



Laerdal
helping save lives

Simulator Maintenance: ALS Simulator, SimBaby, SimJunior, & SimNewB



SUN

SIMULATION
userTM
NETWORK

WELMORCK
2014

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Technical Support

- Learn about the maintenance services provided by Laerdal
- Learn the benefits of periodic simulator maintenance
- Discover ways to extend the “life” of your simulators
- Learn how to troubleshoot common problems
- Share your tips
- Ask questions!

Preventative Maintenance programs are the simplest way to control costs with planned maintenance services. With each yearly service, our Field Service Engineers will ensure that your products maintain peak performance through our extensive testing process and replacement of worn consumables.

Other benefits:

- Assessment of functionality by a trained professional
- FSE can call in to start return or repair process (if covered under warranty)
- Latest software/firmware updates for the covered product
- Replacement of consumables which are NOT covered under warranty

Return to Bench

Includes:

- 1 Service per year (product returned to Laerdal)
- Full refurbishment or replacement of all consumables and injection pad sets
- Refurbishment of skin and/or veins on I.V. arm
- Product cleaning
- Final test and inspection of manikin
- Documentation of findings and recommendations (if applicable)

- **On-Site (For simulation products only)**
- Includes:
 - 1 Service per year (on-site visit by Field Service Engineer)
 - Full refurbishment or replacement of all consumables, some bladders and injection pad sets
 - Includes head skin and airway
 - Refurbishment of skin and/or veins on I.V. arm
 - Internal inspection of Compressor and Linkbox
 - Upgrades of Laerdal product software to latest version applicable to platform
 - Manikin/link box software updates
 - Product cleaning
 - Final test and inspection of manikin
 - Documentation of findings and recommendations (if applicable)



- Good old soap and water



- Isopropyl alcohol (70%)



- Baby powder with cornstarch to remove adhesives

- **AVOID** anything that lists kerosene or other fossil fuels as an ingredient! It will eat through the plastic! If you are unsure, call Tech Support before use.



Avoid these items when handling the simulators

- **Disclaimer: Some IV arms skins may be made TOO tight from the factory**
- If the old arm skin is ruined, CUT IT OFF
- The wrist is the key
- Liquid dish soap is also important! You can't use too much
- Look at old tubing to learn how it attaches (take a picture if you need a reference)
- Use DOTS of super glue to hold the tubing in place
- MAKE SURE fingers are in place before sliding over the wrist
- If wrist just won't go through:
 - Try heating the skin with a blow dryer (wrist area)
 - Soak the skin in hot water

Is your IV arm moldy?

- Over time, the fluids your students inject may cause mold to appear
- While probably not unsafe, it may start to smell
- There is no real way to clean mold from inside the arm
- **BEST ADVICE:** Contact Laerdal to purchase a replacement arm to be sent



- Every SimBaby comes with a bag of replacement esophagus filters
- Filter prevents lubricant from entering valves
- If you frequently perform airway management on SimBaby, you should change the filter every two to four weeks.
- Our depot repair team has seen ruined valve banks

- Compressor:
 - Check the compressor for unusual sounds (rattling, clattering), overheating (electrical, oily smell)
 - Check if it runs continually, (it should **not** unless you have the newer style compact compressor)
- Outer Skin:
 - Clean outside skin with warm soapy water and let dry (wipe down with dry towel and then air dry).
 - Remove tape adhesive with powder/cleaners
 - Outer Skin, head-to-toe: After cleaning with soap/water, powder down exterior surface from head to toe (powder acts as a barrier for “hand grunge/oils”). Encourage learners to use surgical gloves when interacting with patient simulators.

- Internal chest of SimMan: *Lightly* powder the following areas: :
 - inside chest skin,
 - chest wall
 - under chest wall (lift chest wall plate, take care not to disconnect hoses, wiring)
 - surfaces of white lungs
 - surfaces of inflation bladder
- IV Arm
 - Check smell. If odorous/mildew it's time for skin and veins changed
 - When using IV arm with fluids such as simulated blood, add $\frac{1}{4}$ teaspoon bleach into blood mixture

- IM injection Pads (total of 4 on SimMan: right deltoid, right gluteus, left ventral gluteus, left lateral thigh)
- Check smell. If odorous/mildew remove the internal pads, submerge and squeeze in a soapy/bleach (only 1 teaspoon bleach per gallon),
- Using BVM, check for good rise/fall of chest inflation. If deficient, first check for punctured or loose tape under neck skin that covers hole in trachea. If tape has good seal, remove chest skin and chest plate to inspect for loose fittings at lung bag or bronchial tree connections.

- Blood Pressure calibration
- Microphone
- Confirming connectivity
- ELO/ Touch Screen Monitor
- Compressor
- Simpad BP calibration



Calibrating BP on SimMan, SimBaby



Laerdal SimMan Software

File View Simulation Edit Calibration Help

Respiration

RR:

Exhale CO2

Difficult Airway

Reset All

Normal Normal

Normal Normal

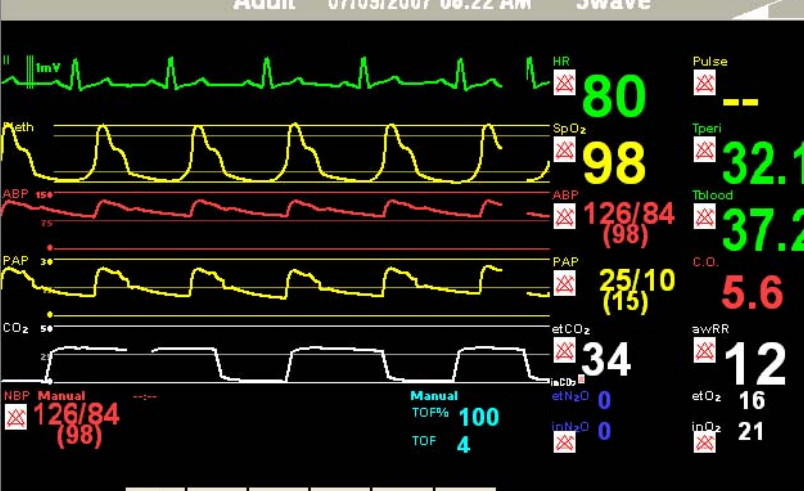
EMD/PEA

Shocks to conversion: Pacing threshold (mA):

Running rhythm: Sinus Rhythm, HR:80, BP:126/84

Waiting Rhythm: None

Adult 07/09/2007 08:22 AM 5wave



HR	80	Pulse	--
SpO2	98	Tperi	32.1
ABP	126/84 (98)	Tblood	37.2
PAP	25/10 (15)	C.O.	5.6
etCO2	34	awRR	12
NBP Manual	126/84 (98)	etO2	16
Manual TOP%	100	inO2	21
Manual TOF	4		

ABC Miscellaneous Medication

- Airway/Breathing
- Circulation
- Abort attempt
- Auscultation & percussion
- Awaken the patient
- Back-door for Automatic Maniki
- Call for help
- ConsciousnessCheck
- Anesthesia Related Drugs and
- Benzodiazepines
- Cardiac
- Conscious Sedation
- Induction Medication
- IV Fluids

00:00:00 Scenario started: "Healthy patient"

00:00:00 Summary of vital signs:
awRR: 12, HR: 80, BP: 126/84, SpO2: 98
PAP: 25/10, etCO2: 34 mmHg, Tblood: 37.2°C, etO2: 16

00:01:00 Summary of vital signs:
awRR: 12, HR: 80, BP: 126/84, SpO2: 98
PAP: 25/10, etCO2: 34 mmHg, Tblood: 37.2°C, etO2: 16

Start Scenario

Scenario: **Healthy patient**

Frame: **Initial State**

Time in Frame: 1:29

Patient Time: 0:00

Time: 1:29

Debrief...

Rec


Trends:

Start/Stop...

Handlers:

Hide Trends

History Future Parameters



180 HR

160 RR

140 SpO2

120 SAP

100 DAP

80 Empty

60 Empty

40 Empty

20 Empty

0 Empty

-9 -8 -7 -6 -5 -4 -3 -2 -1 Now +1 +2 +3 +4 +5 +6 +7 +8 +9 min

start Laerdal SimMan Soft... Microsoft PowerPoint ... 8:22 AM

Expiration

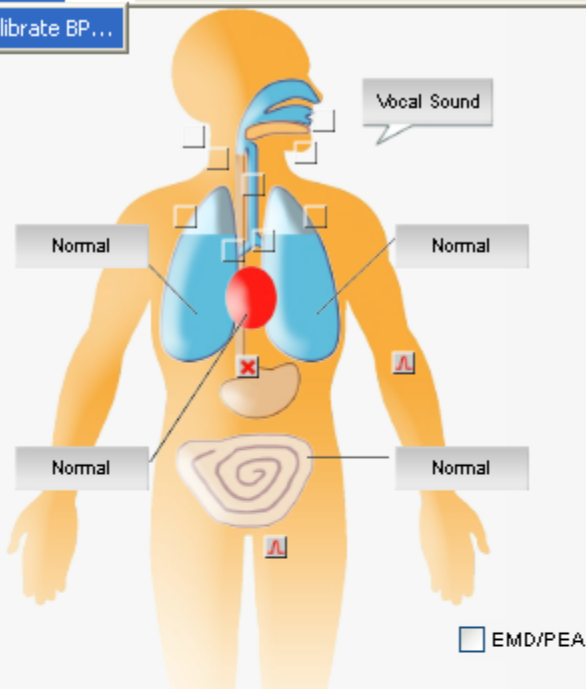
Calibrate BP...

12

Exhale CO2

Difficult Airway

Reset All



Shocks to conversion: Pacing threshold (mA):

Running rhythm: Sinus Rhythm, HR:80, BP:126/84

Waiting Rhythm: None

1:00 Scenario started: "Healthy patient"
 1:00 Summary of vital signs:
 awRR: 12, HR: 80, BP: 126/84, SpO2: 98
 PAP: 25/10, etCO2: 34 mmHg, Tblood: 99.0°F, etO2: 16

Start Scenario

Time: 0:16

Debrief...

Rec

Scenario: **Healthy patient**

Frame: **Initial State**

Time in Frame: **0:16**

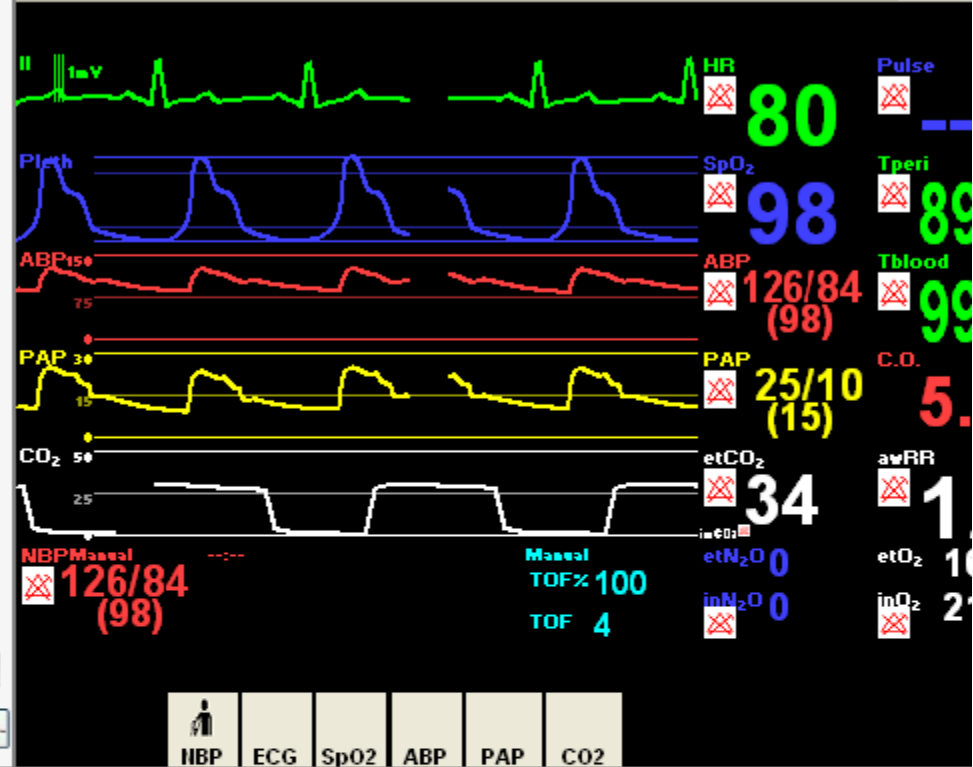
Patient Time: **0:00**

Trends: [Empty Graph]

Handlers: [Empty Graph]

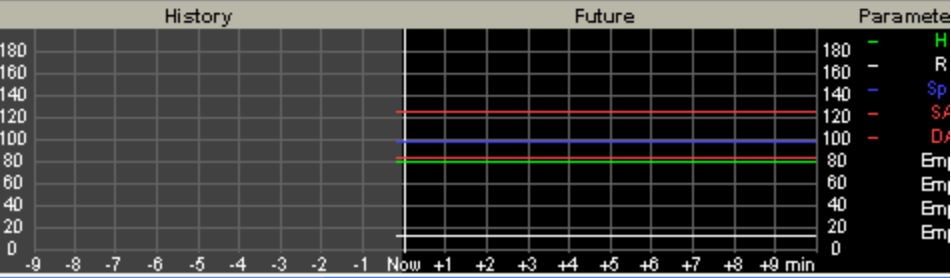
Start/Stop... Hide Trends

Adult 05/07/2009 07:05 PM 5wave



ABC Miscellaneous Medication

- Airway/Breathing
- Circulation
- Abort attempt
- Auscultation & percuss
- Awaken the patient
- Backdoor for Automat
- Call for help
- ConsciousnessCheck
- Anesthesia Related
- Benzodiazepines
- Cardiac
- Conscious Sedation
- Induction Medication
- IV Fluids



Expiration

12

Exhale CO2

Difficult Airway

Reset All



BP Calibration

Press calibrate when your BP instrument measures 100 mmHg.

Calibrate

Close

Normal

Normal

EMD/PEA

Shocks to conversion: 1

Pacing threshold (mA): 80

Running rhythm: Sinus Rhythm, HR:80, BP:126/84

Waiting Rhythm: None

1:00 Scenario started: "Healthy patient"

1:00 Summary of vital signs:
awRR: 12, HR: 80, BP: 126/84, SpO2: 98
PAP: 25/10, etCO2: 34 mmHg, Tblood: 99.0°F, etO2: 16

1:00 Summary of vital signs:
awRR: 12, HR: 80, BP: 126/84, SpO2: 98
PAP: 25/10, etCO2: 34 mmHg, Tblood: 99.0°F, etO2: 16

Start Scenario

Time: 1:22

Debrief...

Rec

Scenario: **Healthy patient**

Frame:

Initial State

Time in Frame: 1:22

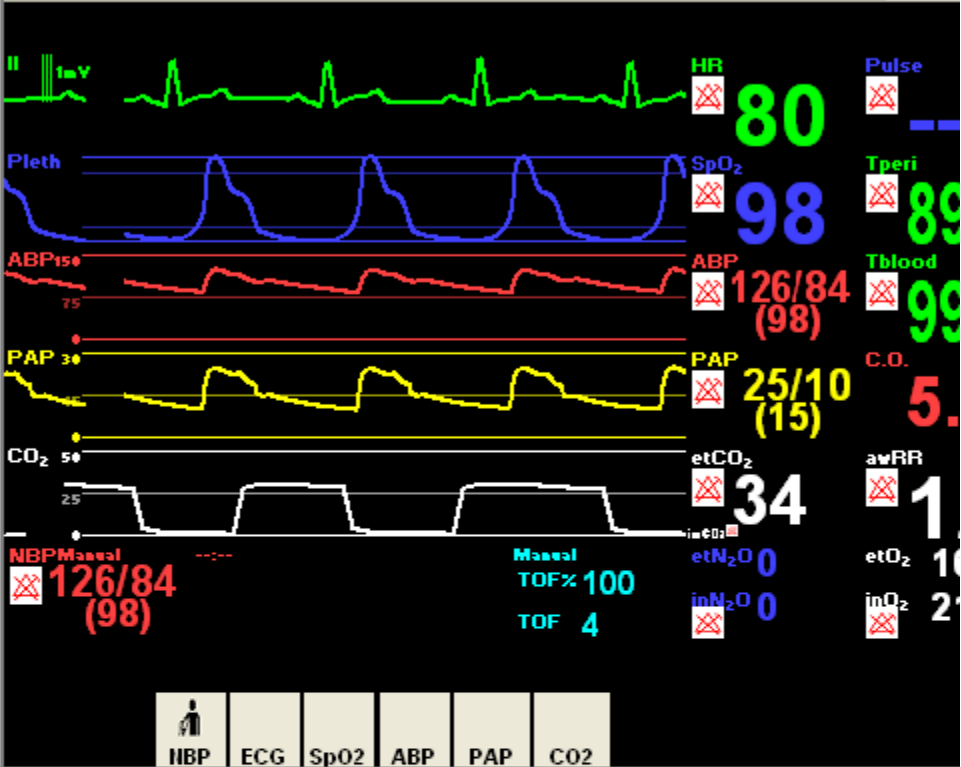
Patient Time: 0:00

Trends: [Empty Graph]

Handlers: [Empty Graph]

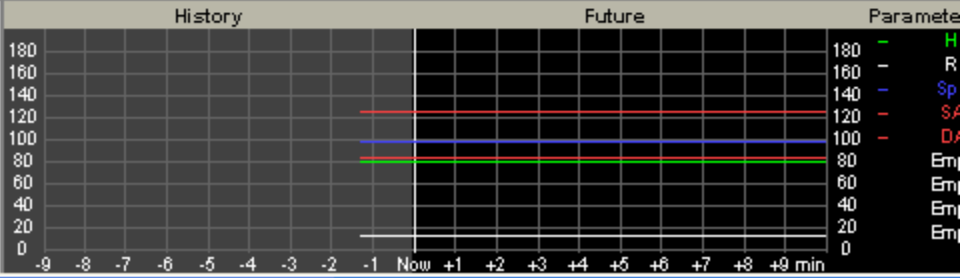
Start/Stop...

Hide Trends



ABC Miscellaneous Medication

- Airway/Breathing
- Circulation
- Abort attempt
- Auscultation & percuss
- Awaken the patient
- Backdoor for Automat
- Call for help
- ConsciousnessCheck
- Anesthesia Related
- Benzodiazepines
- Cardiac
- Conscious Sedation
- Induction Medication
- IV Fluids



Korotkoff Controls



Korotkoff sound volume



Auscultation Gap

Close

Expiration:

Breathing pattern:

Post rise:

Exhale CO2:

Body Motion:

Upper Airway Obstruction

Vocal Sound

Normal

Normal

Normal

EMD/PEA

Shocks to conversion: Pacing threshold (mA):

Pacing Rhythm: Sinus Rhythm, HR:120, BP:94/66

Waiting Rhythm: None

11:00 Scenario started: "Healthy baby"

11:00 Summary of vital signs:
awRR: 28, HR: 120, BP: 94/66, SpO2: 98
PAP: 15/5, etCO2: 34 mmHg, Tblood: 37.2°C, etO2: 16

Start Scenario

Time: 0:19

Debrief...

Rec

Scenario: **Healthy baby**

Frame: **Initial State**

Time in Frame: **0:19**

Patient Time: **0:00**

Trends:

Handlers:

Start/Stop...

Hide Trends

Infant 05/07/2009 06:58 PM 5wave

HR: 120

Pulse: --

SpO2: 98

Tperi: 36

ABP: 94/66 (75)

Tblood: 37

PAP: 15/5 (8)

C.O.: 1.

etCO2: 34

awRR: 28

NBPM: 94/66 (75)

Manual TOF%: 100

etN2O: 0

etO2: 16

TOF: 4

inN2O: 0

inO2: 21

ABC

Miscellaneous

Medication

Airway/Breathing

Circulation

Abort attempt

Auscultation & percuss

Awaken the patient

Backdoor for Automat

Call for help

Consciousness Check

Anesthesia Related

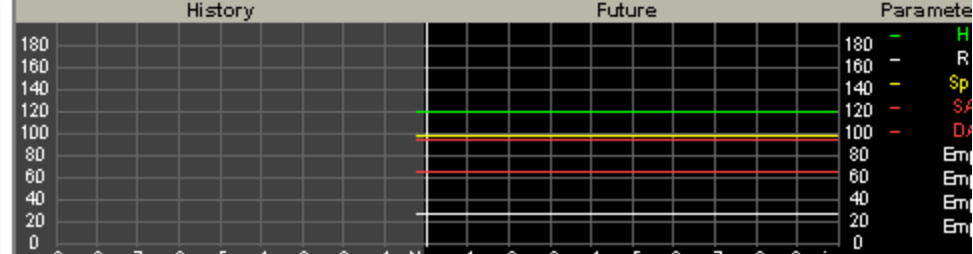
Benzodiazepines

Cardiac

Conscious Sedation

Induction Medication

IV fluids



Respiration
RR:

Exhale CO2

Difficult Airway

- Edit Monitor Setup...
- Start Scenario Editor
- Start Handler Editor
- Start Trend Editor
- Configuration...
- Microphone Configuration...**
- Video Recording Configuration...
- Set Vital Signs...
- Korotkoff Controls...

Normal

Normal

EMD/PEA

Shocks to conversion: Pacing threshold (mA):

00:00:00 Scenario started: "Healthy patient"

00:00:00 Summary of vital signs:
awRR: 12, HR: 80, BP: 126/84, SpO2: 98
PAP: 25/10, etCO2: 34 mmHg, Tblood: 99.0°F, etO2: 16

Time: 0:32

Scenario: **Healthy patient**

Frame: **Initial State**

Time in Frame: **0:32**

Patient Time: **0:00**

Trends:

Handlers:

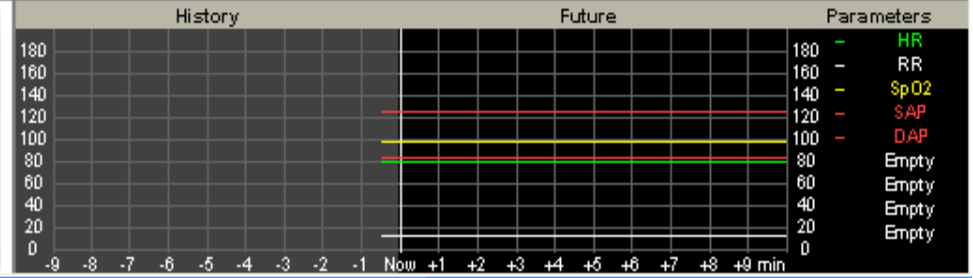
Adult 05/05/2009 05:25 PM 5wave

HR	80	Pulse	--
SpO2	98	Tperi	89.8
ABP	126/84 (98)	Tblood	99.0
PAP	25/10 (15)	C.O.	5.6
etCO2	34	awRR	12
etN2O	0	etO2	16
inN2O	0	inO2	21
Manual TOF%	100		
TOF	4		

ABC ECG SpO2 ABP PAP CO2

ABC Miscellaneous Medication

- Airway/Breathing
- Circulation
- Abort attempt
- Auscultation & percuss
- Awaken the patient
- Backdoor for Automat
- Call for help
- ConsciousnessCheck
- Anesthesia Related D
- Benzodiazepines
- Cardiac
- Conscious Sedation
- Induction Medication
- IV Fluids





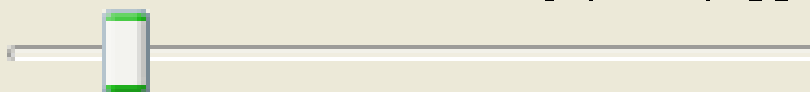
Microphone Controls

Input device:

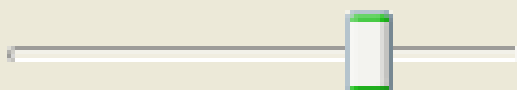
Primary Sound Capture Driver

Microphone ON

Latency (msec) 63



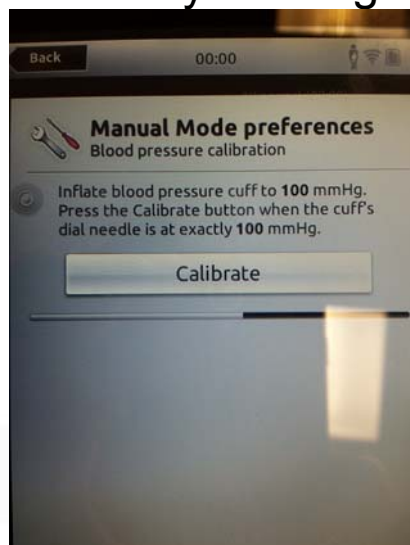
Mic Volume 7



Close

SimPad BP Calibration

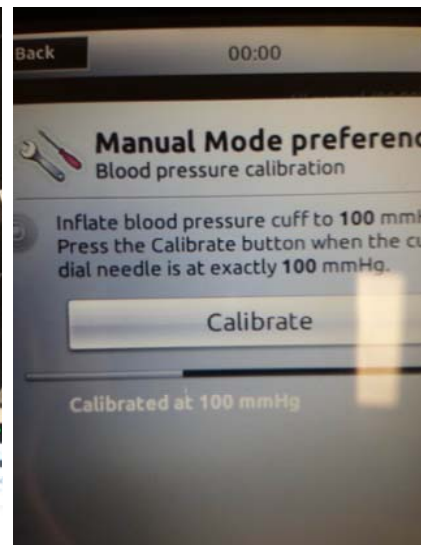
- With a session running on the simpad, click on Menu, select Preferences (If in manual mode it will say manual mode pref, if in auto mode it will say auto mode pref)
- Tab on Blood Pressure Calibration. Pump the cuff to 100 and hold it there by twisting the dial. Press the calibrate button the simpad.



As you pump the cuff you will see the bar progress across



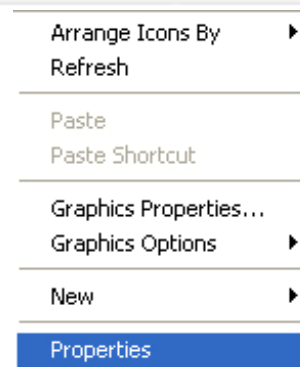
Stop once you have pumped the cuff to 100



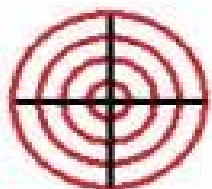
You should get an acknowledgement confirming calibration.

Patient Monitor won't display Vitals?

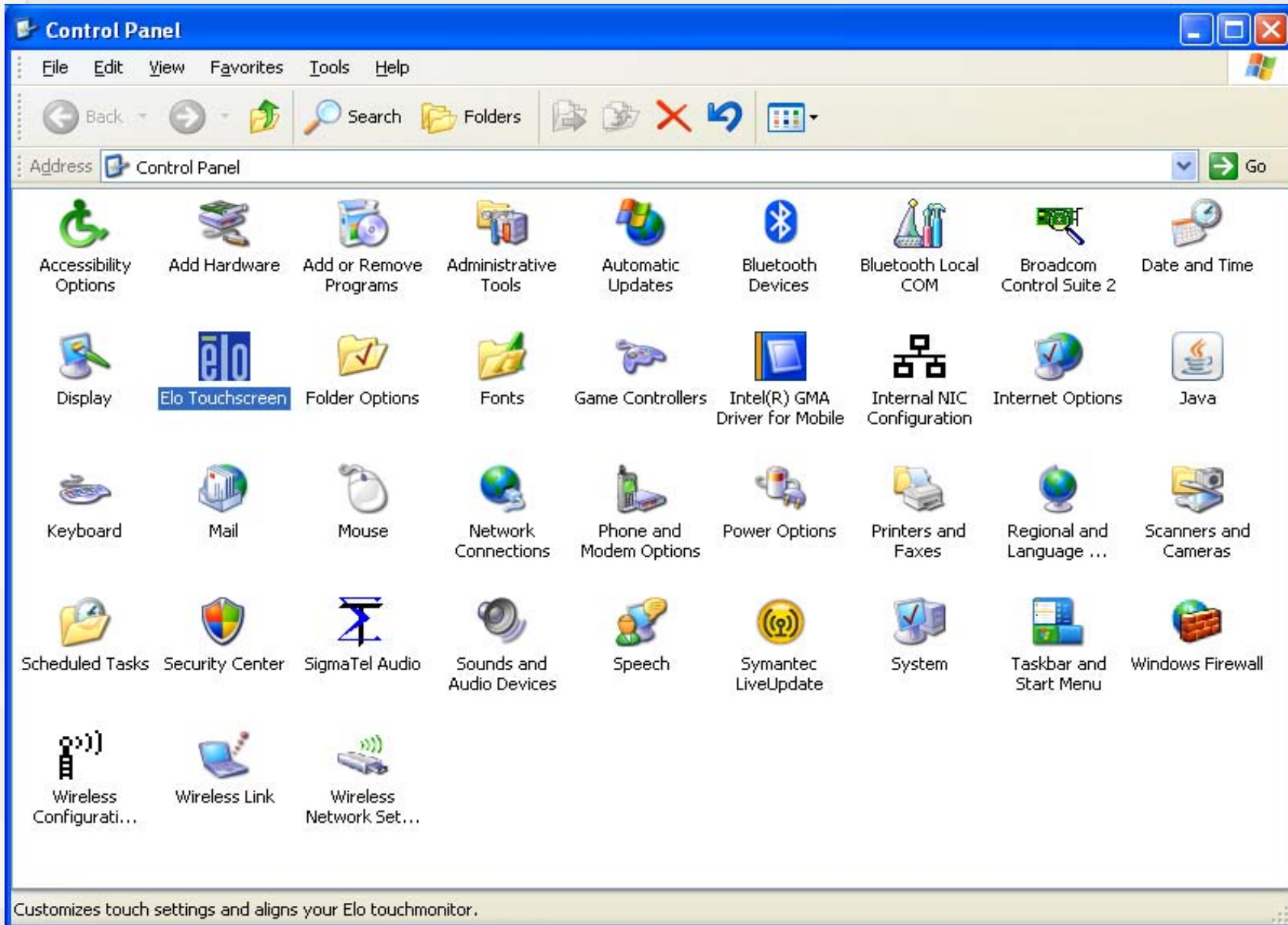
- Right click on desktop – select “Properties”
- Select Display 2
- Set resolution to 1280 x 1024 pixels
- Check “Extend my Windows desktop onto this monitor”
- Click OK
- Connect the Monitor USB cable to the computer



Calibrate Touch Screen



- Double click on the “ELO” icon in the system tray
- Click on the align button on the dialog that appears
- Press the Esc key on your keyboard (this sends the bullseye to the ELO monitor)
- Touch each target as it appears on the patient monitor



Control Panel

File Edit View Favorites Tools Help

Back Search Folders

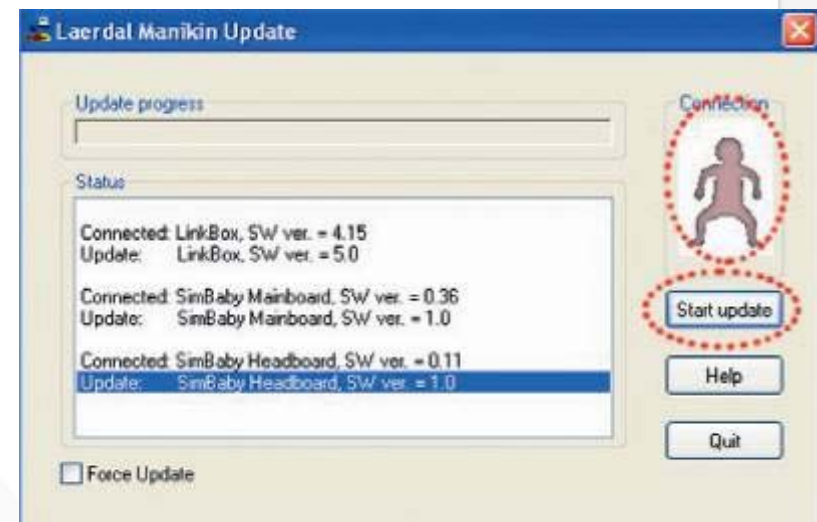
Address Control Panel Go

Accessibility Options	Add Hardware	Add or Remove Programs	Administrative Tools	Automatic Updates	Bluetooth Devices	Bluetooth Local COM	Broadcom Control Suite 2	Date and Time
Display	Elo Touchscreen	Folder Options	Fonts	Game Controllers	Intel(R) GMA Driver for Mobile	Internal NIC Configuration	Internet Options	Java
Keyboard	Mail	Mouse	Network Connections	Phone and Modem Options	Power Options	Printers and Faxes	Regional and Language ...	Scanners and Cameras
Scheduled Tasks	Security Center	SigmaTel Audio	Sounds and Audio Devices	Speech	Symantec LiveUpdate	System	Taskbar and Start Menu	Windows Firewall
Wireless Configurati...	Wireless Link	Wireless Network Set...						

Customizes touch settings and aligns your Elo touchmonitor.

Update the Software

- Start the manikin update program from the start menu
- Start update
- This program will automatically update all software in the link box and in the manikin



Compressor for Man/Baby



- At the end of each training session, turn the power off and open the red knob to exhaust moist air
- The internal filters are changed out during an annual preventative maintenance visit by a Laerdal Field Service Engineer.
- Continuous running, continuous hissing sound, or unusual smells indicate need for repair

Compressor Continued....



When compressor is turned off,
the air tank must be drained

Newer Style Compressor

- The new style compressor, part 210-01750 is much smaller, lighter and most importantly quieter than any other compressor we have sold. The difference on this compressor vs. the older style ones, is that there is not tank inside of the this unit.



SimJunior Compressor

- If you are not getting chest rise and fall with SimJunior and Convulsions are not working, check to ensure that you have power going into the manikin. SimJr has an internal battery that once depleted will cause the chest rise and fall to stop as well as



Always make sure that the power adapter is plugged into the manikin and the wall. Internally the manikin has a linkbox battery as seen below.



Call our technical support team between the hours of 8a-8p EDT Monday – Friday and Saturday from 10a – 6p EDT.

We're able to provide the most help when you have the following....



Some time to troubleshoot the issue with us



Have access to the manikin, computers, and simpads.



Laerdal
helping save lives

Questions.....



Your feedback is valuable, please be sure to let us know what we can add, or change for next time!