

Technical Note

OxiMax N-600x™ Pulse Oximeter with Alarm Management System

Alarm Management System Upgrade and Activation Procedure

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Introduction

Intended Audience

Users of this technical note include:

- Customer Biomedical Technicians
- Nellcor Technical Services and Field Services
- Nellcor Internal Engineering
- Nellcor Reliability

Prerequisites



Note:

Performing the upgrade and activation process on an N-600x pulse oximeter will overwrite its institutional default settings, the time, and the date. Restore these settings following completion of the upgrade and activation procedure. Make note of the institutional default settings prior to upgrade and activation, restoring those settings immediately after the upgrade. Refer to *Restoration of Institutional Default Settings*, page 23.

This technical note contains the alarm management system upgrade and activation procedure for the N-600x pulse oximeter. Oximeters to be upgraded must contain firmware version 1.5.2.0 or higher. To verify the oximeter firmware version is 1.5.2.0 or higher, see Figure 13 on page 14. If the firmware version is not 1.5.2.0 or higher, **do not continue with the firmware upgrade**. Contact Nellcor Technical Services or your local Nellcor representative. See *Product Support*, page 29.

Features

Upgrade and activation supports the following list of oximeter features.

- General Care Format (GCF) display view (new default screen with larger numbers and icons)
- OxiMax SPD™ Alert (SPD) feature
- SatSeconds™ Alarm Management feature
- Pulse Rate Delay Alarm Management feature
- Upper and Lower Alarm Limits on all four monitoring screens (general care format view, plethysmographic view, blip view, and trend view)
- Different tone for Upper Saturation Limit violation

Upgrade and Activation Tasks

- Installation and launch of the SPD Activation Tool (SPDAT). Use it to upgrade the firmware and activate the OxiMax SPD™ Alerts (SPD) feature in any OxiMax N-600x pulse oximeter with firmware version 1.5.2.0 or higher.
- Preparation of the N-600x pulse oximeter(s) for upgrade and activation procedures.

- A database tracking system to document information for each oximeter serial number, upgrade, and activation of the new features.
- Interaction with Nellcor Technical Services, who track upgrades and generate Activation Keys for the SPD feature.
- Synchronization of time and date settings, as well as any institutional default settings after upgrade.

Sequence of Upgrade and Activation Procedures

Upgrade firmware first, then activate the SPD Feature, which requires an Activation Key.

- 1.) Before you start, follow the steps listed in *Preliminary Operations*, page 4.
- 2.) Follow the instructions for *Activation Key Request Procedure*, page 9. Either use the software report function and submit the request to Nellcor Technical Services, or use the *Request Form*, page 30 to manually track the procedure and fax to Nellcor Technical Services.
- 3.) Receive Activation Keys from Nellcor Technical Services.
- 4.) Proceed to the *Upgrade Procedure*, page 13, and complete.
- 5.) Complete the *Activation Procedure*, page 19.
- 6.) Generate a confirmation report in SPDAT or manually complete the *Confirmation Form*, page 31.
- 7.) After completing the above procedures, verify the oximeter performs as it should using the "Performance Verification" procedure in the *N-600x Service Manual*.

Preliminary Operations

Print Necessary Documentation

The documents contained on the upgrade kit *Alarm Management System Upgrade and Activation Resources* compact disc provide necessary and important information. Per the *Directions for Use* contained in the CD-ROM case, print a copy of this *Technical Note*. After successful completion of all upgrade and activation procedures for a specific facility, print and make available the *N-600x Operator's Manual*.

Log Oximeter Serial Numbers Ready for Upgrade

Use the *Request Form*, page 30, as a worksheet. Keep it handy. Log all oximeter serial numbers you plan on upgrading, since you will need these when activating the SPD feature. Perform a backup of the database file after activating all oximeters. The database file resides at the following default pathname: C:\Documents and Settings\All Users\Application Data\Covidien\spd.dat.

Log Institutional Default Settings Prior to Upgrade

Use the *Restoration of Institutional Default Settings*, page 23, as a worksheet. Keep it handy. Log all institutional default settings prior to performing activation, then use the same worksheet to restore those defaults after activation.

Assemble Required Equipment

Ensure you have the necessary supplies for performing the upgrade.

- 1.) Personal Computer (PC)
 - a. One of the two specified operating systems
 - Windows XP Professional, v. 2002, SP2 with a minimum of 1 GHz processor and 512 MB RAM
 - Windows Vista, SP1 with a minimum of 2GHz processor and 1 GB RAM
 - b. Serial COM Port (User may select COM1 to COM4)
 - c. CD drive
 - d. 100 MB free disk space

**Note:**

Use the same computer to submit the Key Request Number for activating the SPD feature. Activation will only work if this is the case!

- 2.) Upgrade and activation kit components
 - a. PC-X monitor serial cable
 - b. CD-ROM contents: The SPD Activation Tool (SPDAT), upgrade files, and related manuals
 - c. Two or more Quick Guide adhesive labels

**Caution**

Before proceeding, ensure there are enough Quick Guide adhesive labels for each oximeter requiring upgrade and activation. The ordered upgrade and activation kit should contain a Quick Guide for each purchased license. Do not proceed without a sufficient quantity of labels. Contact Nellcor Technical Services to obtain more Quick Guide adhesive labels!

- 3.) Method for contacting Nellcor Technical Services
- 4.) Method for providing Nellcor Technical Services a record prior to and after upgrade and activation of all oximeters
 - a. Soft copy: Submit soft copies of forms or reports to Nellcor Technical Services via email
 - b. Hard copy
 - Print forms or reports via printer attached to PC performing procedure
 - Submit reports or forms to Nellcor Technical Services via facsimile or mail

Review the SPD Activation Tool Features

The SPD Activation Tool (SPDAT) is a Windows software program that performs various tasks.

- 1.) Allows user to upgrade N-600x pulse oximeter firmware
- 2.) Allows user to set the time and date of an N-600x pulse oximeter to match the system time of the computer used in performing the upgrade

- 3.) Allows user to create and print a report or error log text file
- 4.) Allows user to generate an Key Request Number unique to the PC used to perform the upgrade

**Note:**

Use the same computer to submit the Key Request Number for activating the SPD feature. Activation will only work if this is the case!

- 5.) Allows user to activate and deactivate the SPD feature

Installation of the Software Tool

- 1.) Insert the *Alarm Management System Upgrade and Activation Resources* compact disc into the computer's CD-ROM drive.
- 2.) Wait for the setup program to automatically launch the installer.

**Note:**

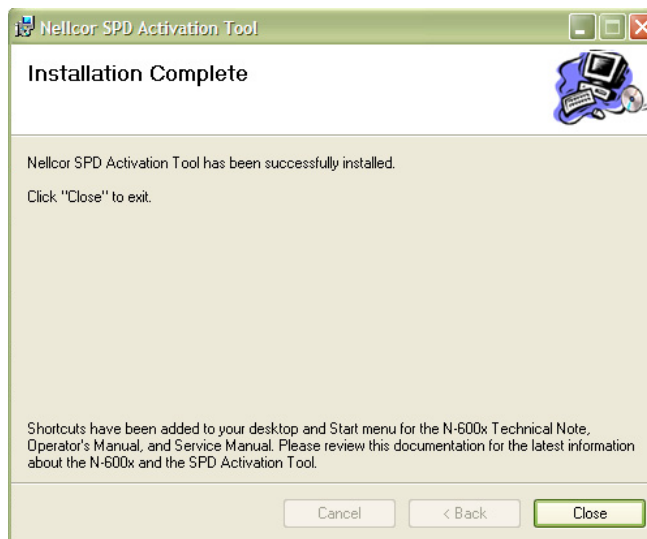
If the CD installation screen does not appear automatically after inserting the compact disc into the CD-ROM drive, use "My Computer" in Windows Explorer to access the CD-ROM drive contents. Then, start the installation process by double-clicking on the "setup.exe" executable file.

Figure 1. SPD Activation Tool Setup Wizard



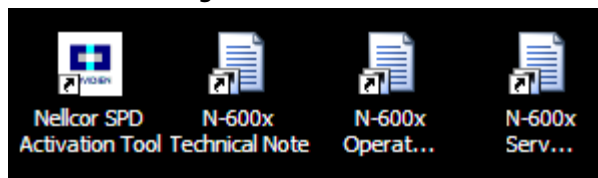
- 3.) Follow directions until the Setup Wizard completes. When the installation process completes successfully, the SPD Activation Tool is ready for use. If the installation process fails, remove the CD-ROM, reboot, and begin the installation again.

Figure 2. SPD Activation Tool Installation Complete



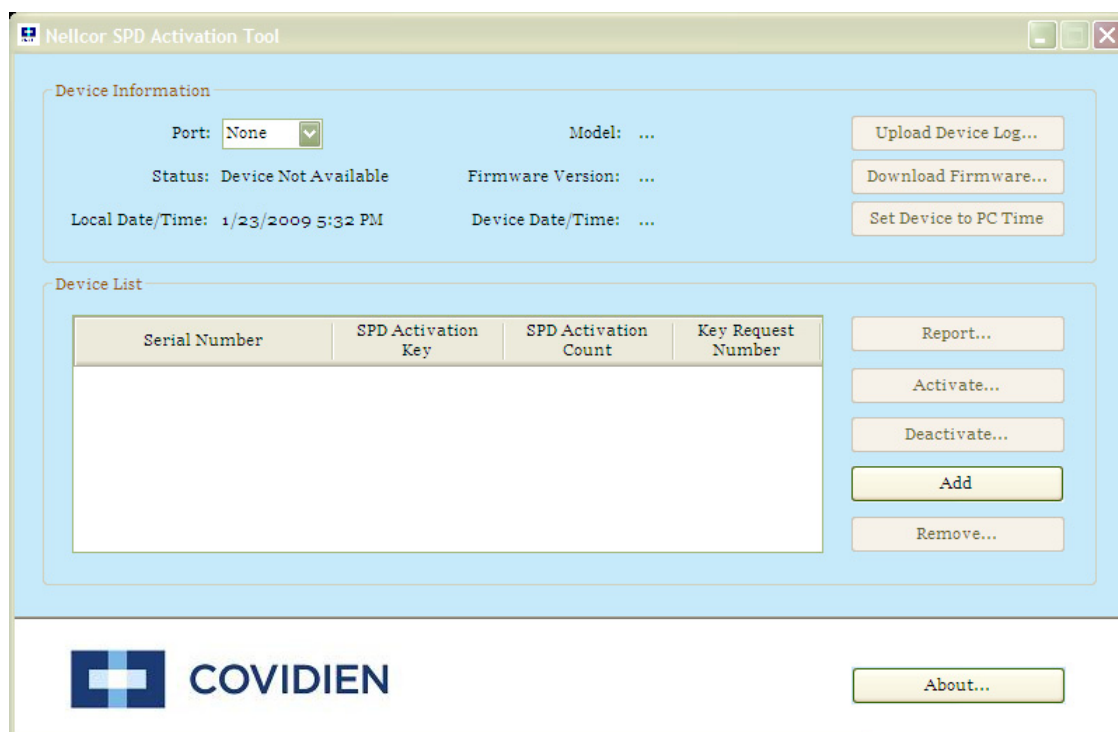
- 4.) Launch the SPDAT tool by selecting the Nellcor SPD Activation Tool shortcut icon on the computer monitor desktop.

Figure 3. Shortcut Icons



- 5.) Get familiar with the user interface. The user interface window has three main sections.
- Device Information Section**—Lists device information and allows the user to select the appropriate COM port for connecting to the oximeter. It also provides the user with the ability to download the firmware (upgrade the oximeter firmware), set the time and date in the oximeter to match the date and time of the computer, and create a device log report for record keeping or troubleshooting.
 - Device List Section**—Allows the user to activate or deactivate the SPD feature, as well as to generate reports. It provides a list of potential serial numbers and their associated activation keys.
 - Covidien Section**—Contains the Covidien logo and an “About” dialog box that provides information about the Activation Tool and several methods for contacting Covidien.

Figure 4. SPDAT Primary Window



- 6.) Locate the “Status” of the device. Since an oximeter is not yet connected, the SPDAT tool reports a “Device Not Available” status. Attaching an oximeter and selecting the correct COM port will change this status, as long as the COM

port matches your hardware configuration and the oximeter is configured correctly.

Figure 5. Device Data Prior to Oximeter Connection



The screenshot shows the 'Nellcor SPD Activation Tool' window. It has a light blue background with a yellow header bar. The title bar says 'Nellcor SPD Activation Tool'. Below the header, there's a section titled 'Device Information' in orange. Inside this section, there are several fields: 'Port:' with a dropdown menu showing 'None', 'Model:' with a dropdown menu showing '...', 'Status:' with the text 'Device Not Available', 'Firmware Version:' with a dropdown menu showing '...', 'Local Date/Time:' with the text '1/23/2009 5:32 PM', and 'Device Date/Time:' with a dropdown menu showing '...'. An arrow points from the 'Status:' field to the left.

- 7.) Review the SPD Activation Tool Features. The SPD Activation Tool (SPDAT) is a Windows software program that performs various tasks.
- Allows user to upgrade N-600x pulse oximeter firmware
 - Allows user to activate and deactivate the SPD feature
 - Allows user to set the time and date of an N-600x pulse oximeter to match the system time of the computer used in performing the upgrade
 - Allows user to create and print a report or error log text file
 - Allows user to generate a Key Request Number unique to the PC used to perform the upgrade



Note:

Use the same computer to submit the Key Request Number for activating the SPD feature. Activation will only work if this is the case!

Activation Key Request Procedure



Note:

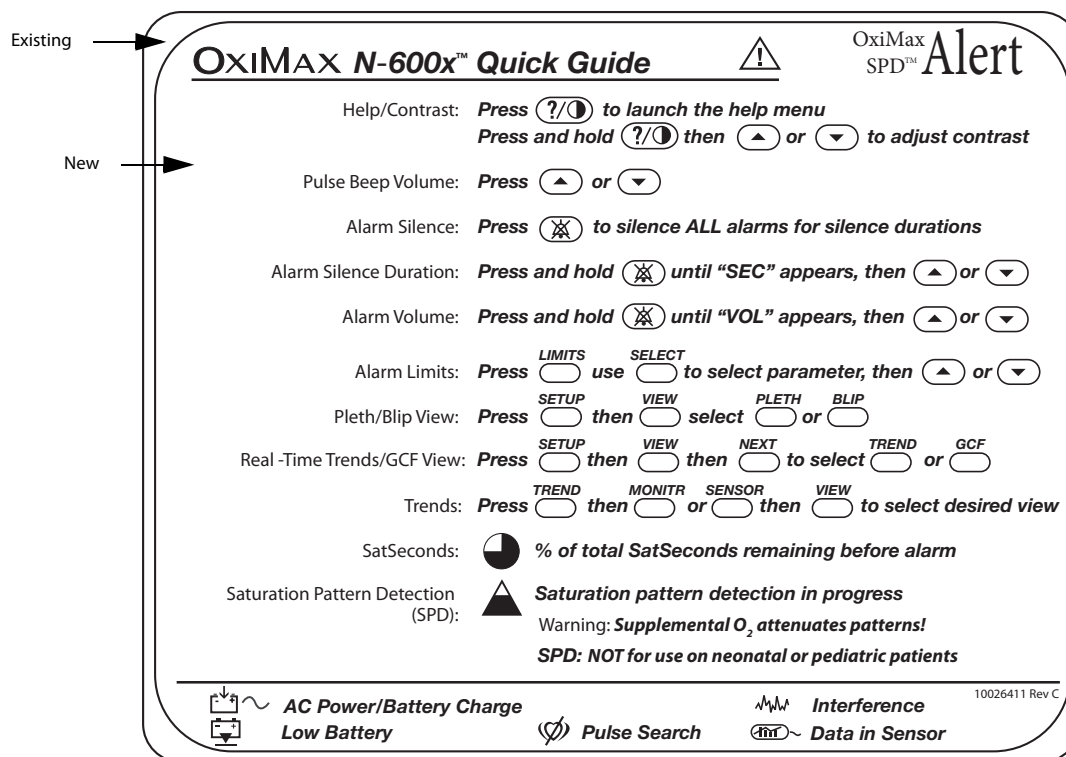
The preliminary steps of the upgrade and activation procedure do not require any connection with an oximeter over the serial port. If you are upgrading multiple oximeters, it would be most efficient to complete the Activation Key Request section prior to performing firmware upgrades and then activating the SPD feature on each individual oximeter. **After activating all designated oximeter units, create a backup of this serial number database.**

- 1.) Collect all oximeters requiring upgrade and activation.
- 2.) Clean the top cover of every oximeter requiring upgrade and activation per the instructions of the *Maintenance* section under *Cleaning and Periodic Safety Checks* in the *N-600x Operator's Manual*.

- 3.) Attach the new Quick Guide adhesive label to the top cover of the oximeter, centering it on and ensuring edges do not overhang the existing Quick Guide adhesive label. If the Quick Guide adhesive label overhangs the edge of the existing one, remove it and re-clean the oximeter surface. Using one of the spares shipped with the upgrade kit, repeat this step.

**Note:**

Should the Quick Guide adhesive label begin to peel at any time in the life of the oximeter, replace it with one of the spares or request a replacement. For more Quick Guide adhesive labels, contact Nellcor Technical Services at the number listed in *Product Support*, page 29, or a local Nellcor representative.

Figure 6. Centering Quick Guide Adhesive Label

- 4.) Smooth the Quick Guide adhesive label to remove any air pockets and ensure it is attached securely to the oximeter and all information on the label is visible and legible.
- 5.) Locate the serial number of each oximeter with a new Quick Guide adhesive label.

Figure 7. Location of Serial Number on Rear Panel

- 6.) Click on the ADD button in the Device List section for each oximeter serial number, using the SPDAT tool on the same computer designated to complete the entire upgrade and activation procedure.

Figure 8. Device List Without Entries

The screenshot shows a window titled "Device List". Inside, there is a table with four columns: "Serial Number", "SPD Activation Key", "SPD Activation Count", and "Key Request Number". The table is currently empty. To the right of the table, there are five buttons: "Report...", "Activate...", "Deactivate...", "Add", and "Remove...". The "Add" button is highlighted in yellow, and a black arrow points to it from the right.

- 7.) Enter the complete list of serial numbers from the oximeter(s) you wish to activate in the Serial Number fields. The SPDAT tool auto-generates a number in the Key Request Number field.

Figure 9. Serial Number Entry

The screenshot shows the same "Device List" window, but now the table is populated with data. The columns are: "Serial Number", "SPD Activation Key", "SPD Activation Count", and "Key Request Number". There are four rows of data, each with a unique serial number. The "SPD Activation Key" is "000000000" for all, "SPD Activation Count" is "00", and "Key Request Number" is generated for each. A blue bar highlights the bottom row of the table.

Serial Number	SPD Activation Key	SPD Activation Count	Key Request Number
0000000000123456	000000000	00	623775
0000000000234567	000000000	00	737603
0000000000345678	000000000	00	687188
0000000000456789	000000000	00	212871

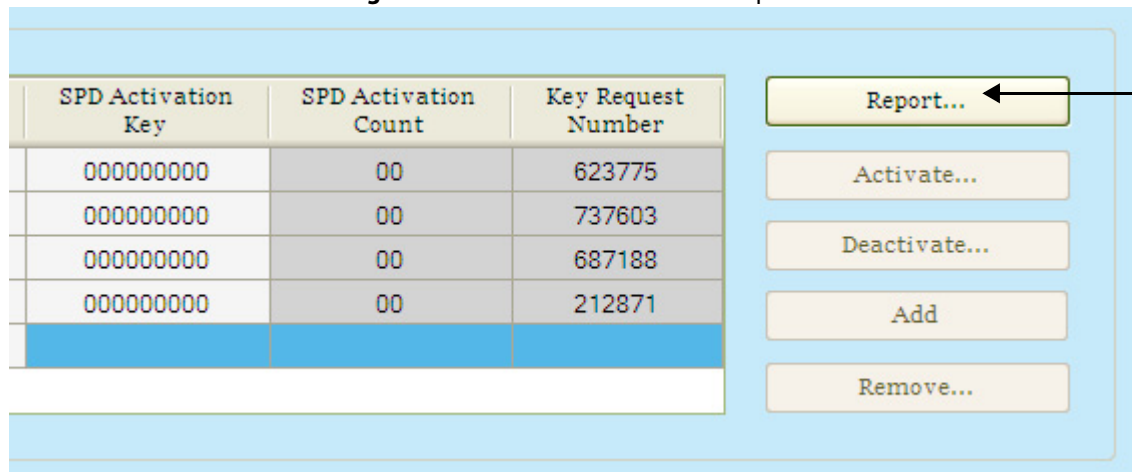


Note:

Enter just the number located on the back of each oximeter. The software auto-fills all extra zeros to the left of the serial number.

- 8.) Generate a Serial Number Report (Serial_Number_Report.txt) by selecting the "Report" option.

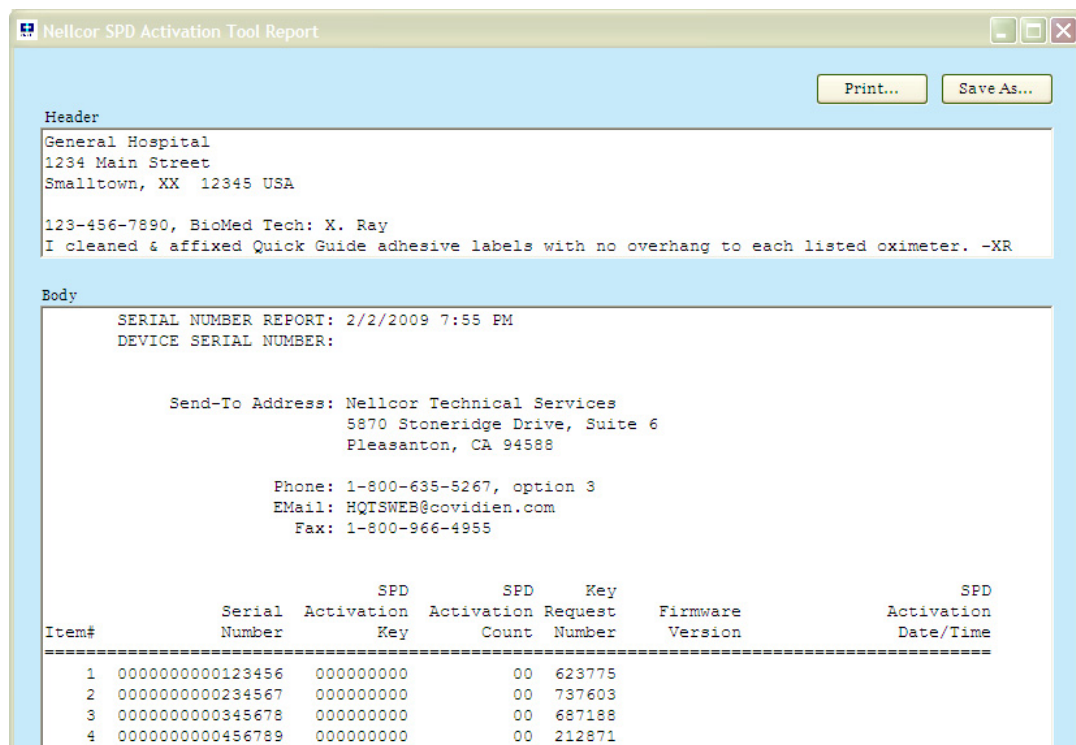
Figure 10. Generate Serial Number Report



The following window results. This window overlays the main SPDAT window, but you may opt to move the Report window to view both. The Report window contains a Header and a Body section.

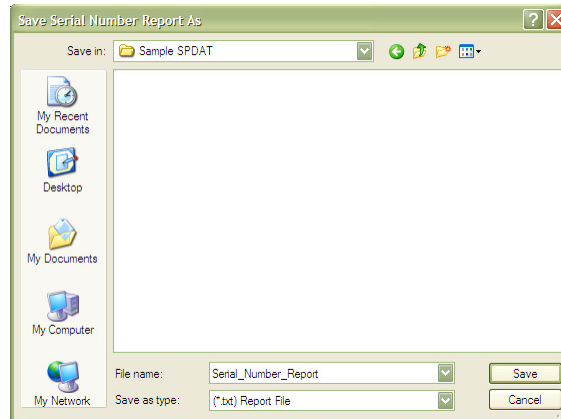
- 9.) Complete the Header section with company, company address, and contact information, including your name and position. On the final line of the header, issue a statement confirming the cleaning and application of the Quick Guide adhesive label on all oximeters after ensuring there are no overhanging edges.

Figure 11. Overlaid Report Window



- 10.) Save the Serial Number Report as a file. Depending on the chosen method for sending this information to Nellcor Technical Services, either print the report using the print button at the top of the report page or complete the *Request Form*, page 30.

Figure 12. Save Serial Number Report Feature



- 11.) Contact Nellcor Technical Services with the information. Use the contact information in the report or see *Product Support*, page 29. A Nellcor Technical Services representative will provide you with an activation key to enter in the SPD Activation Key field. There may be a delay between when Nellcor receives the information and when you receive the Activation Key(s).
- 12.) Quit the SPDAT tool.



Note:

Do not proceed with the upgrade procedure until receiving the required SPD Activation Key(s) requested from Nellcor Technical Services, based on the generated Serial Number Report.

Upgrade Procedure

Establish Connectivity



Note:

Performing the upgrade and activation process on an N-600x pulse oximeter will overwrite it's institutional default settings, the time, and the date. Restore these settings following completion of the upgrade and activation procedure. Make note of the institutional default settings prior to upgrade and activation, restoring those settings immediately after the upgrade. Refer to *Restoration of Institutional Default Settings*, page 23.

- 1.) If attached to the oximeter, disconnect the sensor and sensor cable from the oximeter.
- 2.) Connect the oximeter to AC power, confirming the AC POWER indicator is lit.
- 3.) Turn on the oximeter by pressing the ON/STANDBY button.

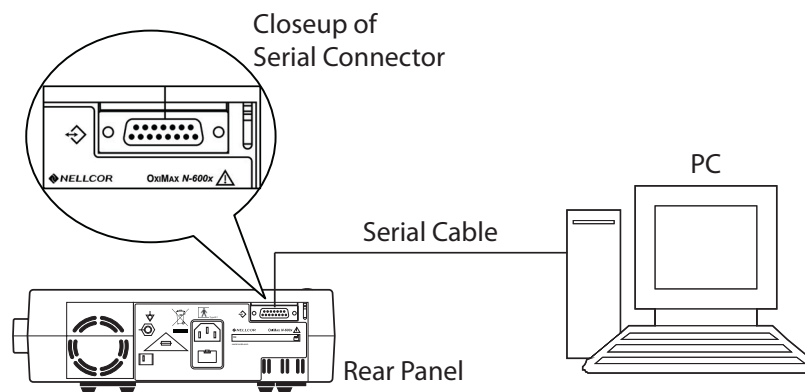
- 4.) Verify the oximeter firmware version is 1.5.2.0 or higher. The oximeter displays the firmware version during the power-on self-test (POST).

Figure 13. POST Splash Screen for Firmware Version 1.6.0.0



- 5.) Connect one end of the PC-X serial cable to the oximeter serial port connector.
- 6.) Connect the other end of the PC-X serial cable to the serial COM port on the computer.

Figure 14. N-600x Pulse Oximeter Upgrade and Activation Setup



Initiate Serial Communication

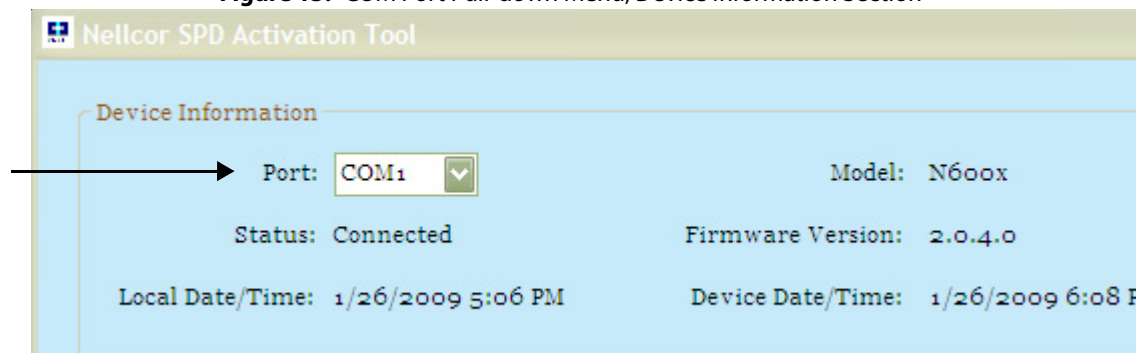
- 1.) Initiate serial communication with the connected oximeter by selecting the proper COM port from the pull-down menu in the Device Information section of the SPD Activation Tool.



Note:

The software tool requires an ASCII 9600 baud rate. If an error occurs, see *Temporary Serial Port Setup*, page 22. After changing the baud rate and performing the upgrade and activation, return the baud rate to its institutional default setting.

Figure 15. COM Port Pull-down Menu, Device Information Section



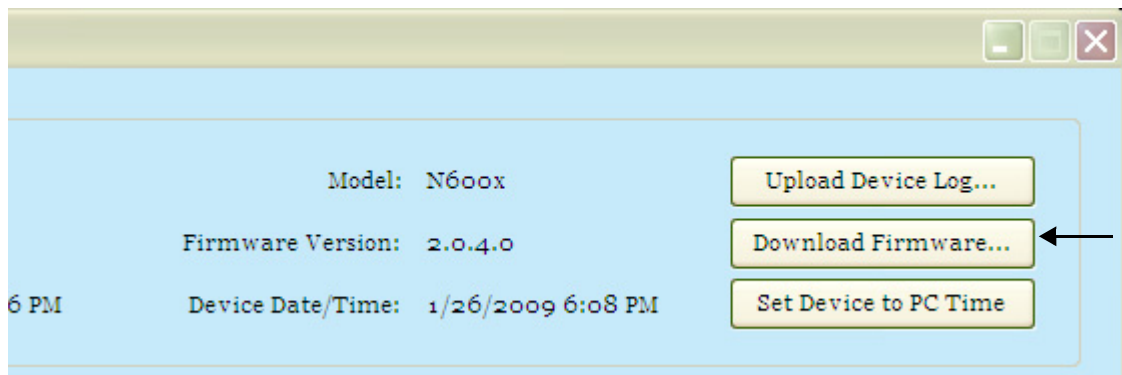
- 2.) Once the SPDAT tool identifies an oximeter on the serial port, the status reports "Connected." The Device Information section also displays the oximeter model type and software version, as well as the date and time stored in the oximeter.

**Note:**

This date and time may not match the system time of the computer, which appears under "Local Date/Time."

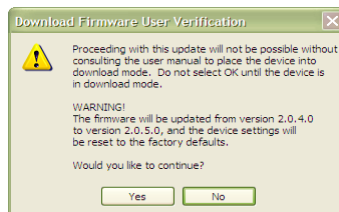
- 3.) Select the Download Firmware option from the Device Information section. The software will wait while you prepare the oximeter for the firmware download.

Figure 16. Download Firmware Option, Device Information Section

**Note:**

Do NOT select YES at the prompt of the Download Firmware User Verification Screen. Instead, turn to the oximeter, following the directions for the next step!

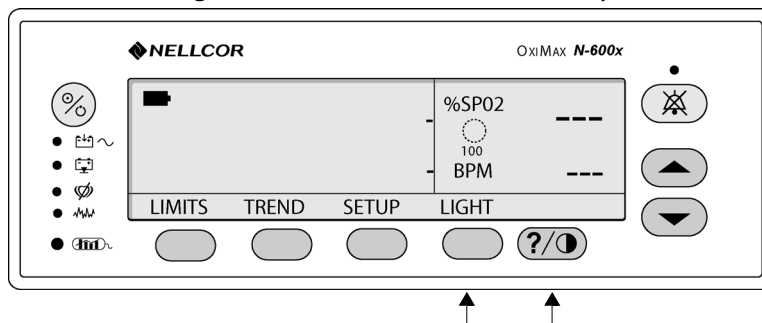
Figure 17. Download Firmware User Verification Screen



Request Oximeter Firmware Download

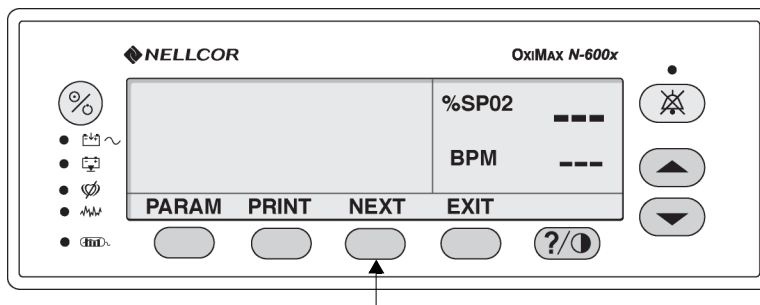
- 1.) Return to the oximeter. Press and hold the LIGHT and CONTRAST softkeys simultaneously until the service menu appears. This takes about five (5) seconds.

Figure 18. LIGHT and CONTRAST Softkeys



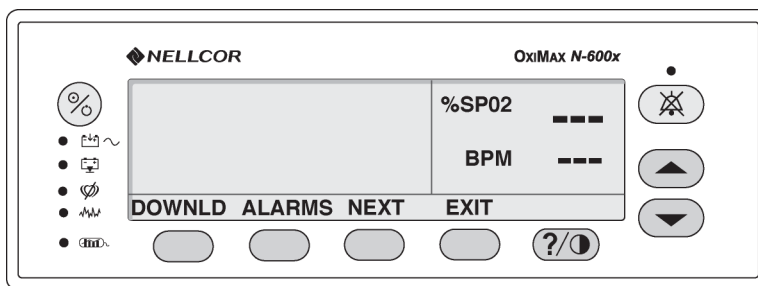
- 2.) Press the NEXT softkey.

Figure 19. Pressing the NEXT Softkey



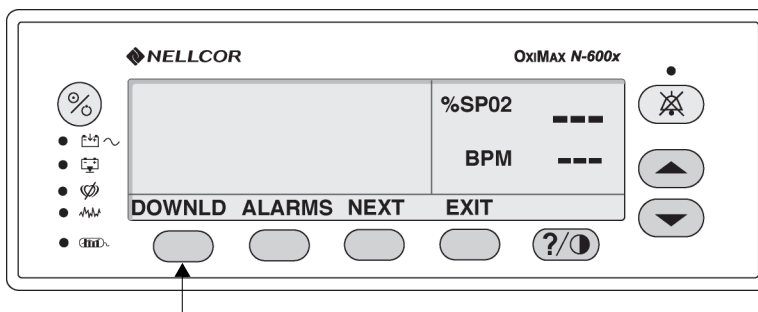
- 3.) Ensure the DOWNLD and ALARMS menu displays.

Figure 20. Resulting DOWNLD Menu



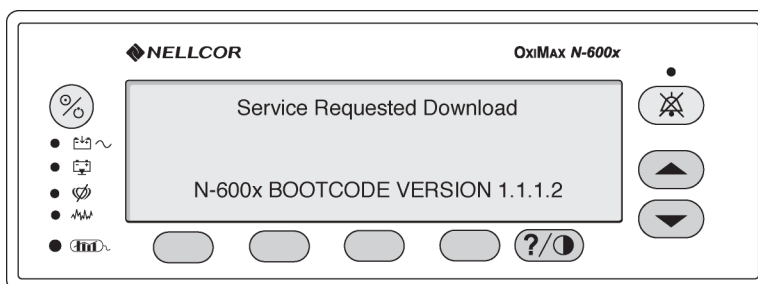
- 4.) Press the DOWNLD softkey. The screen blanks for a few seconds. This is normal.

Figure 21. Pressing the DOWNLD Softkey



The "Service Requested Download" screen results.

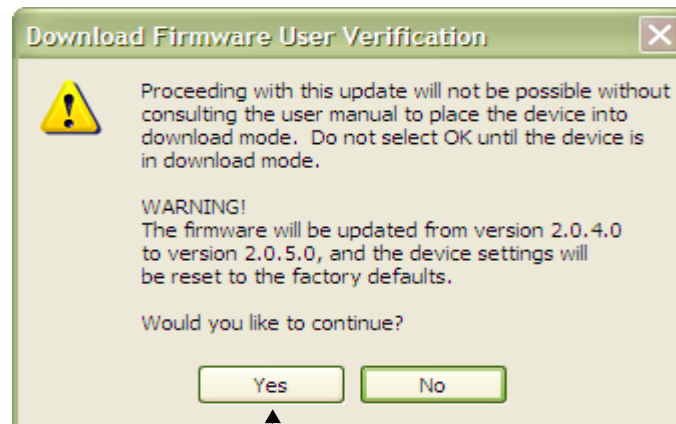
Figure 22. Resulting Download Screen



Perform Firmware Download

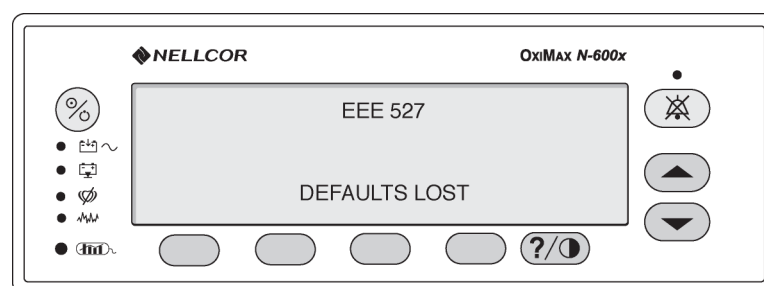
- 1.) Return to the software tool. Read the warning screen issued by the SPD Activation Tool on the computer monitor carefully. Do not continue unless you are prepared to perform the firmware upgrade.
- 2.) To perform the upgrade, select YES. The download proceeds.

Figure 23. Sample Download Firmware User Verification Screen



- 3.) Watch the computer monitor. During the upgrade, the software tool displays a screen with the information "NPB-595 Programmer Version 1.8.0.0." This is part of the software program and does not reflect the current product name or firmware revision number. This is normal.
- 4.) Wait for the upgrade to complete. This can take between five to ten minutes. During the upgrade, the oximeter will reset, displaying the message "EEE 527 Defaults Lost" and emitting an audible alarm. This is normal.

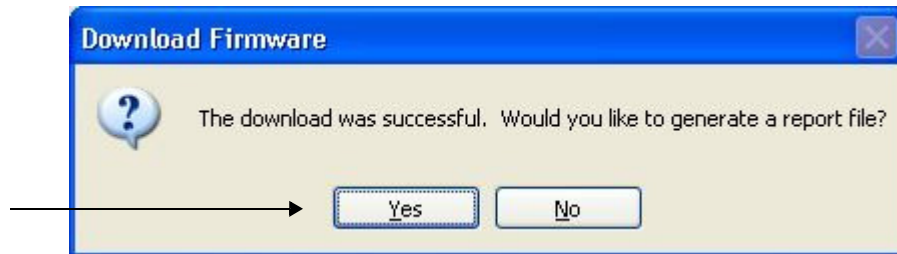
Figure 24. Upgrade Error Code Message Screen



- 5.) Watch the computer monitor, where the program registers progress towards completion. After the progress reaches 100% completion, follow the prompt and press any keyboard key to continue.

- 6.) Watch the computer monitor for a Download Firmware screen message. The SPD Activation Tool will notify you if the download was successful, or if it failed.
- a. If the download is successful, the SPDAT tool automatically displays a "Download Firmware Report;" select YES.

Figure 25. Successful Download Messages



- b. If the download is not successful, select OK. Power cycle the oximeter and return to *Upgrade Procedure*, page 13, and begin again. If still not successful, contact your local Nellcor representative or call Nellcor Technical Services. See *Product Support*, page 29, for contact information

Figure 26. Unsuccessful Download Message



- 7.) Press the ON/STANDBY button to turn the oximeter off, then again to turn it back on. The oximeter will display a white screen for a short time, then display the Nellcor splash screen.

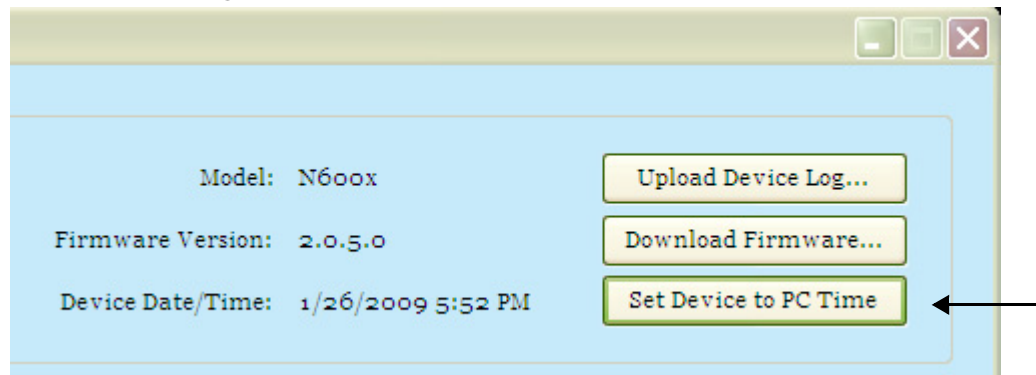
Figure 27. New Sample POST Splash Screen



- 8.) You may opt to synchronize the time and date of the oximeter with the time and date of the computer. To do so, select the Set Device to PC Time option in the Device Information section. This may take a delay of five (5) seconds for the date and time to synchronize.

- 9.) Verify the setting by checking the on-screen values for the real-time Device Date/Time and ensure they match those listed as the Local Date/Time.

Figure 28. Set Time Option, Device Information Section



If you wish to manually set the date and time, refer to *Manual Restoration of Time and Date*, page 26.

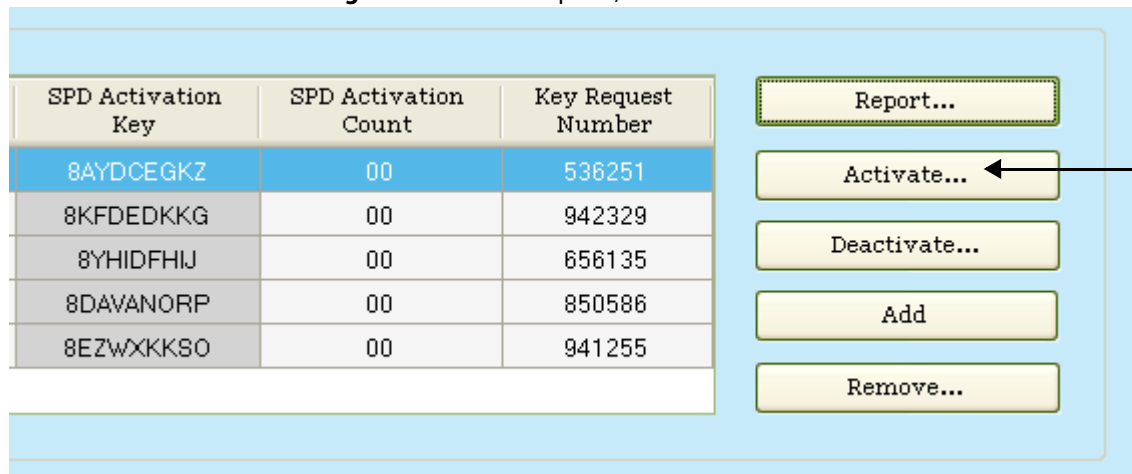
This concludes the upgrade procedure. However, the SPD feature is not yet active.

Activation Procedure

- 1.) Return to the SPDAT main window.
- 2.) Enter each Activation Key provided by Nellcor Technical Services in the same row as the matching serial number. If you received soft copy of the Activation Key(s), you may opt to cut and paste the values into the "SPD Activation Key" field(s). Enter the key(s) exactly as they appear.
- 3.) Connect each oximeter, following all steps to final completion of the Activation process. For connection information, see *Initiate Serial Communication*, page 14.
- 4.) Ensure the Device Information section shows a "Connected" status.
- 5.) Verify the oximeter serial number by checking the label on the rear of the oximeter.
- 6.) Ensure the selected row in the Device List corresponds to the serial number of the attached oximeter.

- 7.) Select the Activate button to begin the activation process.

Figure 29. Activate Option, Device List Section



Note:

If the activation key you enter does not match the serial number, SPD Activation Count, or Key Request Number, the Activate button cannot be selected.

- 8.) Wait for the activation to complete.



Note:

In the Device List section of the main SPDAT window, the SPD Activation Count for that unit reflects the activation, incrementing the count by one.

- a. With successful completion of activation, the following screen results. The “SPD sticker” refers to the Quick Guide adhesive label. Perform this step only as described in this document. See *Activation Key Request Procedure*, page 9.

Figure 30. Activation Accepted Message



- b. If an error occurs, the following screen results. Confirm manual entry of oximeter serial number and activation data. Retry from *Activation Procedure*, page 19. If all entries are correct and activation rejection continues, contact Nellcor Technical Services. See *Product Support*, page 29, for contact information.

Figure 31. Activation Rejected Message



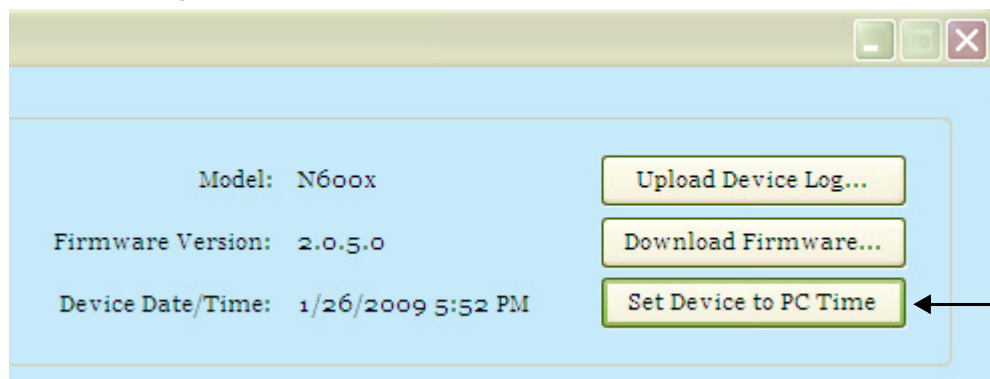
- 9.) Examine the new oximeter display view. The SPD triangle icon and SatSeconds circle icon appear in the new, larger format.

Figure 32. General Care Format (GCF) Display View with SPD and SatSeconds icons



- 10.) Restore institutional default settings. Refer to *Restoration of Institutional Default Settings*, page 23.
- 11.) If you have not done so already, you may opt to synchronize the time and date of the oximeter with the time and date of the computer. To do so, select the *Set Device to PC Time* option in the Device Information section. It may take up to five (5) seconds for the date and time to synchronize.

Figure 33. Set Device Time Option, Device Information Section



To manually set the date and time, refer to *Manual Restoration of Time and Date*, page 26.

- 12.) When upgrading and activating multiple oximeters, see *Upgrade Procedure*, page 13, then *Activation Procedure*, page 19, to repeat this process for each oximeter requiring the new features.
- 13.) Return to the Report window. The Report window overlays the main SPDAT tool window, but you may opt to move the Report window to view both.
- 14.) Print the report or complete the *Confirmation Form*, page 31.
- 15.) Send a copy of the report by e-mail, fax, or regular mail to Nellcor Technical Services. See *Product Support*, page 29, for contact information.
- 16.) Verify the oximeter performs as it should using the "Performance Verification" procedure in the *N-600x Service Manual*.

This concludes the SPD activation sequence.

Temporary Serial Port Setup

The SPD activation tool (SPDAT) requires an ASCII 9600 baud rate to communicate with the oximeter. Some institutional default settings require an alternate baud rate. If so, set the baud rate to ASCII 9600 temporarily, perform the upgrade, and then return the baud rate to the institutional default setting at the same time as setting the other institutional defaults.

- 1.) Turn on the oximeter.
- 2.) Press the SETUP softkey.
- 3.) Press the NEXT softkey twice.
- 4.) Press the COMM softkey to access the serial port setup screen.

Figure 34. Sample Serial Port Setup Screen



POX_10069_A

- 5.) Note the current institutional default setting.
- 6.) Press the SELECT softkey to highlight the protocol area.
- 7.) Use the ADJUST UP button to scroll through the protocol options until reaching the ASCII protocol.
- 8.) Press the SELECT softkey to highlight the baud rate area.
- 9.) It should already read 9600 baud. If not, use the ADJUST UP button to scroll through the baud rate options until reaching the baud rate of 9600.
- 10.) Press the EXIT softkey.

Restoration of Institutional Default Settings

Refer to the *N-600x Service Manual*. Restore oximeter institutional default settings, selecting from the available ranges/options. The bolded settings were not available previously, but are available after the upgrade and activation.

Table 1. N-600x Pulse Oximeter Institutional Default Settings

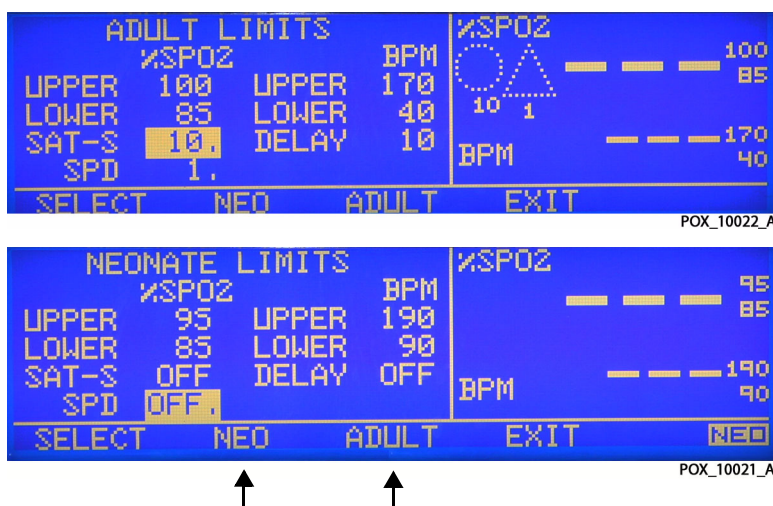
Option	Available Settings	Institutional Default Settings
%SpO2 High Alarm Limit	Low limit to 100%	
%SpO2 Low Limit	85% to high limit	
Alarm Silence Duration	30, 60, 90, 120 seconds	
Alarm silence reminder	Enabled, Disabled	
Alarm Volume	1 to 10	
Alarms Allow Off	Yes, No	
Alarms Off Reminder	Yes, No	
Allow silence duration to be set to OFF	Yes, No	
Allow Sat-seconds to be set	Yes, No	
Backlight Brightness	8 (battery), 10 (AC power)	
Data Port Baud Rate	2400, 9600, 19200, 57600, 115200	
Data Port Protocol	ASCII, CLINICAL, SPDout , PHILIPS Not Available: DATEX, GRAPH, MARQ, OXINET, SPACELBS	
Default Trend Display	Dual, %SpO2, Pulse, Histogram, Amplitude	
Display Contrast	Low to high	
Display Format	Pleth, Blip, Trend, General Care Format (GCF)	
Graphical/Tabular Monitor Trend Display Scale	20 sec., 40 sec., 15 min., 30 min., 1 hr., 2 hr., 4 hr., 8 hr., 12 hr., 24 hr., 36 hr., 48 hr.	
Language	English, Danish, Dutch, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, Swedish	
Monitoring mode	Adult, Neonate	
Nurse Call Priority	Normally high, normally low	
Pulse Beep Volume	0 to 10	
Pulse Rate Lower Alarm Limit	30 bpm to high limit	
Pulse Rate Upper Alarm Limit	Low limit to 250 bpm	
Pulse Rate Delay Alarm Management	OFF, 5 secs, 10 secs	
Real-Time Trend Scale	20 secs, 40 secs, 15 mins, 30 mins, 1 hr, 2 hrs, 4 hrs, 8 hrs, 12 hrs, 24 hrs, 36 hrs, 48 hrs	
Response Mode	Normal, Fast	
SatSeconds Alarm Management	OFF, 10, 25, 50, 100	
OxiMax SPD™ Alerts Sensitivity	OFF, 1, 2, 3	
Sensor Event Record Format	%SpO2, %SpO2and Pulse Rate	
Sensor Message Enabled	Yes, No	

To restore institutional default alarm limit settings

- 1.) Disconnect the sensor from the monitor.
- 2.) Press the LIMITS softkey.

Figure 24. General Care Format (GCF) Display View

- 3.) Press the NEO or ADULT softkey to set the desired ADULT LIMITS or NEONATE LIMITS.

Figure 25. Default Limit Settings, Adult or Neonate

- 4.) Press the SELECT softkey until the area(s) you wish to change are highlighted, using current institutional default values or the list you created prior to upgrade.

Figure 26. Selecting Default Values

- 5.) Press the EXIT softkey when you have finished changing all institutional default values to confirm and accept all changes.

- 6.) Press and hold the LIGHT and CONTRAST softkeys simultaneously until the service menu appears. This should take about five (5) seconds.

Figure 27. Entering Service Menu



- 7.) Press the PARAM softkey, which changes the softkey menu options.

Figure 28. Selecting Parameter Softkey



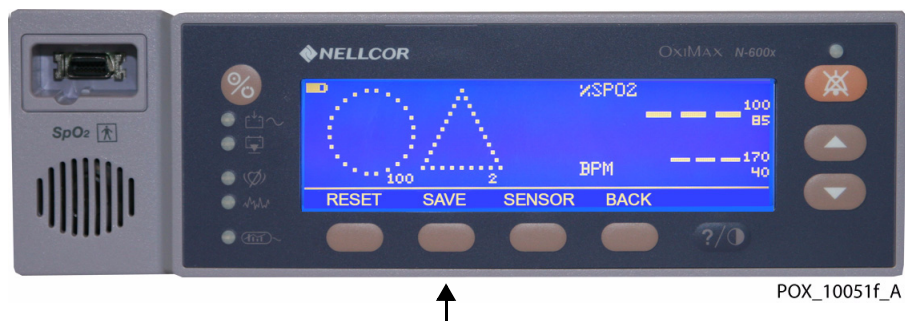
Note:



If the only softkeys that appear on the screen are PARAM and EXIT, the sensor cable is still connected. Disconnect the sensor cable from the oximeter.

- 8.) Press the SAVE softkey.

Figure 29. Selecting Save Option



- 9.) Press the YES softkey when the oximeter requests a confirmation to save the settings as the institutional default settings. The monitor will sound three (3) beeps indicating that institutional defaults have been set.

Figure 30. Selecting Save Defaults Option



Manual Restoration of Time and Date

If you do not wish to synchronize the time and date to those in the computer system, you must re-enter the oximeter time and date manually after completing the firmware upgrade procedure.

To manually set time and date

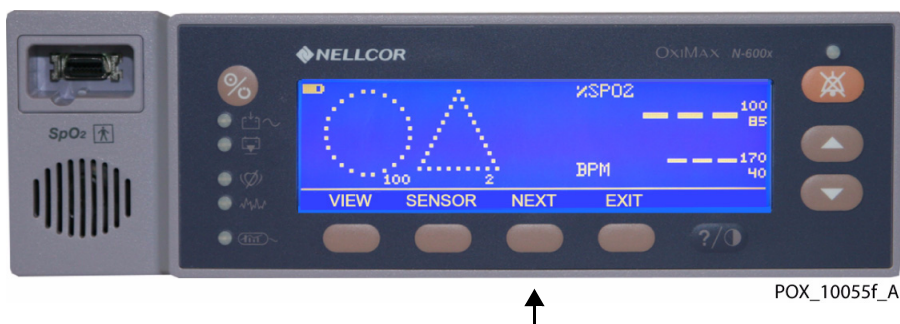
- 1.) Press the SETUP softkey, which changes the softkey menu options.

Figure 31. Setup Softkey



- 2.) Press the NEXT softkey. This again changes the softkey menu options.

Figure 32. Menu Option Screen



- 3.) Press the CLOCK softkey.

Figure 33. Clock Menu Option



- 4.) Press the SET softkey. This highlights the hours portion of the time setting.

Figure 34. Set Clock Time Option



- 5.) Use the ADJUST UP and ADJUST DOWN buttons to set the correct hour.

Figure 35. Adjusting Time and Date Settings

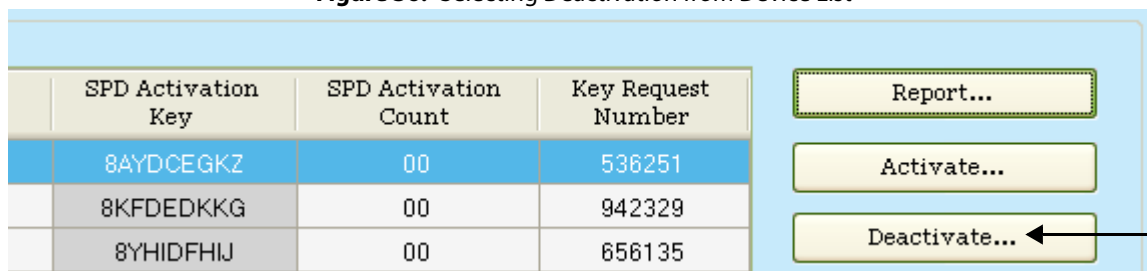


- 6.) Repeat to select and set the proper values in the minutes, seconds, day, month, and year fields.
- 7.) Press the EXIT softkey to confirm and accept all changes.

Deactivation Procedure

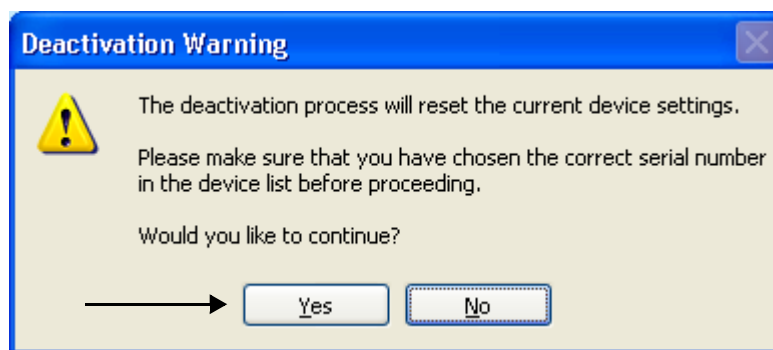
- 1.) In the device list section, ensure the highlighted selection matches the serial number of the oximeter requiring deactivation.
- 2.) Select the Deactivate button from the Device List section.

Figure 36. Selecting Deactivation from Device List



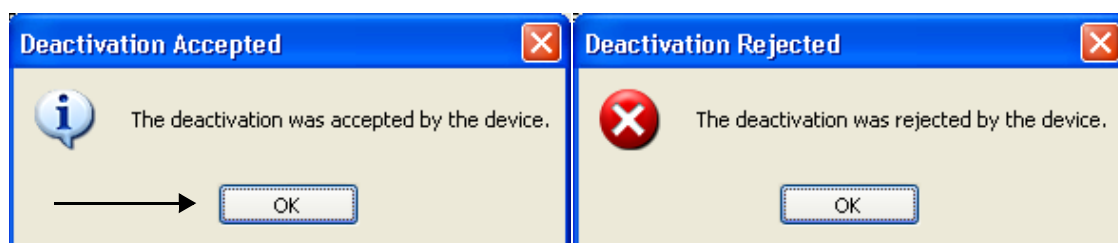
- 3.) The SPDAT tool issues a warning. Select Yes to continue.

Figure 37. Deactivation Warning Window



- 4.) The SPDAT tool indicates deactivation status. Press OK.

Figure 38. Deactivation Status Window



- 5.) If rejected, review the serial numbers and values for accuracy and retry.

Product Support

If you have questions, contact your Nellcor Technical Services Department at 1.800.635.5267 or your local Nellcor representative.

Nellcor Technical Services, U.S.A.

5870 Stoneridge Drive, Suite 6

Pleasanton, CA 94588

1.800.635.5267

800.966.4955, 925.463.4600 (fax)

HQTSWEB@covidien.com (e-mail)

Request Form

Complete the table below to indicate oximeters scheduled for upgrade and activation, then fax this form to Nellcor Technical Services.



Note:

- Service personnel must submit the reports generated while in the Activation Tool or use this form and respond via fax.
- Additional copies of this form may be made to document all oximeter upgrade and activation requests.
- Ensure Quick Guide adhesive label is properly affixed to each oximeter and that there are no overhanging edges. See *Activation Key Request Procedure*, page 9.

Nellcor Technical Services (U.S.A.)

800.635.5267

800.966.4955, 925.463.4600 (Fax)

Location/Institution: _____

Street Address: _____

City/State/Postal Code: _____

Country: _____

Name/Title of Person

Performing the Upgrade: _____

Telephone Number: _____

Fax Number: _____

Oximeter Serial No.	SPD Activation Count	Key Request Number	Quick Guide Adhesive Label Affixed

Confirmation Form

Upgrade and activate the OxiMax N-600x pulse oximeter as described in this document. Complete the table below after upgrade and activation, then fax this form to Nellcor Technical Services.

**Note:**

- Service personnel must submit the reports generated while in the Activation Tool or use this form and respond via fax.
- Additional copies of this form may be made to document all oximeter upgrade and activation requests.
- Fax the completed form or generated report within three (3) days of completing the upgrade and activation to facilitate a prompt update of the N-600x pulse oximeter history records.

Nellcor Technical Services (U.S.A.)

800.635.5267

800.966.4955, 925.463.4600 (Fax)

Location/Institution: _____

Street Address: _____

City/State/Postal Code: _____

Country: _____

Name/Title of Person
Performing the Upgrade: _____

Telephone Number: _____

Fax Number: _____

Serial Number	SPD Activation Key	SPD Activation Count	Key Request Number	SPD Activation Date/Time	Quick Guide Adhesive Label Affixed



Nellcor Puritan Bennett LLC
4280 Hacienda Drive
Pleasanton, CA 94588 U.S.A.
Telephone Toll Free 1.800.635.5267

Authorized Representative
Tyco Healthcare UK LTD
154 Fareham Road
Gosport PO13 0AS, U.K.

Rx ONLY

CAUTION: Federal (U.S.A.) law restricts this device to sale by or on the order of a physician. • ATTENTION: La loi fédérale des États-Unis stipule que ce produit ne peut être vendu que sur ordre d'un médecin. • PRECAUCIÓN: La ley federal de EE.UU. establece que este producto sólo puede venderse bajo prescripción médica.



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