit (5 x 10ml & 5 x 20ml)
212-23450 Lock Kit for catheter, International (4 sets of 2)
212-33550 Lock kit for catheter, US (4 sets of 2)
212-33650 IV Catheter; Luer lock, male (pkg 40)
212-33250 IV Catheter with lock, US version (one port)
212-33350 IV Catheter with lock, International version (two ports)

Consumables
212-21050 Neck Skin Kit (6)
212-24500 Torso Skin
212-24450 Torso Skin Sternal IO
212-33150 Skin right, arm
212-33150 Skin left, arm
212-33500 Skin right, leg
212-26050 Skin left, leg
212-26250 Leg Skin Left Tibial IO
381106 Rigid Teeth
212-24150 Pneumothorax Bladder Set (pkg. 2)
212-24250 Pleura, chest drain (pkg. 20)
212-11050 Chest Rise Bladder (pkg. 4)
212-21150 SimMan 3G Cricothyroid Tape
250-21050 Airway Lubricant
212-24450 Pneumothorax Bladder Set (pkg. 2)
212-24250 Pleura, chest drain (pkg. 20)
212-24350 Sternal IO Unit (pkg. 4)
212-25250 IM Pad (Intra-muscular Pad) (pkg. 4)
212-26150 Tibial IO Unit (pkg. 4)
212-11150 Lung Bag (pkg. 2)
212-11250 Chest Drain Ribs Set (left and right)
212-25350 Inline Filter, Blood (pkg 5)

Modified Clinical Accessories
212-17050 SpO₂ probe with USB connector
200-00550 Cuff assy, Blood pressure

Tool Kit
212-18350 Repl. Tool Arm, Allen Key 8mm
212-18450 Repl. Tool, IV filter, Screwdriver Pozid no. 1

Support Material
212-19150 Directions for Use
212-19350 Quick Setup Guide, poster

SimMan 3G Software
212-19550 License (1) Instructor Application