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DISCLAIMER
Use of the SimMan Essential and SimMan Essential Bleeding 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

PATENTS PENDING
US and International patents pending.

COUNTRY OF ORIGIN
SimMan Essential and SimMan Essential Bleeding are made in Norway

Printed in Norway
Manufactured by Laerdal Medical AS
Tanke Svilandsgate 30
P.O. Box 377
4002 Stavanger
Norway
Using this document

Please note that this document contains user instructions for both the SimMan Essential and SimMan Essential Bleeding manikins. All information is relevant for both products unless marked otherwise with an icon. Sections relevant to a specific model are marked with the following icons:

Information for SimMan Essential only

Info SimMan Essential Bleeding only

SimMan Essential Help

DIRECTIONS FOR USE

This Directions for Use (DFU) includes comprehensive instructions and illustrations showing SimMan Essential and SimMan Essential Bleeding functionality and features.

Note: The illustrations may vary slightly from product.

QUICK SETUP GUIDE

SimMan Essential and SimMan Essential Bleeding come with an illustrated step-by-step poster. The Quick Setup Guide shows how to assemble both manikins and includes a list of spare parts, consumables and accessories for both SimMan Essential and SimMan Essential Bleeding.

SOFTWARE HELP FILES

The software help files are accessible from the SimMan Essential software help menus.

For First-time Instructors:

• Instructor Application: Auto Mode
• Voice Conference Application
• Debrief Viewer

Note: A Patient Monitor can be purchased separately.

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.

ORIGINAL MANUFACTURER’S USER MANUALS

All separate user manuals and labeling from original manufacturers should be followed. The SimMan Essential & SimMan Essential Bleeding DFU does not replace or supersede those from the original manufacturer.
SimMan Essential and SimMan Essential Bleeding

FOR CLINICAL SIMULATION
SimMan Essential and SimMan Essential Bleeding are patient simulation systems that facilitate training of Basic and Advanced Life Support. These systems allow the instructor to effectively assess the learner’s individual and team skills based on realistic clinical situations.

Both manikins allow observation and recognition of most vital signs. This is achieved through direct interaction with the manikin and observation of the manikin’s status which can also be viewed on the Patient Monitor PC (optional).

FEATURES COMMON TO BOTH SIMMAN ESSENTIAL AND SIMMAN ESSENTIAL BLEEDING
• An advanced configurable airway - allowing simulation of difficult airway management cases.
• Eyes with interchangeable pupils and adjustable blinking function.
• Focus on Quality CPR (QCPR): measurement and feedback according to the 2000 and 2010 Guidelines.
• Vascular Access (intra-osseous) via the left tibia and sternum.
• Internal urine bladder which can be filled with fluid to simulate urine.
• Automatic Simulation Control based on pre-programmed and validated Patient Cases.

FEATURES UNIQUE TO SIMMAN ESSENTIAL BLEEDING
In addition to the basic features offered by SimMan Essential, the SimMan Essential Bleeding manikin allows clinical simulation of bleeding patient cases or scenarios. SimMan Essential Bleeding comes with Bleeding and Wound Modules. When attached to the blood ports, these modules will bleed from an internal blood reservoir. An external Blood Fill Unit may be connected for extended bleeding cases.

MAIN COMPONENTS OF THE SIMMAN ESSENTIAL AND SIMMAN ESSENTIAL BLEEDING SYSTEM
• Adult life-size wireless manikin, with internal battery power; internal air compressor. Interventions by learners are registered by the system in the session log and used for later debriefing.
• The Instructor Application 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 pases. 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 optional Patient Monitor PC.

WLAN COMMUNICATION
Communication between both the SimMan Essential and SimMan Essential Bleeding manikin and the tablet PCs is based on WLAN communication. The manikin and PCs can also be connected to a LAN cable network, and WLAN disabled.

OPTIONAL COMPONENTS
The Patient Monitor PC, including SpO2 probe can be purchased separately. SpO2 probe can also be purchased separately. The web-camera records video and sound from the simulation for use during the debrief session. The Patient Monitor PC also doubles as a display for other functions, such as 12-lead ECG, X-ray images and lab results to view the patient’s case history.
Important Information

Follow the instructions below when working with the SimMan Essential or the SimMan Essential Bleeding manikins, in order to maintain optimum performance and longevity of both manikins and their components.

GENERAL MANIKIN HANDLING
The manikin should be operated by trained personnel only. During simulation, treat the manikin as you would 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.
• Use only Laerdal Airway Lubricant in the manikin airways. Do not spray airway lubricant into the manikin. Lubricate tools only.

PREVENT STAINS ON MANIKIN SKINS
Avoid using colored plastic gloves as they may discolor 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 newsprint or colored paper. Staining may be permanent.

ENVIRONMENT
Wait until the manikin has reached room temperature before switching the manikin ON.

TRANSPORTATION AND STORAGE
The manikin is heavy - Ensure that the manikin is properly secured during transportation to prevent personal injury or damage to the product.

ANTI-VIRUS AND FIREWALLS (SOFTWARE FOR ESSENTIAL)
The 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 and components from unauthorized access.

The manikin will revert to factory settings each time it is switched off.

The customer should install all recommended Windows updates from Microsoft. General security measures should be taken before browsing the internet.

FILE SECURITY AND BACKUP OF DATA
The customer is responsible for file security and backup routines for all simulation session data. All use and storage of simulation session data should be in accordance with local rules, regulations or laws, and is the sole responsibility of the customer.
Cautions and Warnings

The following precautions should be taken when using SimMan Essential or SimMan Essential Bleeding, to avoid personal injury or damage to the product.

Note: all warnings are valid for both SimMan Essential and SimMan Essential Bleeding.

GENERAL MANIKIN HANDLING

- Do not introduce fluids into or onto the manikin (except as directed in these 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 the internal tubes and cables are disconnected.
- Never use the manikin outdoors in wet conditions, as this may pose a shock hazard or damage the manikin.
- Never use the manikin in temperatures exceeding 40° C (104°F).
- The manikin should never be stored in temperatures below -15° C (5° F).
- The manikin will automatically shutdown if the battery temperature exceeds 60° C (140°F).
- Using a defibrillator in temperatures over 35° C (95°F) may cause overheating.

The weight of the assembled manikin is approximately 38,5 kg (85 lbs). Use proper lifting techniques when ever lifting and/or moving the manikin.

- The assembled manikin should always be lifted and/or handled by at least two persons.
- Do not handle or lift the manikins if you have a recent history of back pains, or have been advised against carrying heavy loads.

Always ensure that the manikins are properly secured during handling and transport to prevent personal injury, or damage to the manikin.

Do not use the Manikin if:

- The 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.

DEFIBRILLATION HAZARDS

Both the SimMan Essential and SimMan Essential Bleeding allow for defibrillation in accordance with 2000 and 2010 international guidelines for CPR.

A conventional defibrillator may be used on the manikin. 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: Defibrillation must be performed on the defibrillator connectors only.

The ECG connectors are designed exclusively for ECG monitoring and must not be used for defibrillation. Defibrillation on the ECG connectors will damage the internal electronics of the manikin and may cause personal injury.

⚠️ Warning: Do not exceed a maximum of 3 shocks in 45 seconds, cease shocks for at least 15 minutes before starting a new sequence.

⚠️ Warning: The manikin must not come into contact with electrically conductive surfaces or objects during defibrillation.
**INTRODUCTION**

⚠️ Warning: Do not defibrillate the manikin in a flammable or oxygen enriched atmosphere.

⚠️ Warning: Intensive defibrillation performed under hot conditions, 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 baseboard and pose a shock hazard.

⚠️ Caution: Do not apply conductive gel or conductive defibrillation pads intended for patient use, as this will cause pitting of the manikin skins.

⚠️ Caution: Do not press down too hard on the defibrillation connectors during defibrillation as this may also cause arcing and pitting.

The manikin will automatically shut down whenever it detects a significant increase in internal temperature. If automatic shutdown occurs, allow the manikin to cool down before resuming the training session. Open the torso skin to speed up the cooling process.

⚠️ Warning: Do not defibrillate the manikins when it is turned OFF or if it is not functioning normally.

⚠️ Warning: Do not defibrillate the manikins if the torso skin is not in place.

⚠️ Warning: Do not use automated chest compression machines on SimMan Essential or SimMan Essential Bleeding.

**MECHANICAL OR ELECTRICAL HAZARDS**

- ⚠️ Warning: Avoid pinch hazards - Do not remove protective bushings from the manikin’s joints or use the manikin without the manikin skins.

- ⚠️ Warning: Avoid all sharp edges on the manikin to prevent personal injury.

**BATTERY USE**

For more information see: Manikin Setup - Battery Use and Other Battery.

**SERVICING THE MANIKIN**

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

⚠️ Caution: All servicing must be performed by qualified service personnel.

**ALWAYS PERFORM A SERVICE:**

- If liquids have been spilled in the manikin
- After use in dusty environments.

⚠️ Caution: Do not use cables or connectors showing visible damage.
Transportation and Storage

The SimMan Essential and SimMan Essential Bleeding Systems each 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.

Note: The storage cases and contents exceed 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 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.

TORSO CASE WITH FOAM INSERTS

LEG CASE WITH FOAM INSERTS

For more information on SimMan Essential and SimMan Essential Bleeding accessories, see: - Spare Parts, Consumables & Accessories.
SimMan Essential Overview

- Speakers
- ECG Connectors
- Defib Connectors
- Pulses
SimMan Essential Bleeding Overview

- Bleeding Ports
- Speakers
- ECG Connectors
- Defib Connectors
- Pulses

Power panel

Fluid fill panel

Air/CO2 panel
Manikin Setup

Open the manikin torso for the following procedures:

**ATTACHING OR REPLACING LIMBS**
- Attaching or disassembling the manikin legs and arms.
- Exchanging default arms for optional IV or trauma arms.

**MAINTENANCE TASKS**
- Changing the manikin batteries.
- Replacing the pneumothorax bladders, chest-rise bladders, lung bladders, IO modules and chest drain modules.
- Replacing the torso skin.
- For general inspection.

**OPENING THE TORSO SKIN**

Note: DO NOT disconnect the tubes and cables connecting the stomach foam to the manikin.

1. Unzip the zippers on the left shoulder and side of the manikin 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. Take care not to tug on the connected tubes and cables.

To 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 thigh joint connectors. See steps 1 – 4, Opening the Torso.
2. Align the left leg bolt and cable with the pelvis socket. Do not pull the leg by the cable.
3. Feed the leg bolt and cable through the socket and into the torso.
4. Carefully push the leg in towards the pelvis to form a snug fit.
5. With the rounded end of the connector facing downward; place the leg cable into the side slot of the connector.
6. Slide the connector downwards along the cable and screw it onto the leg bolt. Connect the leg so that it is able to rotate freely around the thigh joint connector.
7. Ensure that the cable is fitted properly within the connector. Avoid twisting the cable.
8. Connect the cables to the corresponding cables in the torso.

LEFT LEG CONNECTION FOR SIMMAN ESSENTIAL & SIMMAN ESSENTIAL BLEEDING

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Pedal</td>
<td>Grey harness cable</td>
<td>black with silver colored connector</td>
</tr>
</tbody>
</table>

ATTACHING THE RIGHT LEG

1. Align the right leg bolt and cables with the pelvis socket. Feed the leg bolt and cabling through the leg 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 below:

SIMMAN ESSENTIAL ONLY

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right leg</td>
<td>Black harness cable</td>
<td>Black rectangular connector, 4 lead</td>
</tr>
<tr>
<td>Air from leg</td>
<td>Colorless transparent tube</td>
<td>White twist and lock connector</td>
</tr>
</tbody>
</table>

SIMMAN ESSENTIAL BLEEDING ONLY

<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, 4 lead</td>
</tr>
<tr>
<td>Air from leg</td>
<td>Colorless transparent tube</td>
<td>White twist and lock connector</td>
</tr>
</tbody>
</table>
ATTACHING THE LEFT ARM
Open the torso as described in steps 1 - 4, Opening the Torso. Follow the procedures listed below in reverse to detach the arms.

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 CONNECTIONS FOR SIMMAN ESSENTIAL & SIMMAN ESSENTIAL BLEEDING

<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>
</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 detach the arms.

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

### RIGHT ARM CONNECTIONS FOR SIMMAN ESSENTIAL & SIMMAN ESSENTIAL BLEEDING

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Arm</td>
<td>Black harness cable</td>
<td>Black rectangular connector, 4 lead</td>
</tr>
<tr>
<td>Air</td>
<td>Transparent tube</td>
<td>White tube connector twist</td>
</tr>
<tr>
<td>Right Radial</td>
<td>Grey harness cable</td>
<td>Black with silver colored connector</td>
</tr>
</tbody>
</table>
ATTACHING BLEEDING MODULES

To simulate severe bleeding patients a separate ‘Bleeding Module’ kit can be purchased. The Bleeding Module kit contains:

- Amputated Arm SimMan 3G
- Gunshot Arm SimMan 3G
- Amputated Leg SimMan 3G
- Gunshot Leg SimMan 3G

For more information on how to assemble the Bleeding Module, please see the Directions for Use for the Bleeding Module kit.

Inserting and Connecting the Batteries

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

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 while the manikin is OFF.

<table>
<thead>
<tr>
<th>Name/Label</th>
<th>Tube/Cable Color</th>
<th>Connector Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery 1</td>
<td>Black harness cable</td>
<td>White rectangular connector; 6 lead</td>
</tr>
<tr>
<td>Battery 2</td>
<td>Black harness cable</td>
<td>White 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 situated on the right side of the manikin, under a loose skin flap. Lift the skin flap and pull out the protective cover.

To ensure easy access, use the zippered clothing provided with the SimMan Essential and SimMan Essential Bleeding manikin.

**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 Status*</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.
Connect the power cable to the power inlet on the manikin's power panel. The batteries will begin charging when the external power supply has been connected up.

Note: The manikin does not need to be switched ON for the batteries to charge. During start-up the power status indicator will show a yellow (start-up) light. This process may take some minutes.

**EXTERNAL BATTERY CHARGING**

The external 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. Charging time is approximately 3 hours.

The external battery charger should only be used with SimMan Essential batteries.

**CHARGER LIGHT SHOWING BATTERY STATUS**

<table>
<thead>
<tr>
<th>Status</th>
<th>Light Color</th>
<th>Characteristics</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

Take the following precautions when using, charging, transporting and/or storing SimMan Essential or SimMan Essential Bleeding batteries.

- Always use two SimMan Essential or SimMan Essential Bleeding batteries to power the manikins.
- Ensure that the batteries are properly connected.
- Charge the batteries regularly.
- Check LEDs on manikin’s power panel for battery status.
- Change 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 in the Instructor Application.
- 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

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

When the manikin is run from the batteries, the battery life indicator will indicate remaining time/life.

CHANGING BATTERIES DURING A SIMULATION SESSION:

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

BATTERY STORAGE AND TRANSPORT

- 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 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 SimMan Essential or SimMan Essential Bleeding batteries.

BATTERY WARNINGS

- Do not run the manikin for more than 1 minute on a single battery.
- If the batteries are removed while the simulation is paused, the manikin will shut down and simulation data will be lost.
- Dispose of the battery according to local regulations.
- The external battery charger is for indoor use only.
- The batteries should only be charged in temperatures ranging from 0 °C - 40°C (32 °F - 104 °F)
- Inserting and connecting batteries incorrectly, short circuiting or exposure to fluids pose an explosion hazard.
- Do not mistreat, disassemble or attempt to repair the battery.
- Do not use the batteries if they are visibly damaged, malfunction or appear to leak electrolyte.
- 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.

For more information on battery use and battery hazards, please see the battery manufacturers’ Directions for Use.
System setup

PREPARING SIMMAN ESSENTIAL FOR SIMULATION

Follow these instructions for setting up the SimMan Essential or SimMan Essential Bleeding manikins and Instructor PC. A separate Patient Monitor PC may be purchased separately.

Unpack the Instructor PC and connect it to the power supply to charge the batteries.

1. Unpack the manikin torso and legs. Assemble the legs and torso as described under the Manikin Setup section.
2. Connect and fill all Bleeding ports and modules if necessary. Fill the urine bladder if necessary.
3. Connect the manikin batteries and close the torso skin. See section: Inserting and Connecting Batteries for further instructions.
4. Connect the external power supply to the manikin to charge the manikin batteries. See section: Battery Charging and Use.
5. Close the condensation valve on the back of the manikin’s right leg. See section: Opening the Condensation Valve.
6. Switch on the manikin. Wait until the manikin begins breathing before switching on the Instructor PC.
7. Start the separate Patient Monitor PC if applicable and connect the Web-camera to the USB port of the PC.
8. Start the Patient Monitor Application software. The SpO₂ USB probe can also be connected to the Patient Monitor PC. See section: Starting the Patient Monitor Application.
9. Start the Instructor PC and connect the headset.
10. Start the Instructor Application software. The application will search for all available manikins. See section: Launching Instructor Application.
11. Select a patient case in Auto Mode or pre-programmed scenario via Instructor Mode to start the simulation.
12. The simulation system is now ready to start the simulation. Power cables may be disconnected when batteries are charged.

Note: Also refer to the Quick Setup Guide for detailed instructions on initial system setup.
Activating the Instructor Software license

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

**TO ACTIVATE THE LICENSE:**

1. Select `<Activate through Internet>` or select `<Activate using other options>` in the License key dialog box.

2. Activate the license manually by following the on-screen instructions.

![Activate License](image1)

Note: The SimMan Essential software comes with 3 license keys. For more license keys please contact your local customer service office.

Changes or updates of the computer hardware (e.g. new hard drive or mother board) may render the license invalid. Please contact your local Laerdal support to assistance with re-activating the license.

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 preshared 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, ref 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 manikin 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 DC plug and the Ethernet cables back into the router again.
Disabling / Enabling WLAN

When using manikin in aircraft or other environments where use of WLAN transmitters is prohibited: Contact your local Laerdal representative for instructions on how to turn off radio transmission.

The Instructor PC

The Instructor PC uses the Instructor Application software to manage simulations. The Instructor Application runs in two modes:

- **Auto Mode**, for running pre-programmed, validated patient cases.
- **Instructor Mode**, for on-the-fly, customized patient scenarios.

The Instructor Application supports the 3 different manikins:

- SimMan 3G
- SimMan Essential
- SimMan Essential Bleeding.

Only SimMan Essential and SimMan Essential Bleeding are covered in this Directions for Use. The Instructor application will adapt the user interface according to the manikin selected or connected to.

Auto Mode Overview

For more information on software and system setup, please see the Help files:

Click Windows <Start> <All programs> <Laerdal SimMan 3G > <Documentation>

1 - COMMON LEARNER EVENTS

The <Common learner events> window lists all required events for a selected patient case. Clicking the events in the list records them in the Session Log, together with the time that each event was performed by the learner.

All other events available to the learner can be found under the <All learner events>

2 - SIMULATION CONTROL GRAPH

The Simulation control graph illustrates the patient parameters in terms of past, current, and predicted future trends throughout the simulation.
3 - SIMULATION CONTROL PANEL AND SESSION LOG

The <Simulation control> panel contains the main tools used in running the selected patient case. Parameters controlling the underlying pathology in the simulation can be monitored, and modified during a simulation session by using the <Simulation control> panel. The <Session Log> records information about events in response to the patient case. This information is then made available in debrief files at the end of the simulation session.

4 - ALL LEARNER EVENTS

The <All learner events> menu is used to register all other available events, not listed under the <Common learner events>. Events can be registered in any of the following ways to the <Session log>:

- Using the <General events> button
- Using the <Event search> function
- Using the clickable manikin figure

5 - PERFORMANCE

The <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

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

7 – AIRWAY STATUS

The Airway status window shows the state 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.

Note: Ensure that you select the Airway status tab.

8 - NEUROLOGY

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

The <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 pulses and rate of bleeding.

Note: Bleeding is only available for SimMan Essential Bleeding and NOT for SimMan Essential.

10 – BODY SOUNDS

Clicking the <Body Sounds> button calls up the <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

The Technical status window provides information about the technical status of the SimMan Essential 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
The <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
The 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
The <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
The <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 the <expand> button to open the window.
5 - INSTRUCTOR PATIENT MONITOR
The <Instructor’s Patient Monitor> shows the current physiological state of the simulation.

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
The <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
The <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 the <Circulation & fluids> tab are used to control the pulses and rate of bleeding from the Manikin during simulation.

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

Note: Bleeding is only available for SimMan Essential Bleeding and NOT for SimMan Essential.

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

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

10 – TECHNICAL STATUS
The <Technical Status> window provides information about the technical status of the SimMan Essential 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 Essential and SimMan Essential Bleeding 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 Essential and SimMan Essential Bleeding. Therefore SimMan Scenarios made before SimMan Essential 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.

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.
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 Essential* or *SimMan Essential Bleeding* Manikin. These events are highlighted blue and are marked with a wireless manikin icon.

**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.
- OR
SYSTEM SETUP

- 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.
  OR

- 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 files.

To add a comment on learner performance to the Session Log, click the <Add Comment> button.

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.

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> on 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 emulation 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 desired scenario to select it and then press <OK> button. The chosen scenario will open with the session paused.
5  Start the simulation session when ready by pressing space bar on your keyboard OR click the <Start session> button in the bottom left corner of the screen.
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.

Running a Scenario in Instructor Mode

Monitoring 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 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:

Click the individual graphs or numeric parameters. Pop-up menus allow the instructor to change the relevant parameters, OR
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.

Monitoring and Registering Learner Events
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 Essential manikin. These appear with blue text and have a wireless manikin icon next to them.

Interact with the Learner
Open the <Voice Conference Application> on the Instructor’s PC. Use the headset to listen to the learners’ communication and respond via the microphone.
END SIMULATION SESSION
When the simulation session is complete, click the <End session> button in the bottom left of the Instructor screen.

SAVE FILES AND LAERDAL DEBRIEFVIEWER
Save the session log for later debriefing or documentation. Click <Debrief> to start the DebriefViewer. For more information see section The Laerdal Debrief Viewer.

The Patient Monitor PC

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 patient monitor display and the web-camera can be stored for use in the DebriefViewer.

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 in the <Laerdal SimMan3G> program folder. The Select manikin window will appear. Select a manikin in the list and click <OK>.
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 Patient Monitor Application - Troubleshooting section - in the SimMan3G Help files.

The Patient Monitor Interface
1 - TOP MENU

1 - Press #wave in the top menu to view and change monitor display settings.

Pressing the Alarm Volume icon on the top menu line opens the <Alarm Volume> menu.

2 - Parameters readout area. The learner may also edit scaling, alarm limits etc using this interface. Clicking the parameter of interest will present a menu with available options. Some fields will only be available while appropriate sensors are connected to the Manikin.

3 - BOTTOM MENUS

There are effectively two menus. Press the left or right arrow key to toggle back and forth.

BOTTOM MENU 1 (IN ORDER FROM LEFT TO RIGHT):

Selecting the <Silence Alarm> button turns active alarm sounds OFF.

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

The NBP Start begins inflation of the modified SimMan Essential blood pressure cuff. NBP details will register in the NBP section of the monitor.

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

Cardiac Output generates a new reading of Cardiac Output. The C.O. details will be shown in the C.O. part of the Patient Monitor PC.

The Wedge button temporarily substitutes the PAP wave and numbered parameters with the WP wave and parameters. The wedge curve switches back automatically after 10-15 sec.

The TOF (Train of Four) button generates a new reading of the TOF state of the patient. The TOF details will be shown in the TOF part of the Patient Monitor PC.

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.

Selecting the 12-lead ECG button generates a 12-lead ECG strip. Select <Print> to have this ECG strip printed on the default printer available from your Patient Monitor computer.

BOTTOM MENU 2

Bottom menu buttons in order from left to right:

Selecting the <QRS Volume> button opens the <QRS Volume> menu, shown below. Select the desired volume (0-10).

Selecting the <Alarm Volume> button opens the <Alarm Volume> menu, shown below. Select the desired volume (0-10).

Select the <Radiology> button to open the <Radiology> display. X-ray images which have been included in the current scenario are shown.

Select the <Media> button to open the <Media> display. Select the <Close> button to close the Media display.

Select the Labs button to open the Labs display. Select the <Close> button to close the <Labs> display.

Selecting the Main Setup button opens the <Main Setup> menu. Options in the <Main Setup> menu are identical to the similar options displayed on the Menu line.

Selecting the <Main Screen> button enables an immediate return to the <Main Screen>, and cancels all submenus. Submenus can also be closed by selecting the “X” box of the submenu.
Transferring Media Files

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.

For an overview on patient monitor menus, see section System Setup - Patient Monitor Menus.

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.
1. Click <Order New> in the dialog box.
2. The system will then notify the Instructor of the order via the Instructor Application.

The learner may also click on any of the relevant menus to check if the Instructor has made any media files available for viewing.
The Laerdal Voice Conference Application

The Voice Conference Application is a tool for two-way vocal communication through the SimMan Essential and manikin. This function adds realism to simulation sessions by enabling vocal interaction between learners and the “patient”.

Both manikins have a built-in loudspeaker and microphone located in the head. When the Voice Conference Application is started on the instructor’s computer, a voice communication channel is created to the connected manikin.

Instructor channels, that allow voice conferences between instructors can be added.

ACCESSING THE VIDEO 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
   1. Click the Windows <Start> button.
   2. Select the <Laerdal SimMan3G> folder from the program list
   3. 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. Keep the <SPEAK> button activated, by holding the control key <Ctrl> while pressing F5 or any of the other function keys if there are more channels.

On the tablet PC: Tap the <SPEAK> button in the technical status window to speak through the manikin.

Note: unless muted or deactivated, sound from all connected channels will be playing in the headphones/speakers at all times.

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.
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. Select from the available members in the list.

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

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 from a Web-camera connected either to the Instructor’s computer or the Patient Monitor computer.

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>

Note: It is important to save the debrief files for later review.

2 - From Windows Start menu:
• Click the Windows <Start> button.
• Go <All Programs>
• Select the <Laerdal DebriefViewer> program folder
• Click the <Laerdal DebriefViewer> icon.
The Laerdal Advanced Video System (AVS)

The Laerdal AVS can be installed to allow high quality video taken from up to 4 video cameras during a simulation session and be viewed in the Laerdal DebriefViewer.

Note: The Laerdal Advanced Video System is not included in the SimMan Essential package, but can be purchased from your local Laerdal Sales Company or representative.

Customizing Scenarios

SimMan Essential Scenarios can only be used in Instructor Mode. Scenarios can be created and edited using a set of editors:

- Scenario Editor
- Trend Editor
- Event Handler Editor

The Patient Monitor layout can be customized via the Scenario Editor. Select <Edit Monitor layout…> from the <Edit> menu.

Common Learner Events can be customized via the Scenario and Event Handlers Editors. Select <Open Common Learner Events Editor> from the <Edit> menu.

All of the above mentioned editors can be accessed through the Instructor Application’s <Tools> menu, or directly through the Windows <Start> menu:

- Click the Windows <Start> button
- Select the <Laerdal SimMan3G> program folder
- Select the editor of your choice

SCENARIO EDITOR

The Scenario Editor allows you to define relationship between learner events and patient response by drawing lines in a simple graphical editor.

TRENDS

Trends are sets of physiological parameters pre-programmed to increase/decrease over time. They can be added to Instructor Mode Scenarios.

HANDLERS

Handlers are pre-programmed sets of actions and can be added to Instructor Mode Scenarios.
SimMan Scenarios to SimMan Essential

SimMan Scenarios made with previous versions of the Scenario Editor must be converted to SimMan Scenarios in order to run and edit them.

**TO CONVERT SIMMAN SCENARIOS TO SIMMAN ESSENTIAL SCENARIOS:**
Under <Tools> in the Instructor Application access the <Scenario Editor>, <Trend Editor> and <Handler Editor> respectively.

- Create a backup copy of all old Scenarios prior to converting to SimMan Essential.

Launch the conversion wizard from the Scenario, Trend and Handler Editors as follows:
1. In each editor go <File> <Convert> <Old Scenarios>
2. Follow the instructions in the conversion wizard to convert Scenarios.

All old SimMan Scenarios will automatically be converted to a SimMan Classic style scenario, using the old event library.

We recommend that patient responses such as Eyes, Airway resistance, be added manually to the updated Scenarios, to take full advantage of all new features in SimMan Essential.

**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.
Using the Internal Compressor

The SimMan Essential manikin's chest movements, airway modes and SimMan Essential Bleeding's blood systems are driven by compressed air. The right leg contains a built-in compressor and contains a separate blood reservoir for simulated blood.

The manikin's compressor is activated automatically when the air pressure in the tank falls below a preset pressure level. 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 section – Connecting external Air and CO₂ Supply.

SIMMAN ESSENTIAL ONLY

- Do not leave the manikin with pressurized air in the system.
- Drain the compressor tank of condensation after daily use.
- When not in use, leave the condensation valve, on the back of the manikin's right leg, OPEN.

TO AVOID OVERHEATING AND REDUCE WEAR

If using the manikin in temperatures above 40°C (104°F), 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.

**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/CO$_2$

The Air / CO$_2$ 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 / CO$_2$ inlet.

**CONNECTING EXTERNAL AIR AND CO$_2$ 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 CO$_2$ with each ventilation - connect external CO$_2$. Connect CO$_2$ only if the manikin is required to exhale CO$_2$ with each ventilation. Exhaled CO$_2$ can be detected with a real capnographic device.

1. Connect a suitable CO$_2$ source to a Laerdal external compressor or regulator panel.
2. Connect a Laerdal double-lumen Air/CO$_2$ tube from the external compressor or regulator panel to the Air/CO$_2$ inlet on the panel.

*For more information on external compressors and regulator panels compatible with SimMan Essential, contact your local Laerdal representative.*

**SimMan Essential Bleeding**

The following information is relevant for the SimMan Essential Bleeding only.

**Blood System**

SimMan Essential Bleeding has an internal reservoir for blood with a capacity of approximately 400ml.
MIXING OF BLOOD AND FLUID
To mix simulated blood: Fill the Blood Fill bottle about 3/4 full of de-ionized water. Add 5-10 drops of Laerdal Blood colored concentrate, mix and tighten the cap.

FILL MANIKIN BLOOD RESERVOIR
Note: Make sure the manikin power is on. Roll the right leg skin down to expose the fill panel.
1. Connect blood fill unit tubes to the blood and air connectors in the right leg panel.
2. Push the fill button on the panel. The button will light up and blood will flow into the manikin.
3. When the flow stops, disconnect the fill unit.
4. 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 BLOOD RESERVOIR
1. Connect an empty blood fill unit to blood and air connectors in the right leg panel.
2. Blood from the internal reservoir will drain into the bottle.
3. When the flow stops, disconnect the blood and air connectors.

RUN MANIKIN WITH EXTERNAL BLOOD
1. Drain the internal reservoir. Follow instructions for “Empty Internal Blood Reservoir”.
2. After draining the internal reservoir, fill the blood fill unit and connect to the manikin.
3. Push the fill button on the panel. The button will light and blood 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 overfilling the system may damage the product.
CLEANING THE BLOOD SYSTEM

After using the bleeding 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 Empty Internal Blood Reservoir.
3. Fill a bottle with a 60% Isopropanol solution or 70% Ethanol solution.
4. Fill the manikin’s internal blood reservoir with the alcohol solution. See Fill Manikin Blood Reservoir.
   If the manikin will be stored for long periods of time or transported in freezing conditions, it is recommended to fill the reservoir with one of the recommended alcohol solution to prevent damage and preserve the integrity of the blood system.
5. From the <Instructor Application>, open Circulation and fluids tab, check the boxes for Upper port and Lower port, then select Venous from the adjacent drop-down menus. Move the sliders (to the right) to maximum bleeding rates.

6. Allow the Bleeding system to flush with the clearing solution until the internal reservoir is empty.
7. The blood system should be flushed repeatedly until the discharged fluids are clear.
8. When finished, uncheck all of the boxes (in the Instructors application).

CONNECTING THE WOUNDS KIT

SimMan Essential Bleeding comes with a Wound Kit. The Wound Kit includes two wounds as well as double-sided tape to attach each wound to the manikin skin. Connect each wound to a bleeding port 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.
There are four blood ports with twist and lock connectors, as illustrated on the right.

- Ensure the area to which the wound will be attached is clean and dry.
- Apply adhesive tape to the back side of the wound.
- Remove the protective liner from the adhesive tape on the wound and fix it in the desired position on the skin.

**REMOVING WOUNDS**

1. Flush all ports and tubes with 60% Isopropanol alcohol or 70% ethanol while the wounds are still attached to the bleeding ports. Follow instructions for Cleaning the Blood System.
2. When the fluid runs clear, disconnect the wounds from ports.
3. Remove the wounds from the manikin skin and remove any tape residue with Laerdal Manikin Wipes.

*Note: When removing Wounds from the blood ports, cover the manikin skin with a cloth to prevent staining.*
*Note: Trauma modules can be purchased separately to replace default limbs to add realism to simulation.*

**The IV Arm**

Follow these instructions when using the IV Arm for SimMan Essential and SimMan Essential Bleeding.

The manikin must be switched ON when performing the following.

**IV ARM WITH SKIN**

- Filling and Priming port
- Priming switch
- IV Arm Pad
- Drain tube

**IV ARM WITHOUT SKIN**

- Filling and Priming port
- Priming switch
- Tourniquet area
- IV Arm chassis
- Drain tube

**THE IV ARM PAD**

The IV Arm Pads have been tested and proven capable of multiple IV catheter insertions/retractions. To maximize the life of the IV pad we suggest that you insert the IV catheter in the region highlighted on pad.
FILLING AND PRIMING THE IV SYSTEM

1. Ensure that the IV Arm is connected to the manikin and the manikin power is ON.
2. Ensure that the IV Arm Pad is fitted correctly.
3. Attach a collector bag to the drain tube of the IV Arm. The bag should be placed on the bed beside the manikin or at the same level, to allow fluid to drain into it.
4. Connect a blood filled (min 40ml syringe with luer lock) to the Filling and Priming port.
5. Press the priming switch to open the system.
6. Slowly fill the system with simulated blood. Continue this operation until there are no air bubbles coming out through the drain tube. Release the priming switch.
7. Continue to slowly fill with no more than 16ml of blood or until you feel resistance in the syringe.
8. Remove the Syringe. The IV Arm is now ready for use.

Note: It is important that the Arm is filled slowly to prevent damage to the IV Arm Pad causing leaks.

Note: The IV Arm Pad is designed for use with a 18 GA 1.3 x 32mm 103ml/min Intravenous Catheter.
REMOVING AND REPLACING THE IV ARM PAD

1. Ensure that the Tourniquet Area is not activated i.e. remove the tourniquet.

2. Remove the IV Arm Pad by pulling at the tabs on edge of the IV pad.

3. Remove excess blood that may accumulate in the IV Arm chassis.

4. When replacing the IV arm pad, ensure that it is pressed firmly into place.

5. Fill and Prime the system as instructed in the previous section.

REFILLING THE IV ARM WITH BLOOD

1. If the veins do not respond (energize) when the tourniquet is applied it is likely that the system requires refilling with blood.

2. Connect a blood filled syringe and slowly fill with no more than 16ml of blood or until you feel resistance. Remove the Syringe.

The IV Arm is now ready for use.
CLEANING THE SYSTEM

1. After each session and before storage, clean the IV Arm system.

2. Make sure the collector bag is connected to the drain tube.

3. Connect a syringe filled with de-ionized or distilled water to the fill port and slowly inject until clear fluid is coming out of the drain tube.

4. Connect an air filled syringe to the fill port. Inject air until water is no longer coming out of the drain tube.
Troubleshooting - IV Arm

Problem
• Veins do not energize.

Solution:
• Ensure manikin is powered on and IV Arm cable and air tube are connected to the manikin.
• Ensure the blood reservoir is filled, see Filling and priming the system.
• Ensure the tourniquet area is activated (depressed).
• Look for a leak between the IV Arm pad and the IV Arm chassis.
• If the tourniquet area has been activated several times within a short period of time, internal pressure in the IV Arm may drop. Wait 30 seconds to let pressure rebuild and try again.

Problem
• When injecting more than 40ml fluid and prime switch is depressed, no fluid is visible in the drain tube.

Solution
• Leak inside IV Arm. Contact Laerdal Technical Service.

Problem
• After releasing the prime switch and filling the internal reservoir, more than 16ml of fluid can be injected into the arm.

Solution
• Leak inside the IV Arm. Contact Laerdal Technical Service.

Problem
• There is a leak between IV Arm Pad and IV Arm chassis.

Solution
• Ensure the IV Arm Pad is fully inserted and secure in the IV Arm chassis.
• If this does not help, too high pressure has been applied to the IV Arm Pad during the filling process. Replace the IV Arm Pad.

Problem
• No flashback when inserting Intravenous Catheter into IV Arm Pad

Solution
• Ensure that the collection bag is at the same elevation as the IV Arm.
Repeating and Filling the IO Modules with Blood

The IO Pads supplied with SimMan Essential and SimMan Essential Bleeding are disposable parts meant for single use.

**REPLACING AND FILLING THE STERNAL IO PAD WITH BLOOD**

1. Attach the Sternal IO bag to the Sternal tube and close off the pinch clamp.
2. Remove the Sternal IO pad from the manikin chest.
3. Remove the Sternal tube from the sternal pad.
4. Fill the sternal IO pad with 7ml of blood. Ensure the pad is completely filled.
5. Reattach the Sternal tube to the Sternal IO pad.
6. Place the Sternal IO unit in the Sternal Chassis. Slide the unit down and towards the neck, until it fits securely under the top edge of the chassis.
7. Reattach the Sternal IO pad.

The sternal IO is now ready for simulation.

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

- F.A.S.T 1™
- Jamshidi ® Illinois Bone Marrow Aspiration/Intraosseous Infusion Needle. 18 Ga. 9/16” (14mm) - 1 ½” (38mm).

*Note: In some cases you will not get any blood backflow when using the F.A.S.T 1™

*Note: If bits of plastic from the module get stuck in the needle, flush the needle with fluid to dislodge the obstruction.*
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.
Fill the Tibial IO unit with 30 - 35ml of blood, ensure the Tibial Pad is completely full.

Connect the Tibial tube to the Tibial IO unit.

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

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 you will not get any blood backflow when using the BIG Automatic Intraosseous Device.
Changing Genitalia Modules

SimMan Essential and SimMan Essential Bleeding are shipped with a neutral genitalia pad as default. The pad can be exchanged for a male or female genitalia pad with urine catheter to simulate urine flow and catheterization.

Note: The manikin legs do not need to be removed before the genitalia pad can be replaced.

CHANGING THE GENITALIA PAD

1. Remove the genitalia pad. Grip the top of the genitalia pad and pull forward and down.

2. Connect the tube of the new genitalia pad to the tube from the manikin labeled 'G'.

3. Carefully place the new genitalia pad in place.
Urine system

⚠️ Warning: Do not open the cap of the urine tank.
Do not keep the urine system charged/pressurized for longer periods of time.

The urine tank has a capacity of 100ml of fluid.

TO SIMULATE URINE

Use plain water. Small amounts of food coloring can be added if required.

Filling and Refilling with Urine

Ensure that the urine system is completely drained before filling or refilling. To do this, insert a catheter and allow the system to drain, then follow these instructions:

1. Using a syringe with a Luer, inject no more than 100ml of urine into the urine connector that is located on the fluid panel. Do not overfill.
2. Remove syringe. The system is ready for use.

We recommend the use of the following catheter sizes:

- 14Fr Bard Bardex silicone catheter
- 16Fr Bard Bardex silicone catheter

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

CLEANING

The system should be cleaned regularly and always stored empty.

CLEANING AFTER THE DAY’S TRAINING SESSIONS.

If you intend to use the system tomorrow then simply flush through with clean water using a syringe and drain the system. If you use plain water as a urine simulant then it is only necessary to drain the system. To flush and drain the system, follow these instructions:

Ensure that the urine catheterization system is operational and connected inside of the manikin and that the cap on the tank is secure.

1. Using a syringe with a Luer, inject no more than 100ml of plain water into the urine connector. Do not overfill.
2. Insert a catheter and allow the system to drain, then remove the catheter.
3. Repeat steps 1 and 2 until the fluid runs clear. Remove syringe.
CLEANING THE GENITALIA PAD
1 Use a syringe and flush the genitalia with approximately 200ml of water through the genitalia opening.
2 Press the bulb on the back side of the genitalia pad to expel the last of the water.
3 Let all the parts air dry, or wipe them with a cloth to remove excess water.
4 Ensure that the urine tank is empty of water before storing the manikin.

CLEANING FOR STORAGE OR EXTENDED PERIODS OF NON-USE
1 Fill the urine system with 60% Isopropanol or 70% Ethanol
2 Insert a catheter, and drain the system
3 Remove catheter
4 Connect a syringe with 100ml of air, and fill the urine system with air
5 Insert a catheter and drain the urine system
6 Remove catheter
7 Repeat steps from 4, until the 60% Isopropanol or 70% Ethanol has been drained out and only air exits the catheter.

REPLACE URINE TANK
1 Remove the genitalia pad clear of the pelvis to reduce the risk of leakage inside the manikin. Disconnect the exposed tube connector labelled ‘G’.
2 Open the stomach as shown in section Opening the Torso – Manikin Setup.
3 Disconnect the tube labeled ‘P’ remove the urine tank from the pelvis.
4 Put the new urine tank back into the manikin and connect the corresponding connectors.
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:

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

Press the adapter plates firmly into place.

**DURING DEFIBRILLATION**
A conventional defibrillator may be used on the SimMan Essential. 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. DO NOT cover the ECG connectors.

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 for 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.

Connecting the SpO₂ Probe

The SpO₂ probe can be purchased separately. The SimMan Essential 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, ensuring that the probe is always firmly fixed in position.
Changing the Upper Dentures

The SimMan Essential and SimMan Essential Bleeding manikins come with a set of soft upper teeth as default. The soft set may be replaced with a hard set of teeth.

1. With one hand pull back the upper lip of the manikin's mouth.
2. Using the other hand, pull the set of upper teeth slightly forward and down to free them from the gums.
3. Remove the teeth from the mouth.
4. Align the new set of teeth with the gums and push them back until the teeth engage and lock onto the gums.
5. Ensure that the new set of teeth is properly aligned with the gums before pushing them into place.
Changing the Irises

The irises can be changed to simulate different clinical states. The irises are secured by magnets in the eye socket. To change the irises use the especially adapted suction wand.

Before changing the irises during a simulation, stop the blinking function in the Instructor Application.

1. Moisten the suction cup before performing this procedure.

1. With one hand pull back the upper lid.

2. Place the suction wand on the upper part of the iris. Squeeze the back end of the wand to create a suction seal on the iris.

3. Pull and roll the iris up and down towards the manikin’s mouth using a rolling motion.

4. Place the iris in the eye kit and select another from the kit.

5. Insert the lower part of the iris into the socket until it connects with the magnet below. Repeat this for the other eye.
Clinical Features

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. A male or female genitalia pad is also included with the SimMan Essential and SimMan Essential Bleeding. To change the genitalia pad see section, Changing the Genitalia.

TEETH
The manikin comes with a set of soft teeth as default. These can be exchanged for a hard set of teeth, included with the SimMan Essential and SimMan Essential Bleeding. To change the dentures; see section: Changing upper dentures.

BLEEDING MODULES

A separate Bleeding Module kit can be purchased. The Bleeding Module kit includes the following:

• Amputated Arm SimMan 3G
• Gunshot Arm SimMan 3G
• Amputated Leg SimMan 3G
• Gunshot Leg SimMan 3G
• Hardware kit
• Directions for Use
• Warranty booklet

Contact your local Laerdal representative for more information on other trauma modules compatible with SimMan Essential and SimMan Essential Bleeding.

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
Elbows: Fixed, no mobility
Wrist: 3-axis rotation
Thumbs: Free mobility
Hip joints: 3-axis rotation
Knees: 1-axis rotation
Ankles: 1-axis rotation

Do not remove protective bushings at shoulder or lower back. These are present to protect users from pinch points.
SIMMAN ESSENTIAL AND SIMMAN ESSENTIAL BLEEDING CLOTHING

Included with the SimMan Essential 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

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 correct down to but not including the bifurcation of the trachea into the right and left main bronchus.

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
- Oronasal intubation
- Nasotracheal intubation
- Transtracheal intubation

Prior to using airway adjuncts, apply a small amount of Laerdal 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 airways: The airways are designed for use with size #4, but size #5 may also seal correctly.
- 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.
- Fiberoptic intubation
- Combitube (size small adult is suitable)
- Retrograde intubation
- Needle cricothyrotomy
- Surgical cricothyrotomy

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)
CONFIGURABLE AIRWAY FEATURES

Manikin features may be configured to present various airway Scenarios:

- The airway may be closed automatically or manually. There are 2 levels of resistance: ‘On’ for full airway obstruction and ‘Off’ for no obstruction in the manikin airways.
  
<table>
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<th>Setting</th>
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<td>Off – Normal</td>
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<td>On – Extreme</td>
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- Tongue edema - multiple levels
- Pharyngeal swelling
- Laryngospasm
- Decreased cervical range of motion
- Trismus
- FBAO
- Teeth - soft upper dentures may be replaced with a hard set of teeth for enhanced realism while practicing intubations.

The SimMan Essential and SimMan Essential Bleeding can also be connected to third part respiratory manikins. Contact your local Laerdal representative for more information.

During simulation, the following conditions can be set:

- Can’t intubate / can ventilate
- Can’t intubate / can’t ventilate

The following information is automatically registered during a SimMan Essential or SimMan Essential Bleeding simulation session:

- Detection of proper head position
- Jaw Thrust
- Pneumothorax decompression
- Ventilations
- Stomach distension

INSTRUCTOR MODE AIRWAY / BREATHING TAB

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

1 - PRESET

Select preset using drop down menu. The airway configuration is then automatically set.

- Custom
CLINICAL FEATURES

- Normal
- Can't intubate, can ventilate
- Can't intubate, can't ventilate

2 - RIGHT LUNG RESISTANCE
The On setting will cause a full airway obstruction on the manikin.
- Off - Normal
- On – Extreme

Off corresponds to Resistance = 0 in scenario editor.
On corresponds to Resistance = 3 in scenario editor.

3 - LEFT LUNG RESISTANCE
The On setting will cause a full airway obstruction on the manikin.
- Off - Normal
- On – Extreme

Off corresponds to Resistance = 0 in scenario editor.
On corresponds to Resistance = 3 in scenario editor.

4 - ALLOW STOMACH DISTENTION
Check or uncheck the box to activate stomach distention or uncheck the box to allow trapped air to exit.

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

6 - TONGUE FALBACK
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.

Breathing Features

⚠️ Warning: Do not ventilate the manikin with oxygen enriched air or flammable gases.

The SimMan Essential can simulate spontaneous breathing and can be connected to ventilators or used with assisted ventilations:

- Bilateral and unilateral chest rise and fall
- Normal and abnormal breath sounds:
- 5 anterior auscultation sites and 6 posterior auscultation sites
- Unilateral, bilateral and lobar breath sounds
- Oxygen saturation and phlethysmogram
- CO₂ exhalation for use with third-party et CO₂ detectors (Requires connection to an external CO₂ reservoir)

PATIENT MONITOR FEATURES - BREATHING (OPTIONAL)
- SpO₂
- Airway respiration rate (awRR)
- End-tidal CO₂ (etCO₂)
- End-tidal O₂ (etO₂)
- inO₂
- pH
CLINICAL FEATURES

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 H₂O
- Simulated stomach inflation starts from approximately 40cm H₂O airway pressure. 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.

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 intercostals space

User-replaceable items, spare parts:
- Lung bladders
- Chest-rise bladders
- Pneumothorax bladders
- Pleura skin
- Torso skin
- Cricoid tape
- Neck skin

For instructions on replacing these items, please refer to Maintenance.
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 and pre-programmed scenarios.

**Defibrillation Studs**

**3-Lead ECG Studs**

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**CIRCULATION FEATURES**
- BP measured manually by auscultation of Korotkoff sounds
- Carotid, brachial, radial, femoral, 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

**CPR**
- Compliant with 2000 and 2010 Guidelines
- Compressions generate palpable pulses, 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)
- Pulse
- NBP
- ABP
- PAP
- C.O.

PATIENT MONITOR FEATURES - TEMPERATURES
- TPeri
- Tblood

SIMMAN ESSENTIAL CIRCULATION AND FLUIDS TAB

Move the slider to the appropriate position. Moving the central pulse slider sets the overall limit for all pulses represented by the red horizontal lines.

Select one of the following settings:
- Normal
- Weak
- Absent
ABOUT THE CIRCULATION TAB

The settings of the <Circulation> tab are used to control the blood flow from the Manikin during simulation.

Circulation fluids settings and configuration

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

1 - 5 Pulses
Move slider to appropriate position.

NOTE: Moving the central pulse slider sets the overall limit for all pulses represented by the red horizontal lines.

6 - Total Bleeding Rate

Number in box shows total bleeding rate from both upper and lower ports in ml/min.

7 - Upper Port Bleeding

Click to place a check in the checkbox for port open (bleeding).

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.

NOTE: 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.

8 - Select upper port bleeding type

Select bleeding type using drop down menu.

• Venous
• Arterial

9 - Lower Port Bleeding

Click to place a check in the checkbox for port open (bleeding).

Move slider to left or click the ‘-‘ button to decrease bleeding rate. Move slider to right or click the ‘+‘ button to increase bleeding rate.

NOTE: 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.
10 - Select lower bleeding port
Select bleeding type using drop down menu.
• Venous
• Arterial

11 - Bleeding rate scale factor
1:1 to 1:10
Used to reduce blood consumption from the manikin's internal reservoir. Select higher ratios to reduce blood tank consumption compared to the patient blood loss setting.

Bleeding
To allow the manikin to bleed realistically, the manikin has internal reservoirs for simulated blood. See the Manikin Setup.

• Upper / lower bleeding ports
• Venous / Arterial
• Works with various wound modules and moulage kits

BLEEDING TREATMENT:
• Bandage
• Pressure point
• Tourniquet
• Surgical Clamps

VASCULAR ACCESS:
• IV access (right arm)
• Intraosseous access (tibia and sternum)

CONSUMABLES AND SPARE PARTS:
• Laerdal Artificial Blood
• Fill Unit
• Wound modules
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
• Borborygmus
• Hypoactive postop
• Hyperactive diarrhea
• Hypoactive constipation
• Paralytic ileus
• Diarrhoea

5 - MORE BODY SOUNDS
Click the <Adv. Sounds Control> to open the sounds control popup. The sound settings and volume for each speaker:

6 - AUSCULTATION FOCUS
This will disable features generating mechanical noise in the manikin for 30 sec. This includes stopping the compressor and preventing chest 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 sound, 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.
Eye Settings and Configuration

Eyelid Status - Select one of the following from the drop down menu:
- Closed
- Half open
- Wide open
- R open, L closed
- R closed, L open

Blinking Frequency - Select one of the following from the drop down menu:
- Off
- Infrequently
- Normal
- Frequently
- 1 left
- 1 right
- 1 both
Drugs and IV

REGISTRATION DRUGS
Drugs and drug concentrations can also be registered manually by the instructor in the 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 <Select Drug> 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>.

SimMan Essential and SimMan Essential Bleeding have an extensive drug library with automatic or adjustable physiological responses.

Patient Monitor features – Drugs:
•  Train-of-Four (TOF)
•  in N₂O, et N₂O
•  Anesthesia agents
•  Lab reports

User-replaceable items, spare parts:
•  Intra-muscular pad
•  Sternal IO pad
•  Tibial IO pad

VASCULAR ACCESS (IV AND IO) LOCATIONS
Intraosseous access with needle insertion is possible through the sternum and left tibia. The IO pads are disposable items which should be replaced after each session.

For instructions on replacing these items, please refer to Maintenance.

⚠️  Caution: Do not inject fluids into these pads unless there are approved IO modules with fluid outlets in place.

Intra-muscular (IM) Injection
The right buttock has a pad under the torso skin for training intra-muscular injections. Do not inject fluids into this pad.
Maintenance

MAINTENANCE AFTER EACH SIMULATION SESSION
The following preventive measures are required to ensure longevity of the SimMan Essential and SimMan Essential Bleeding 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 or 70% ethanol. See Cleaning the IV Arm.

Power off the manikin and PCs
Charge batteries if necessary.

Wipe the skin with a moist cloth
Wipe the skin with a moist cloth to remove stains. Remove wet clothes or linens. Glue residue from the wound module tapes may be removed with a moist cloth or Laerdal Manikin Wipes.

General clean-up
• Return manikin and PCs to original state

Single use modules
Based on the use of the manikin, replace modules that are spent or damaged:
• Cricothyrotomy: Crico-tape and neck-skin
• Chest drain module pleura
• IO-modules (tibia and sternum)

Multiple-use modules
• IV-catheter
• Pneumothorax bladders
• Chest rise bladders
• Lung bladders
• Manikin skins (body, legs, arms)
• Urine tank

Before Storage or Shipping
Flush the IV arm with water and clean the blood system with a solution of 60% Isopropanol alcohol or 70% ethanol.

Detach the manikin’s legs from the torso and pack into the transport cases as illustrated in Manikin Setup.
Installing and Upgrading 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 previous versions of SimMan 3G software.
3. Insert the Laerdal SimMan Essential software DVD and allow auto-run. If auto-run is disabled on your computer, please manually execute the <autorun.exe> file on the DVD. Follow the onscreen instructions to install.
4. In the installation menu – click the <Install SimMan 3G Software> button once. This will start copying files to your computer.
5. If necessary, insert the Laerdal DebriefViewer DVD and follow the on screen instructions to install.

Note: That the copying process takes approximately 2-3 minutes. Once the copying process is finished, please follow instructions in the installation wizard.

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

Please note that the version shown in these screenshots is subject to change.

1. Make sure you have installed the software on the Instructor PC as described above.
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 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 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.

\[\text{Note that some components might fail updating on first attempt. Please ignore this and allow the update process to continue.}\]

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.

**ADVANCED VIDEO SERVER (AVS):**
If you use an AVS with your SimMan Essential system, please make sure that all components are updated with the latest software.

### Replacing Crico Tape / Neck Skin

After creating an emergency airway through the crycothyroid 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 Refit the neck skin. Secure with velcro fasteners at the back of the neck.
5 Seal the opening with tape.
6 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 session of 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. Lift the chest plate to reveal the pneumothorax bladders located in slots in the side of the chest plate assembly.
2. Slide out the old pneumothorax bladder.
3. Disconnect the tube and discard the old bladder.
4. Insert the new bladder into the slot.
5. Reconnect the tube to the new bladder.

Replacing Chest Rise Bladder

The chest rise bladders located in the lower end of the chest plate may break after a while. These are easily replaced.

1. Open the torso skin to expose the chest plate. There is one bladder on each side of the chest plate assembly.
2. Disconnect the tube from the bladder.
3. Discard the old bladder.
4. Insert new bladder.
5. Re-connect the tube to the new bladder.
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. Pull the old lung out from its socket.

6. Insert the new lung reversing this procedure.

Note: Ensure that the compliance bands intersect between the two folds of the lung.
Replacing Manikin Skins

The manikin skins may need replacement if they have torn, perforated or stained.

1. Unzip and roll the skin off.
2. Powder the inside of arms, torso and legs to reduce friction while replacing the manikin skins.

To prevent tearing of the zippers from skins, 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 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 pelvis 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.

WLAN STABILITY AND PERFORMANCE:
Problem
Connection between the PCs and the manikin is frequently lost.

Causes
• The WLAN signal might interfere with other radio traffic or noise.
• E.g. WLAN and Bluetooth networks, wireless telephones, microwaves etc.

Possible Solutions
• Change WLAN channel see section: Changing WLAN settings.
• Place manikin closer to the PCs. Avoid solid barriers which may block the signal between the manikin and PCs.
• Windows includes power management features. Configure the WLAN for Maximum performance. Some WLAN adapter drivers come with their own power management settings.
• When the manikin is stationary, consider using a LAN network between manikin and PCs.
• Change to external router.
• Use Laerdal Connection Manager to locate the best channel.

WLAN CONNECTION
Problem
• The manikin works via LAN cable, but not with WLAN connection.

Possible Solutions
• First test WLAN using another computer; to rule out computer related malfunction.
• Check that WLAN has been enabled on the PC.
• > Check that all relevant settings are set to enable WLAN.
• > Check that WLAN is not disabled by the driver.
• Check that the WLAN dongle is set up with the correct TCP/IP settings. Default is using DHCP ( Obtain an IP address automatically).
• WLAN adapter drivers and utilities may come equipped with features that allow intelligent control of the radio. These features may automatically shut down the adapter. This occurs typically after the computer has been in sleep or hibernate mode. It may be necessary to disable such features. Consider removing OEM utilities all together. Use Windows built-in features instead.

WLAN CONNECTION
Problem
• WLAN Connection is lost.

Possible Solutions
• Bad Reception or connectivity when running a network of manikins. Ensure that the WPA security keys are not the same on all manikins (channel and passphrase).

If WLAN is functioning on the PCs and you are unable to connect to the manikin via wireless connection, this indicates a problem with the WLAN dongle in the manikin.
• Check network settings using Manikin Update utility See section Wireless and LAN configuration.
• As a last resort you may restore the manikin to factory defaults. Contact your local Laerdal customer support.

If the manikin is identifiable on the wireless settings of the PCs, but cannot be connected to, the problem could be related to the software security keys.
• SimMan Essential uses WPA authentication as default. The default password is SimMan3G.
• Should a problem arise with the WLAN profiles, please delete the existing WLAN profiles for the manikin and try reconnecting to the manikin.

Check the wireless connection between the manikin and the PCs:
• Make sure that the manikin and the PC are ON.
• From the PC, Run command prompt: shortcut Windows-button + R, type cmd and press enter.
• Typing: ping –t 192.168.170.1 (with wireless connection), 192.168.169.2 (with cable connection). The same numbers apply for all manikins.
• Error messages are generated if connection is missing. Retry or contact Laerdal support.

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

CHANGING MANIKIN WIRELESS NETWORK DISPLAY NAME

VOICE CONFERENCE APPLICATION
Problem
• Sound from manikin to Instructor 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.
TROUBLESHOOTING

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 DEBRIEFVIEWER
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-cam is available when transferring to debrief.

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 if multiple manikins in network?
- 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 section: Maintenance - Replacing Lung Bladders. 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.
- Ensure that the condensation valve is closed. See section: Opening the Condensation Valve.
- Check that awRR is not set to zero on Instructor Application (Patient Case or scenario)
- Check that airway complications like maximum air resistance or laryngospasm are not set.
- Check if the internal compressor is switched off. See section: Turning the Internal Compressor Off/On.
- Check that any external compressed air source is switched off and that the air tube is disconnected from the manikin.
- The internal compressor be overheated. Wait approximately 20 minutes for it to cool down.
- Chest-rise is set to bilateral (for example if ET-tube is inserted to far into the bronchia).
- 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 section: Replacing Chest Rise Bladders.
- Check air tubing for leakage; check that all connections are intact. Replacing tubing section if leaking.
- 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.

Solution
- Clean the blood system
• Check the flow setting in the Instructor Application
• Replace filter
• The blood system may need to be re-calibrated. Contact your local service representative.

**Problem**

• Air when bleeding

**Solution**

• Bleed the blood reservoir empty and refill.

**Problem**

• Simulated blood is seen leaking from the back of the right leg during filling or when the manikin is turned off.

**Solution**

• Blood system has been overfilled, when running manikin with external blood. Empty internal reservoir and fill according to instructions.
• The internal reservoir may need to be replaced. Contact your local service representative.

**Problem**

• Can't fill the blood reservoir

**Solution**

• The filter in the fill unit may be clogged. If so, order a replacement fill unit.

**MANIKIN LIMBS**

**Problems**

• Lack of motion in the legs

**Possible Solution**

• Loosen and re-adjust the hip joint nuts on the inside of the pelvis. See section: Manikin Setup - Attaching the legs.

**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 lie 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.

**MECHANICAL NOISE DURING AUSCULTATION**

In the Instructor Application, click <auscultation focus>.

**BATTERIES**

**Problem**

• Battery life is less than 150 minutes with healthy patient and fully charged batteries.

**Possible Solutions**

• Batteries may be old, (recommended lifetime is 200 discharge cycles). Insert new batteries.
• Compressor may not function properly; consult your local Laerdal Technical Services Centre.

**PULSES**

**Problem**

• Cannot feel pedal pulses

**Possible Solutions**

• Skin may be too tight over pulse units – re-adjust skin and reboot.

**CLINICAL FEATURES – PNEUMOTHORAX BLADDERS**

**Problem**

• Pneumothorax bladders are not functioning properly.

**Solution**

• Check tubing connection at base of the bladder, to ensure that tubing has not been disconnected.

**MANIKIN SHUTDOWN**

**Problem**

• The manikin is unresponsive.

**Solution**

• Press and hold the <ON/OFF> button for 10 sec to force shutdown the manikin.

**URINE SYSTEM**

**Problem**

• No urine output after filling the urine system.

**Solution**

• Make sure that the manikin is laying on its back, the urine tank is placed correctly in the pelvis and no catheter is inserted. Fill the urine system with 100ml of air and then insert a catheter and drain the urine system. Remove catheter. Repeat until all the fluid inside the urine tank has drained out.

Note: Do not fill the urine system with the catheter inserted.
Problem
• Leak around the cap of the urine tank.

Solution
• The system is over-pressurized. Insert a catheter and drain the urine system. Remove the catheter and fill the urine system with 100ml of air. Insert catheter and drain the urine system. Remove catheter. Repeat until all the fluid has drained out of the urine tank and only air exits the catheter. Follow the filling procedure and fill the urine system. Make sure that there are no leaks around the cap of the urine tank. If it is still leaking, the urine tank needs to be replaced.

Problem
• Difficult to insert a catheter

Solution
• The system is over-pressurized. Insert a catheter and drain the urine system. Remove catheter. Empty the urine tank by filling the urine system with 100ml of air. Insert catheter and drain the urine system. Remove catheter. Repeat until all the fluid has drained out of the urine tank and only air exits the catheter.

If catheter cannot be inserted, disconnect genitalia from urine system. See Changing Genitalia Modules. Insert catheter into genitalia, and re-connect to the urine tank. Fluid will exit the catheter immediately.

Main Specifications

Size, weight
Dimensions (manikin only): 1800mm (l) x 550mm (b) chest (5.9 ft x 1.8 ft)
Weight (patient manikin only): 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

Only use the SimMan Essential external power supply and batteries.

Air & CO₂ Pressure
Internal fluid reservoir: Max 0.9 bar
External air connection: Max 1.4 bar
External CO₂ to manikin: Max 1.4 bar

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

* Requires that the fluid tanks and system is filled with 60% Isopropanol or 70% EtOH

Environment - Manikin only
Relative humidity: 20%-90% (non-condensing)
DO NOT use outdoors in wet conditions.
Not tested with salt spray.

RF Communication
WLAN frequency ranges:
2.4 GHz WLAN, channels 1-11.
5 GHz WLAN, channels 36 - 64,149 - 165.
Operation range: 100 m (300 ft) max.

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

Minimum Hardware Requirements for use with SimMan Essential tablet PC’s)
• Core 2 Duo or better
• 1 GB 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
Cleaning 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

Regulatory Information
FEDERAL COMMUNICATIONS COMMISSION STATEMENT
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
• This device may not cause harmful interference, and
• 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.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

Laerdal Medical AS hereby declares that when carrying the CE-mark this product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Dispose of in accordance with local requirements and regulations.

Li-ion batteries should be recycled

Spare Parts and Accessories
Substitute XX with the number for your local language version

TRANSPORT & STORAGE CASES
212-17950 Case soft, torso
212-18050 Case soft, legs

PCS & EQUIPMENT
213-090XX Instructor PC, 12”
213-091XX SimMan Essential, Rugged Instructor PC’s Panasonic
213-092XX Patient Monitor, 12”, including SpO2 probe
213-09350 Patient Monitor Panel PC 17”, including SpO2 probe
213-094XX SimMan Essential, Rugged Patient Monitor PC’s Panasonic, including SpO2 probe
212-18150 Sleeve Patient Monitor
212-18250 Sleeve Instructor PC
245-96050 Webcam
212-19650 Headset with microphone

POWER CORDS
260305 Power Cord (US)
260306 Power Cord (EUR)
260307 Power Cord (UK)
212-07050 External Battery Charger (2)
212-18650 Power Supply (110-240V)

MANIKIN PARTS
213-00050 SimMan Essential (manikin only)
214-00050 SimMan Essential Bleeding (manikin only)
212-07650 Arm Adaptor Screw/bolt
212-11350 Arm bushing (left and right)
213-12050 Genitalia with fluid reservoir, male and female
212-12250 Battery manikin, internal (pkg. 2)
212-12350 Thigh joint connector
212-12450 Battery clip, manikin internal
212-12550 Panel cover (left and right)
213-13050 Arm right, IV arm (no convulsion)
213-14050 Arm left, BP Arm complete (no convulsion)
212-14250 Arm Adaptor SimMan 3G/ SimMan
213-15050 Leg right, complete (Essential)
214-15050 Leg right, complete (Essential Bleeding)
213-16050 SimMan Essential Leg left
213-20050 Eyelenset, Inserts
381106 Rigid Teeth (1)
381107 Soft Teeth (1)
380460 Neutral Genitalia
213-12250 Urine tank replacement
213-13450 Syringe to prime and fill IV arm, Access

MODIFIED CLINICAL ACCESSORIES
200-00550 Cuff Assey, BP
282100 Manual Defib Adapters
212-17050 SpO2 probe with USB connector

SUPPORT MATERIAL
213-19150 Directions for Use
213-19350 Quick Setup Guide, poster
CONSUMABLES

212-11050 Chest Rise Bladder (pkg. 4)
212-11150 Lung Bag (pk. 2)
212-11250 Chest Drain Ribs Set (left and right)
213-13150 Skin right, arm
213-13550 Replaceable IV-pads for the IV site, 10,
212-14150 Skin left, arm
212-15150 Skin right, leg
212-21050 Neck Skin Kit (6)
212-25250 IM 11.5 cm Pad (Intra-muscular Pad) (pkg. 4)
212-24450 Torso Skin Sternal IO
250-21050 Airway Lubricant
212-21150 SimMan 3G Cricothyroid Tape
212-26250 Leg Skin Left Tibial IO
212-24150 Pneumothorax Bladder Set (pkg. 2)
212-24250 Pleura, chest drain (pkg. 20)
212-11650 Sternal IO Tubing (1)
212-11750 IO External Fluid Reservoir (pkg. 5)
212-24650 Sternal IO Pad (pkg. 10)
212-15250 Tibial IO Pad (pkg. 10)
212-15450 Tibial IO Tubing (1)
212-15550 Tibial IO leg band (pkg. 5)

CLOTHING

213-17450 Shirt
212-17550 Trousers
212-17650 Boxer Shorts
212-17750 Belt

SOFTWARE

213-19550 License (1) Instructor Application
SimMan Essential
214-19550 License (1) Instructor Application
SimMan Essential- Bleeding

213-30050 SimMan Essential Patient Cases, sample Package
(5 patient cases and 4 scenarios included)
Will be delivered as a CD until SimStore is up
and running. *No binder included.

SIMMAN ESSENTIAL BLEEDING ONLY

212-07450 SimMan 3G Bleeding Modules Kit
212-07850 Amputated arm SimMan 3G
212-07950 Gunshot arm SimMan 3G
212-08150 Amputated leg SimMan 3G
212-08250 Gunshot leg SimMan 3G
212-08350 Hardware Kit
210-20050 Wound Tape Kit
212-18550 Wounds Kit
212-17150 External Blood Refill Unit
300-00750 Blood Concentrate
212-25350 Inline Filter; Blood (pkg 5)

TOOLS

212-18350 Repl.Tool Arm, Allen Key 8mm