LENS Surgical Imaging System

All-in-one visualization solutions – designed for maximum performance, efficiency and value

This self-contained visualization system is truly an all-in-one solution. Now, everything needed to view, capture and manage surgical media is available in one place and for one cost. The Camera captures in high definition. The Camera Head is durable and ergonomic. A proprietary iPad® application takes media management and versatility to a whole new level. And this system is scalable so that you can add new features and functions as they become available, without having to buy a new system.

### Performance
Employing the latest in CMOS chip technology, the LENS Surgical Imaging System captures high-quality, true HD images, features excellent depth of focus and produces crystal-clear live video. Clarity and confidence are at your fingertips.

### Efficiency
Designed to be durable, intuitive and easy to operate, the LENS Surgical Imaging System provides all the core visualization features necessary for exceptional results. Illumination, visualization, image capture and image management are all here, in one system.

### Value
By combining three products into one, the LENS Surgical Imaging System can potentially minimize capital investment. Also, the system is designed for scalability, meaning that future camera options and software upgrades may be added on as they become available. Utility designed for growth.

*Currently, the LENS Application is only available for iPads® with iOS7.0 - iOS9.0.2.*
**LENS System Stretch Mode**

Stretch Mode is a function included with the LENS System. The Stretch function provides a real-time enhancement to the video image by “stretching” the color saturation of the image to be used as an alternate visualization tool. LENS Stretch Mode may help surgeons better visualize certain features in surgical images. However, there are no diagnostic claims made with the Stretch feature; it is provided for surgeons to use as is.

**Key Aspects of Stretch Mode**

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>BENEFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhances a portion of the image that is hard to visualize under standard imaging</td>
<td>May aid image evaluation</td>
</tr>
<tr>
<td>Does not require calibration</td>
<td>Easy to use</td>
</tr>
<tr>
<td>Does not require an activation key</td>
<td>No additional cost</td>
</tr>
<tr>
<td>Easy activation from the Camera Head</td>
<td>Can be mapped to any button</td>
</tr>
<tr>
<td>Fully automated</td>
<td>No need to adjust monitor settings</td>
</tr>
<tr>
<td>Stretch Mode is real-time</td>
<td>No delays</td>
</tr>
</tbody>
</table>
LENS° Surgical Imaging System

Hardware Overview and Setup
LENS® System Front Panel Layout

LENS System Rear Panel Layout
LENS® System On-Screen Menu Layout

- iPad® Available Storage
- USB Drive Available Storage
- Image/Video Capture
- LENS Wi-Fi Connection
- USB Drive Connection
- Light Source Standby On/Off
- Custom Procedure Setting
- Camera Head Button Map
Connection/Wiring Diagrams

**Without** connection to the 660HD-E Image Management System – direct connection to a monitor

- Connect with a single cable
- DVI or SDI can be used
Connection/Wiring Diagrams (cont.)

With connection to the 660HD-E Image Management System

- SDI connects to 660HD-E IMS
- DVI connects directly to monitor
Printer Options

- Wireless AirPrint
- Wireless or cabled printing with the 660HD-E Image Management System

LENS® System Printer Options

Wireless AirPrint

Wireless AirPrint can be used between the LENS iPad® Application and any AirPrint-enabled printer

Wireless or Cabled Printing with the 660HD-E IMS

With the 660HD-E IMS and LENS System you can print wirelessly or wired to the HP printer, or wired to the Sony Medical Grade printer.

LENS System Secondary Camera

A secondary camera (such as a C-arm or room camera) can be connected to the LENS Console, and images can be captured, viewed and annotated on the LENS Application.
Initial Console Setup and Programming with Camera

All of the LENS® System functions can be controlled from the Camera and Camera Head with or without the use of the LENS iPad® Application. The following illustrates how to set up the Console using the Camera.

To Power on the LENS System Console

- Plug in the CCU to a 110V outlet.
- Connect the LENS System HD-SDI and HD-DVI Video Outputs to the Video Display and/or the 660HD-E IMS.
- Turn on the Main Power switch, located on the left Rear Panel.

As the LENS System powers on, a picture of the LENS CCU will appear on the display, first as the Smith & Nephew burst and then as an icon of the LENS CCU.

The Smith & Nephew burst turns from orange to grey, indicating that the LENS CCU is booting up.

On the front of the CCU, the Power, White Balance and Menu switches are illuminated.

LENS System Console Setup

As the LENS System powers up, you will see a picture of the LENS CCU on your display with an icon of Smith & Nephew and then an icon of the LENS CCU.

As the Smith & Nephew icon turns to orange from grey, the LENS CCU is booting up.
LENS° System Console Setup (cont.)

On the front of the CCU console, you will see the Power, White Balance and Menu switches illuminated.

Once the LENS CCU boots up, the display will show the following:

- Color Bars
- Procedure Menu
- LENS Image Management
- Wi-Fi Status Connection Display
- USB Status Display
- Light Source Status Display
- LENS Camera Head Button Map

In the Procedure menu, the default display will be the High Definition procedure.

To view and switch between Procedures, push the **Left or Right Camera Head** buttons or the **Menu** arrow buttons on the Console.

If you move through Procedures and reach the Menu Icon, press the Menu **Select** switch to open the Main Menu.
LENS® System Procedure Settings

1. To choose or create a Procedure setting switch to the Procedures icon from the main menu screen.
2. Press Select to open the default Procedure menu.
3. To create a Procedure, switch to the next icon, indicated with the Procedure icon and a small gear icon.
4. Adjust and create/choose your LENS Camera settings for that procedure.
5. Select Save and Exit.

LENS System Console Functions

The following function icons appear on the Main Menu. Press the Up/Down arrow buttons to switch between them.

- Brightness
- Zoom
- Enhancement
- White Balance
- Procedures
- System Configuration
- Camera Head Buttons
- Exit

Once you have selected the function you wish to change, press the Console Select button or the middle button on the Camera Head and use the arrow buttons or Left/Right buttons, respectively, to make adjustments.
LENS° System Procedure Settings (cont.)

In the System Configuration Menu, the following icons appear (left to right):

- Set/Change Password Protection
- Set/Change Admin Password (default password for all LENS CCUs is admin)
- Configure Accessory Ports
- Language
- Reset Factory Defaults
- Network
- Advanced Settings
- Versions
- Return to Previous Menu

To adjust any of the above, switch to any of the icons and press Select.

Setting White Balance

To adjust the White Balance, a LENS Camera Head must be plugged into the front of the LENS CCU. White balance is adjusted from the top button of the Camera Head or with the White Balance button on the Console.
LENS™ Surgical Imaging System
iPad® Application* Overview

*Currently, the LENS Application is only available for iPads® with iOS7.0 - iOS9.02.
One of the many unique features of the LENS™ System is a proprietary iPad® application* (app) that can be used to control the system and manage media. The features of the app are laid out below.

**LENS System Camera Head Functions**

The LENS Camera Head has three buttons that can be programmed to control up to six different Console functions with either a “short press” or a “long press” of the Camera button.

The Camera Head buttons can be individually programmed either through the LENS Application or the Console Menu functions.

*Currently, the LENS Application is only available for iPads® with iOS7.0 - iOS9.02.*
To Install and Activate the Application

Before using the LENS® App, complete the “Download and Install the App” and “Activate the App” sections in this document.

**Connect your mobile device to the Internet-enabled Wi-Fi network**

1. From your iOS mobile device Home Screen, tap the **Settings** icon.
2. Tap the **Wi-Fi** tab.
3. Tap the **Wi-Fi** network associated with your facility’s Wi-Fi network* to connect to the Internet.
4. Enter the **username** and **security password** for the network, if any.

*Contact the network administrator for your location.

**Note:** The network password needs to be entered only the first time a device is connected to the network. Thereafter, the mobile device will automatically remember the network password.

**Download and install the LENS App (One-Time Setup)**

**Note:** Ensure that the mobile device is connected to the Internet.

1. From the mobile device Home Screen, access the Apple Store.
2. Search the Apple Store for **LENS**.
3. Tap the **LENS** icon to install the App. If prompted, enter the Apple Store Identifier.

The LENS icon (Figure 1) will appear on the mobile device once the App is fully installed.

**Activate the App**

The LENS App must be activated before the first use. Activation is a one-time procedure and does not need to be repeated before subsequent logins, or upon future updates. If the App is uninstalled and then reinstalled, the App will need to be reactivated.

**Note:** Have your site’s information available.

1. Ensure that the LENS App has been downloaded and installed on the desired mobile device. Refer to the “Download and Install the App (One-Time Setup)” section in this document.
2. Tap the LENS icon (Figure 1) to start the App.

**Note:** If the App requires activation, a prompt appears (Figure 2).

3. Tap **Request Key**
4. Follow the on-screen instructions to obtain the product key code from Smith & Nephew.

**Note:**
- In the U.S., use the e-mail within the App’s tech support, or use the information in App Support to call.
- Outside of the U.S., contact a local authorized Smith & Nephew representative with your account number and the unique installation ID provided by the App.
5. When the activation product key is received, tap **Unlock App With Product Key**.
6. Enter the **product key** (case sensitive) to activate the App.

**Note:** Once the App is active, go to the “Create a User and Log In” section in this document to create a new user account.
To Connect to the LENS® Wireless Network

1. Go to the iPad® Settings and select the LENS Wi-Fi network from the list of available networks. The network should be identified by the iPad automatically.

2. The default password is 12345678. After the initial login, the password can be changed.

3. Tap the Wi-Fi icon on the Navigation Bar to connect the iPad LENS App to the LENS Wi-Fi network.

The icon will fade to gray as it links up to the LENS Camera. Once linked up, the icon will change to orange on the console Navigation Bar and the Wi-Fi icon will light up on the console display.

Functions of the LENS System iPad Application

- Create new patient
- Patient view
- Procedure creation
- Engage picture and video
- Create annotations
- View annotations
- Camera programming
- Printing
- Image files
To Create a User and Log In

1. To create a User tap Create User labeled Create User.
2. Fill in the user information fields and then tap Submit.
3. You will be directed to the Login screen.
4. At the Login screen, fill in the information fields and then tap the Login.

Note: If you have questions, tap the Question Mark icon in the Navigation Bar to view a list of tutorials. Tap the All Tutorials tab to reveal a list of topics. Tap the topic you’d like to learn more about. To close the tutorials, tap Dismiss.

To Log In

Type in your username and password. Tap Login.
To Create a New Patient

1. From anywhere in the LENS® Application, select the **Create Patient** on the **Navigation Bar**.

2. Fill in the required information and tap **Submit**.

To View a Patient Record

You can view a list of all patients from the Navigation Bar.

To Create a New Procedure

You can create or edit existing customized camera settings for a particular type of procedure, which can then be selected for a patient.

1. Tap the empty slot in the Local Procedures list to create a new procedure.
To Create a new Procedure (cont.)

2. Change the settings to match the preferred performance.

3. Tap **Button Mapping** to set the Camera Head buttons to the preferred settings.

4. Make the necessary changes to the **Long** and **Short** button functions. Tap **SAVE**.

5. Type the name for the new procedure. In this example, it is **Left Knee ACL**.

6. The new procedure is finished.
Camera Control Programming

1. Camera functions can be changed during surgery if temporary changes or adjustments are necessary. Tap the Camera icon. Use the sliders in the Camera menu to adjust functions. Use the Button Mapping feature to program the Camera Head buttons by selecting the Button drop-down menu.

2. To program the Camera Head buttons, use the Button Mapping feature.

3. Select the Button drop-down menu and use it to pick the correct function.

To Take a Picture or Video

Once the CCU is live and connected to the LENS® Local Annotations, Tap Patient on the Navigation Tool Bar. Tap the Camera icon to take picture or the Video Camera icon to take a video.

Note: Images and video may also be captured directly from the Camera Head.
To Create Annotations

Text, voice or drawing annotations can be made to patient files by tapping the corresponding annotation icons. To view images after annotations are added, at the bottom of the selected image, on the right side of the screen, tap Local Annotations.

To View Annotations and Media

To view images after adding Voice, Text or Draw, at the bottom of the image selected, on right side of screen, tap Local Annotations.

Once the media is selected, the user can choose to view the media in more detail.
To Print Images

1. Tap an image to select it for printing.
2. Tap the icon in the small window to show the E-mail, Save and Print buttons after selecting the image to print.

To Create a PDF Image File

1. Tap the Edit button.
2. Tap images to select them to be saved in the PDF. (Tap only images, not videos.)
3. Tap Share Media.
4. Tap on Generate Media.
5. The PDF of the selected images appears at the bottom of the screen.
To Create a PDF of a Single Image

1. Tap and hold your finger on a single image until the drop-down menu appears.
2. Tap Generate PDF.
3. The PDF of the image appears at the bottom of the screen.

To Print a PDF of an Image

1. To select the PDF to print, tap the check mark in the lower right corner of the image file. The grayed out check mark turns orange and becomes active.
2. Tap on the Share Media button and select the delivery method.
3. Tap Select Printer and then choose a printer.
4. Tap Print.

*Note: Batch printing is disabled in this version. You can print one file at a time. The mobile device must be linked to an AirPrint printer.*
FAQs and Troubleshooting
FAQs and Troubleshooting

**FAQs**

**Q** What are the file formats for images and videos with the LENS System?

**A** Video files are MP4 and still images are JPEG.

**Q** Are images and videos recorded in HD?

**A** Videos and images are recorded in native 1920p X 1080p.

**Q** What are the sterilization methods for the LENS Camera?

**A** The LENS System Camera Head is part of a family of products specifically designed for multimodal sterilization including autoclave, STERRAD 100S Short Cycle, STERRAD NXT Standard Cycle, or STERRAD 100NXT DUO Cycle Sterilization Systems.

**Q** Do I have to use the LENS 17.2mm Coupler?

**A** No, you can use any Smith & Nephew coupler or Videoarthroscope, but be aware that the 17.2mm coupler is specifically designed for the LENS System to show the full field of view with a 4mm arthroscope.

**Q** Do I need to use a specific type of USB drive with the LENS System?

**A** Any USB drive used with the LENS System needs to be FAT32 or NTFS formatted, with a minimum size of 8GB, however 32 GB is recommended.

**Q** Do I need to keep a USB drive in the console at all times?

**A** No, but keep in mind that the LENS System does not have any kind of internal storage, so if the app doesn't save images for whatever reason they will be lost. Even if a surgeon doesn't need images stored on a USB drive it may be a good idea to leave a USB drive in the console to ensure that images are saved.

**Q** Can pictures/videos be taken without using the LENS iPad® Application?

**A** If you are just using the LENS System without another external image management system, pictures can be stored on the USB drive inserted into the front of the console. Keep in mind that these images will not be formatted in a ready-to-print manner and are only stored as media files.

**Q** Can the on-screen display icons be turned off?

**A** Yes, you can turn some or all on or off. To configure the icons navigate to the procedure to be customized, navigate to Configure Icons, and then navigate to the desired icon to select on or off.

**Q** What is CMOS?

**A** CMOS refers to the type of sensor used in the LENS Camera. CMOS stands for Complementary Metal-Oxide Semiconductor.
## Troubleshooting

Below you will find some basic troubleshooting tips. For more detailed help you may refer to the LENS System Instructions for Use (IFU) or contact Smith & Nephew Customer Service at +1 800 343 5717 in the U.S., or an authorized Smith & Nephew representative.

### LENS CONSOLE / CAMERA TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The image is cloudy/hazy</td>
<td>• Check your scope for moisture and overall quality</td>
</tr>
<tr>
<td></td>
<td>• Check the light cable for any connection breaks</td>
</tr>
<tr>
<td></td>
<td>• Check the camera head for moisture</td>
</tr>
<tr>
<td>The image color is not correct</td>
<td>• Perform another white balance to ensure it is correct</td>
</tr>
<tr>
<td>The image is grainy</td>
<td>• Try decreasing the Enhancement setting</td>
</tr>
<tr>
<td></td>
<td>• Try increasing the Brightness setting</td>
</tr>
<tr>
<td>The image is too bright/excess glare</td>
<td>• Decrease the Brightness setting</td>
</tr>
<tr>
<td>Intermittent picture</td>
<td>• Disconnect/reconnect camera to console</td>
</tr>
<tr>
<td></td>
<td>• Check all appropriate cables are connected fully</td>
</tr>
<tr>
<td></td>
<td>• Replace camera head</td>
</tr>
</tbody>
</table>

### LENS APPLICATION TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cannot connect to the control unit with the LENS Application</td>
<td>Ensure that:</td>
</tr>
<tr>
<td></td>
<td>• The control unit is turned on</td>
</tr>
<tr>
<td></td>
<td>• The iPad® is connected to the appropriate LENS Wi-Fi</td>
</tr>
<tr>
<td>I cannot capture images/video</td>
<td>Ensure that:</td>
</tr>
<tr>
<td></td>
<td>• LENS Application/iPad is connected to the appropriate LENS Control Unit</td>
</tr>
<tr>
<td></td>
<td>• There is enough available storage on the iPad</td>
</tr>
<tr>
<td></td>
<td>• A valid patient file is open on the iPad</td>
</tr>
<tr>
<td>I cannot save to the camera roll</td>
<td>Ensure that:</td>
</tr>
<tr>
<td></td>
<td>• The iPad has enough available storage</td>
</tr>
<tr>
<td></td>
<td>• LENS App access to the camera roll has been granted (in the iPad go to Settings-Privacy-Photos)</td>
</tr>
<tr>
<td>I cannot export text and audio annotations to the camera roll</td>
<td>• Text and audio annotations cannot be exported to the camera roll</td>
</tr>
<tr>
<td>Emails are not being sent</td>
<td>• Ensure that the iPad is connected to a network with internet connectivity</td>
</tr>
</tbody>
</table>
If further information on this product is needed, contact Smith & Nephew Customer Service at +1 800 343 5717 in the U.S., or an authorized Smith & Nephew representative.

Ordering Information

<table>
<thead>
<tr>
<th>Reference #</th>
<th>Description</th>
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<tbody>
<tr>
<td>72204354</td>
<td>LENS Camera Control Unit, with Wi-Fi</td>
</tr>
<tr>
<td>72204685</td>
<td>LENS Camera Control Unit, without Wi-Fi</td>
</tr>
<tr>
<td>72203967</td>
<td>LENS Camera Head</td>
</tr>
<tr>
<td>72204725</td>
<td>LENS Coupler</td>
</tr>
<tr>
<td>72204858</td>
<td>Orange Light Guide</td>
</tr>
</tbody>
</table>

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