

CS 7600



User Guide

Notice

Carestream Dental Systems are designed to meet international safety and performance standards. Personnel operating the unit must have a thorough understanding of the proper operation of the system. This guide has been prepared to aid dental professionals to understand and operate the system. Do not operate the system before reading this guide and gaining a clear understanding of the operation of the system. If any part of this guide is not clear, please contact your Carestream Dental LLC representative for clarification.



WARNING: Read the “Safety, Regulatory, and Technical Specifications User Guide” and make sure you observe all the warnings and cautions before using the CS 7600.

The CS 7600 is intended for digital dental radiography using an imaging plate (storage phosphor screen) for radiographic diagnostic intraoral images.

The CS 7600, in addition, optionally provides the Scan & Go technology, which enables dental practitioners prior to acquisition to record exam acquisition data on the dental imaging plates.

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This document is originally written in English.

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The CS 7600 complies with the Medical Device Regulation (EU) 2017/745 and UK Medical Devices Regulations 2002 (SI 618) as subsequently amended by the EU Exit Regulations of 2019 (SI 791) and 2020 (SI 1478).



Contents

Chapter 1 Conventions in This Guide	Conventions in This Guide	1
Chapter 2 CS 7600 System Overview	Indications for Use	3
	Introduction	3
	CS 7600 Components Overview.....	5
	Scanner Overview.....	5
	Smart Imaging Plates Overview	7
	Hygienic Sheaths	9
	Scan & Go Overview	10
	Connecting the Scan & Go Device.	11
	Scanner Shelf.....	12
Chapter 3 Software Overview	Computer System Requirements	13
	General Software Overview.....	13
	Single Image Acquisition Interface Overview.....	13
	Full Mouth Series (FMS) Acquisition Interface Overview ..	14
	CS Imaging Software Main Toolbar.....	19
	Imaging Plate System Configuration Window	20
Chapter 4 Scanner Interface Overview	Computer System Requirements	21
	CS 7600 Scanner Interface Overview	21
	Scanner Interface Icons	22
	Working with the Scanner	24
	Turning On the Scanner.....	24
	Image Acquisition	24
	Scanner Info	25
	Erasing the Imaging Plates	26
Chapter 5 CS 7600 Image Acquisition Interface	CS 7600 Imaging Software Overview	27
	CS 7600 Image Acquisition Interface Overview	27
	Full Mouth Series Image Acquisition Interface.....	28
Chapter 6 Acquiring Images Without Scan & Go	Introduction	33
	Acquiring a Single Image	34
	Starting the Imaging Software.....	34
	Preparing the Imaging Plates.....	35
	Inserting the Imaging Plate	35

Performing the X-rays	36
Scanning the Imaging Plates.....	37
Acquiring Multiple Images	41
Preparing Acquisition of FMS Images.....	41
Chapter 7	
Acquiring Images	
Using Scan & Go	
Introduction	43
Acquiring a Single Image Using Scan & Go.....	43
Starting the Imaging Software.....	43
Preparing the Imaging Plates.....	44
Tagging the Imaging Plate with the Scan & Go . . .	44
Performing the X-rays	44
Scanning the Imaging Plates.....	45
Acquisition-Related Procedures.....	45
Acquiring Multiple Images (FMS) Using Scan & Go	45
Starting the Imaging Software.....	45
Opening the Image Acquisition Interface	45
Preparing the Imaging Plates.....	45
Tagging the Imaging Plate with the Scan & Go . . .	45
Performing the X-rays	45
Scanning the Imaging Plates.....	45
Acquisition Related Procedures	45
Chapter 8	
Acquisition-Related	
Procedures	
Processing the Images.....	47
Re-Tagging Imaging Plates	48
Storing the Images	48
Clearing Scanner Memory	48
Erasing the Imaging Plates	48
Chapter 9	
Scanner Settings	
General.....	49
Scanner Settings.....	49
Brightness Control	50
IP Setup	50
Viewer	52
Working with Settings.....	53
General Settings Tab.....	53
Working with the General Settings Tab.....	55
Scan & Go Tab.....	57
Scanners Connections Tab.....	58
Working with the Scanners Connections Tab.....	59
About Peer-to-Peer Connection	59
Creating a Peer-to-Peer Connection	60
Disconnecting a Peer-to-Peer Connection	61
Clearing Scanner Memory.....	62

Chapter 10	Imaging Plate Care	65
Maintenance	Handling and Storage of Imaging Plates	65
	Cleaning the Imaging Plate	66
	Cleaning Materials.	66
	Cleaning Method	66
	Disinfecting the Hygienic Sheath and the	
	Imaging Plates.....	66
	Frequency of Disinfection.	66
	Disinfection Solutions.	66
	Disinfection Method.	67
	Disposing of the Imaging Plate.....	67
	Scanner Care.....	68
	Cleaning the Scanner Body.....	68
	Cleaning the Detachable Insertion Panels	68
	Cleaning the Scanner Rollers	71
	Scan & Go Device Care.....	73
	Cleaning the Scan & Go.....	73
Chapter 11	Quick Troubleshooting	75
Troubleshooting	Retrieving a Fallen Imaging Plate	78
	CS 7600 Consumables and Accessories	81
	Scanner Manager.....	82
	Accessing the Scanner Manager	82
	Scanner Info	83
	Scanner Setup	84
	Update Scanner	85
	Updating the Scanner Using the Scanner	
	Manager Tool	86
	Collect Info	87
	Diagnose Connection.....	88
	Activate Scanner.....	88
Chapter 12	Manufacturer's Address.....	89
Contact Information	Factory	89
	Authorized Representatives.....	89
	List of Importers for European Union	
	According to the MDR 2017/745	90
	List of Importers for Switzerland.....	90

1

Conventions in This Guide

Conventions in This Guide

The following special messages emphasize information or indicate potential risk to personnel or equipment:



WARNING: Warns you to avoid injury to yourself or others by following the safety instructions precisely.



CAUTION: Alerts you to a condition that might cause serious damage.



Important: Alerts you to a condition that might cause problems.



Note: Emphasizes important information.



Tip: Provides extra information and hints.

2 CS 7600 System Overview

Indications for Use

The CS 7600 is intended for use in dental digital radiography using imaging plates (phosphor storage screens) for dental intraoral X-ray imaging of pediatric and adult patients.

Introduction



Note: The CS 7600 is intended for dental professionals. You are required to have training to use the CS 7600.

The CS 7600 system is used to scan and review intraoral dental X-ray images. When scanning the X-ray exposed imaging plate, a digital image is previewed on the scanner's LCD and saved to the scanner's internal memory. After scanning, the scanner erases the imaging plate and ejects it. The imaging plate is ready for re-use.

The exam acquisition's scanned image is sent over the network to the workstation's image Acquisition interface. Use the image Acquisition interface to process and review the image.

The image Acquisition interface sends the images to the CS Imaging Software, which archives the acquired images.

The scanner connects directly to the network or is connected peer-to-peer to the workstation.

The scanner can be optionally placed on a desk/countertop or mounted on a wall, using a special shelf (adapter).

The system is composed of the following elements:

- CS 7600 scanning device ([page 5](#))
- Smart imaging plates ([page 7](#))
- Scan & Go device (optional, [page 10](#))



Note: The scanner is supplied with a separate viewing and archiving software package: *CS Imaging Software*, approved by Carestream Dental.



Note: The CS 7600 User Guide is also provided as a PDF file on the supplied USB key.

This device complies with part 15 of the FCC Rules and contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

- 1 This device may not cause interference.
- 2 This device must accept any interference, including interference that may cause undesired operation of the device.



CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CS 7600 Components Overview

Scanner Overview

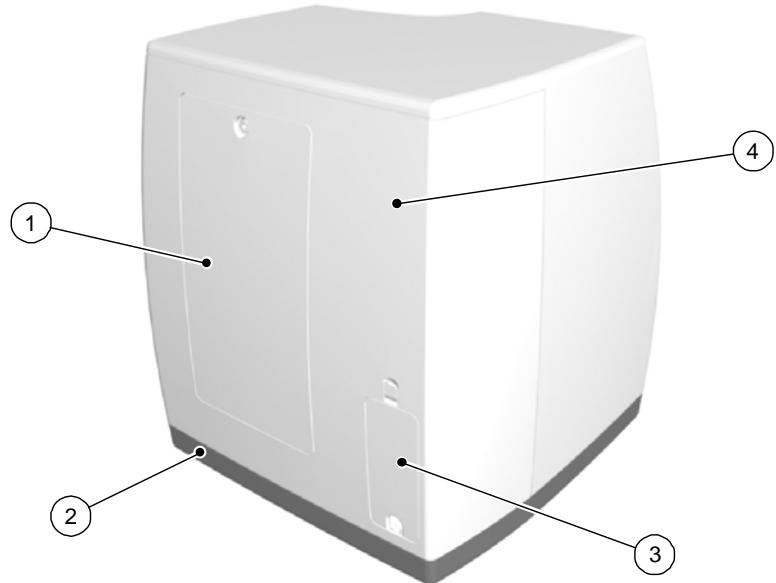
The CS 7600 scanner performs the functions necessary for scanning and acquiring images from the imaging plates.

Figure 1 CS 7600 Front View



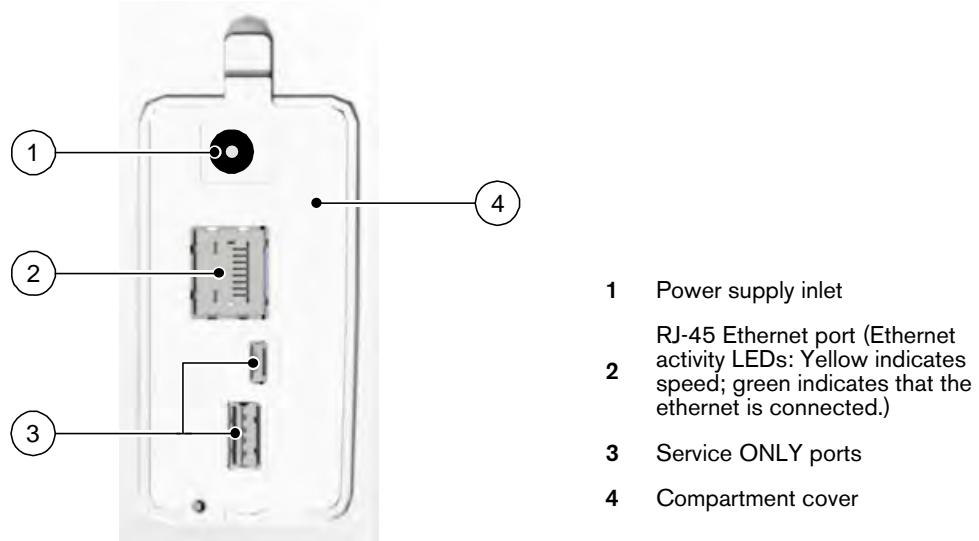
- 1 3.5" QVGA color LCD (320 X 240 pixels, landscape matrix)
- 2 Function buttons for scanner use and menu navigation
- 3 On/Off button + LED power indicator
On/Off button functions:
 - Turn scanner On: Press for 1 second
 - Turn scanner Off (close application and files and then turn off): Press for 2 seconds
- 4 Base
- 5 Intraoral imaging plates tray
- 6 Detachable insertion panel. The CS 7600 makes use of three insertion panel sizes according to the inserted imaging plate size (0, 1–3, or 4).
- 7 Front cover
- 8 Back covers

Figure 2 CS 7600 Rear View



- 1 Service door
- 2 Base
- 3 Cables compartment for power supply connection and interface ports (RJ-45 Ethernet port)
- 4 Back cover

Figure 3 Cables Compartment in Detail



- 1 Power supply inlet
- 2 RJ-45 Ethernet port (Ethernet activity LEDs: Yellow indicates speed; green indicates that the ethernet is connected.)
- 3 Service ONLY ports
- 4 Compartment cover

Smart Imaging Plates Overview

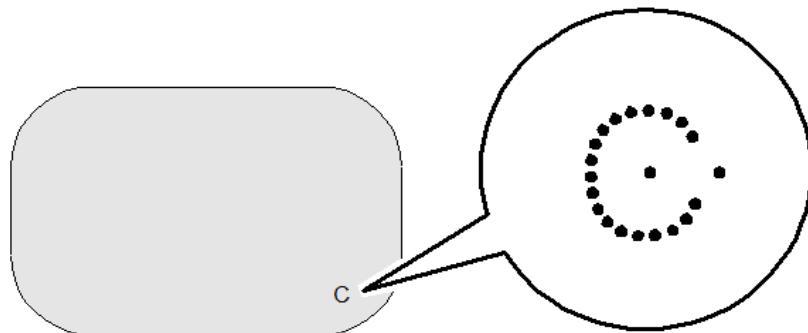
The CS 7600 works with five imaging plate sizes: 0 to 4. The scanned image file size depends on the imaging plate size and the scanning resolution set by the user.

The smart function of the imaging plates is utilized when using the Scan & Go device.

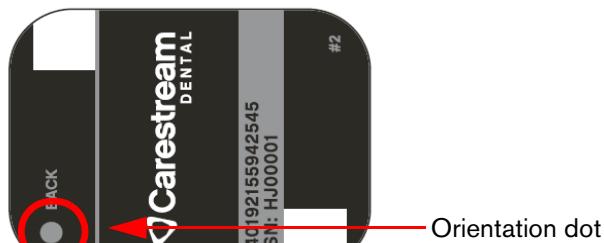
Table 1 Intraoral Imaging Plate Sizes

Size	Illustration	Application
0		Periapical exam (Pediatric dentistry)
1		Bitewing exam (Pediatric dentistry)
2		Periapical exam (Adult)
3		Bitewing exam (Adult)
4		Occlusal exam

The imaging plate has two sides: the active side for capturing the X-ray image and the inactive side. The active side of the imaging plate includes an orientation mark "c" to facilitate accurate positioning within the patient's mouth. The inactive side has a printed dot that corresponds to the location of the orientation mark on the active side. This dot is visible through the transparent hygienic sheath and is also helpful for positioning the imaging plate correctly in the patient's mouth.



Active side



Inactive side

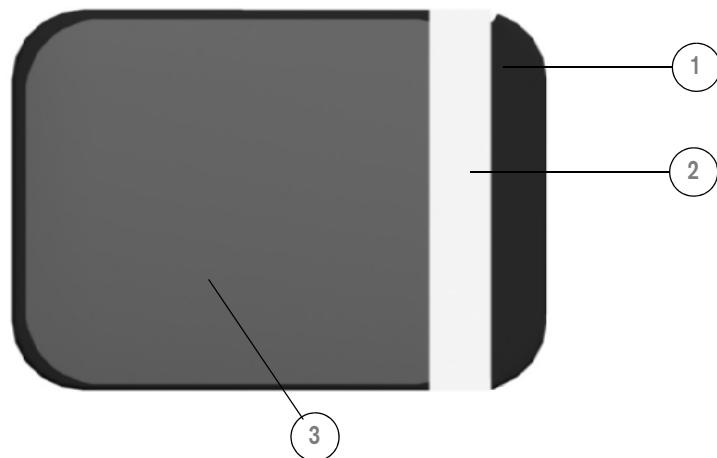


Important: Use only Carestream Dental imaging plates and hygienic sheaths!

Hygienic Sheaths

For each imaging plate size there is a corresponding one-time-use, disposable hygienic sheath for preventing cross contamination. The transparent side enables you to see the orientation mark for positioning the imaging plate correctly in the patient's mouth, while the opaque side protects the active side of the inserted imaging plate from light-damaging effects. The foam strip is a stopper which prevents inserting the hygienic sheath by mistake into the scanner (as long as the insertion direction is correct).

Figure 4 Hygienic Sheath (front view)

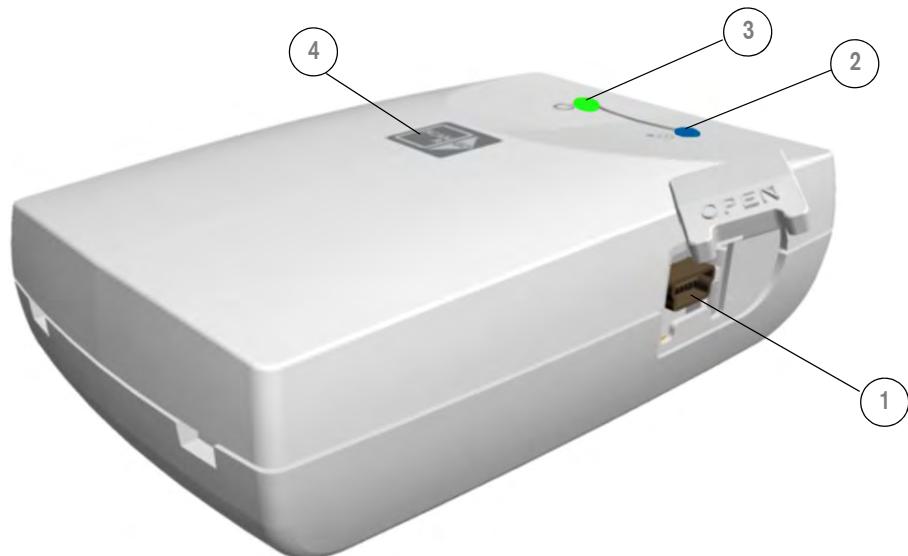


- 1 Adhesive strip (for sealing the hygienic sheath)
- 2 Foam stopper
- 3 Sheath, transparent on one side and with a light protection barrier on the other side

Scan & Go Overview

Scan & Go is an optional device that enables you to link the imaging plate to a specific exam acquisition (for example, patient) prior to acquisition. When the plate is inserted into the scanner, the information which was tagged onto the plate is retrieved by the scanner, and the imaging plate is scanned automatically according to this information (resolution, target workstation, etc). Scanned images are then routed automatically to the correct workstation, associated to the correct exam acquisition, and placed in the correct frame in the CS 7600 image Acquisition interface.

Figure 5 USB Scan & Go Device



1 USB 2.0 port

2 On/Off/Recording LED status indicator (blue)



Power Up: One Flash & Beep (Internal FW)



Beacon: Flashes blue every few seconds when the image Acquisition interface is open (not during tagging)



Tagging OK: One flash (long) & 1 beep (long)

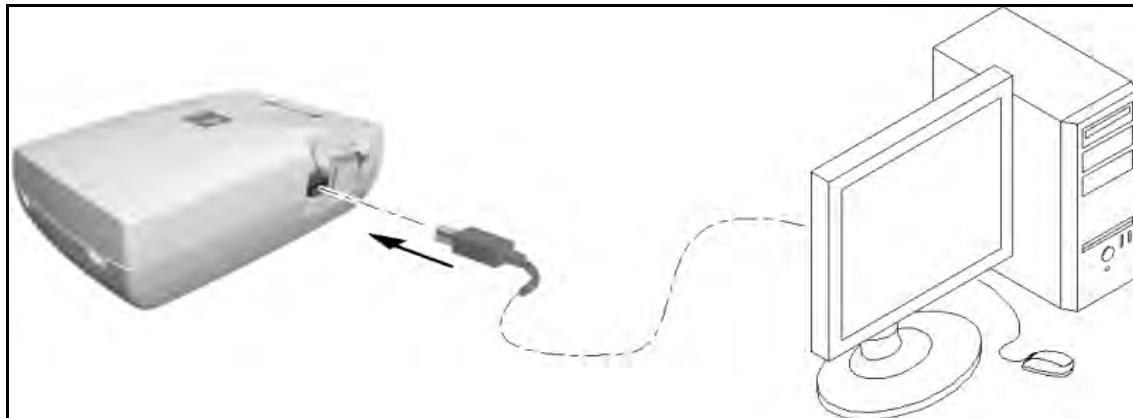


Tagging Fail: One Red flash (long) & 1 beep (long)

3  Connected to USB: LED status indicator (green)

4 Recording surface for imaging plate

Connecting the Scan & Go Device



To connect the USB Scan & Go device:

Connect the USB cable to the computer and to the USB port on the Scan & Go device.

The right LED flashes green three times, the left LED illuminates green continuously, and the device beeps three times to indicate that it is ready for use.

Scanner Shelf

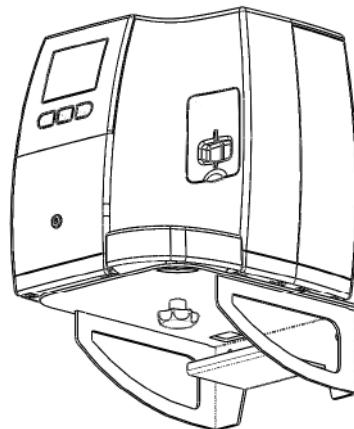
The CS 7600 can be optionally mounted on the wall using a shelf bracket.

The CS 7600 is attached to the shelf by a single central tightening nut.

For more information on scanner shelf installation, see document [HT014_20111006_EN](#).



Scanner Shelf



Scanner On Shelf

3 Software Overview

Computer System Requirements



Important: It is **MANDATORY** to check that the computer system configuration is compatible with the computer minimum system requirements specified in the Safety, Regulatory, and Technical Specifications User Guide. If necessary, update your computer system configuration.

General Software Overview

The CS 7600 intraoral imaging system operates with the following software:

- CS Imaging Software
 - Single Image Acquisition Interface. See “[Single Image Acquisition Interface Overview](#)” on [page 13](#).
 - Full Mouth Series (FMS) Acquisition Interface. See “[Full Mouth Series \(FMS\) Acquisition Interface Overview](#)” on [page 14](#).
- CS 7600 Image Acquisition Software
 - Full Mouth Series (FMS) Acquisition Interface. See “[Full Mouth Series Image Acquisition Interface](#)” on [page 28](#).

Single Image Acquisition Interface Overview

You can acquire individual images using the CS Imaging Software.

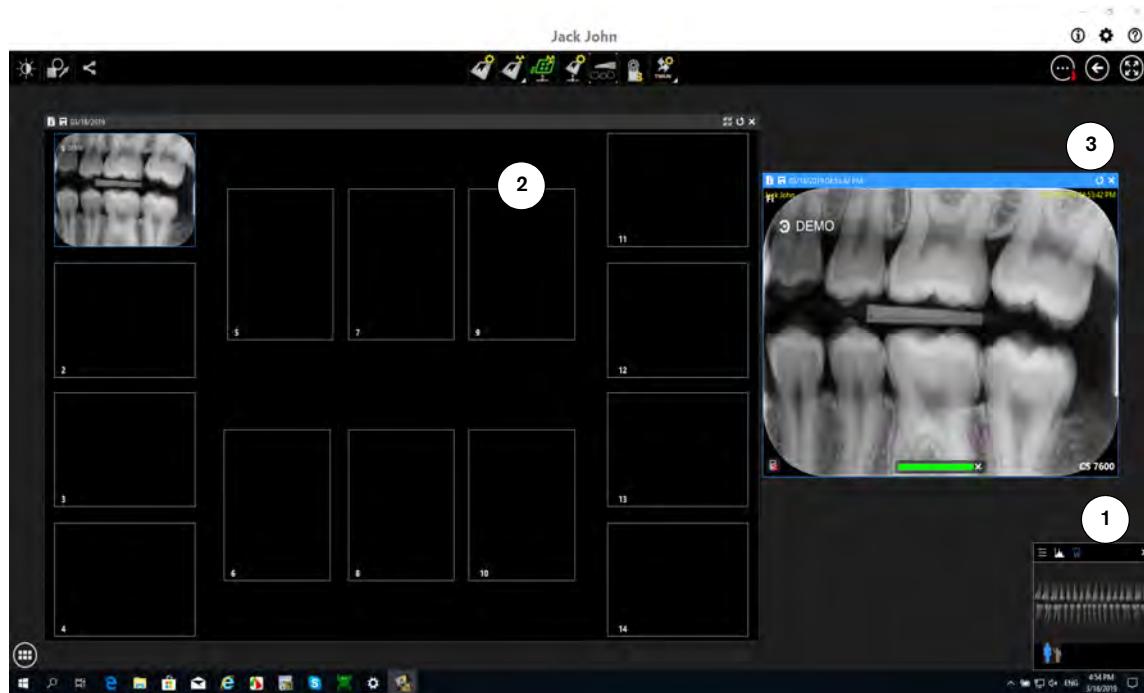
Figure 6 CS Imaging with Active CS 7600 Scanner Connected



Full Mouth Series (FMS) Acquisition Interface Overview

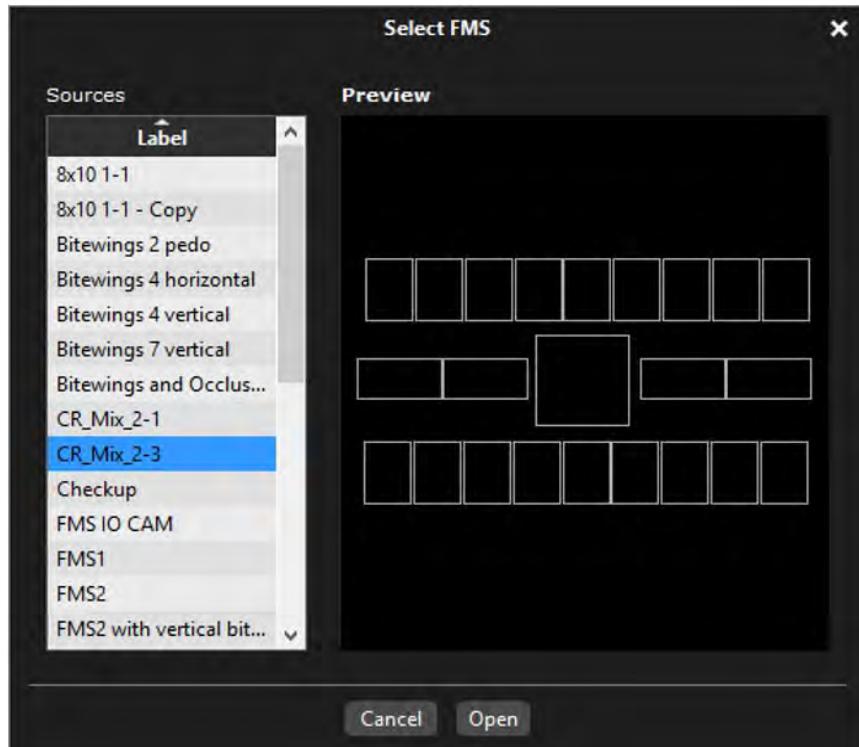
The Full Mouth Series (FMS) is a static representation of the mouth of the patient using a series of intraoral images. The images are placed in fixed numbered frames.

Figure 7 CS Imaging Software FMS Acquisition Interface



- ① **Dental arch:** Highlights the acquisition zone.
- ② **FMS template:** Displays frame templates for acquisition.
 - Green highlight: Frame ready for new acquisition.
 - Blue highlight: Frame in the revue and retake mode. This mode interrupts the automatic acquisition sequence.
- ③ **Preview screen:** Displays the currently acquired image.

Figure 8 FMS Select a Format



Select a Format: Enables you to select FMS template options to select for acquisition. You can modify existing templates and create new templates (see the [CS Imaging Software Online Help](#)).



Note: Only FMS templates for CR images can be used. Using other FMS will cause images not to be displayed.

Figure 9 Control Panel with CS Adapt Buttons



Control Panel: Enables you to adjust the brightness and contrast of the image. For more information on Control Panel functions, see the [CS Imaging Software Online Help](#).



CS Adapt Library: Opens the CS Adapt Library software that enables you to manage your filters.



Adapt - Unfiltered Perio: Enhances the display of periodontal tissue.



Adapt - Unfiltered Endo1: Enhances contrast at the canals and roots (produces brighter images).



Adapt - Unfiltered DEJ1: Optimizes contrast at crowns, amelo-dental junctions, and roots (produces brighter images).



Adapt - Optimized Contrast Endo: Enhances contrast at the canals and roots.

Figure 10 Image Toolbar and Drawings & Annotations Toolbar



Image toolbar: Enables you to adjust the image display. For more information on Image toolbar functions, see the [**CS Imaging Software Online Help**](#).

	Zoom icon: Click to magnify a specific region.
	Highlight: Click to optimize contrast within a region of interest.

 Rotate icon group	 90°	90° rotation: Click to rotate the image by 90° clockwise.
	 180°	Flip: Click to rotate the image by 180° clockwise.
	 Mirror	Mirror icon: Click to create a mirror image of the original image.
 Colors icon group	 Colors #1	Colors #1 icon: Click to replace grays by a color.
	 Colors #2	Colors #2 icon: Click to replace grays by sepia colors.
	 Grayscale	Grayscale icon: Click to replace colors by grays.
 Density icon group	 Crop image	Crop image: Click to access the Crop panel. Cropping is not permanent and can be undone at any time.
	 Isodensity dots	Isodensity dots: Click to apply color to pixels of the same bone density.
	 Densitometric analysis	Densitometric analysis: Click to analyze bone density.
 Filter icon group	 Relief filter	Relief filter: Click to enhance the outlines of the shapes in an image by displaying the image in relief mode.
	 Pseudo - 3D	Pseudo - 3D: Click to display gray scale levels as height values.
	 Logicon	Logicon icon: In RVG images, click to launch the Logicon Caries Detector to detect interproximal caries. Note: This tool is available only if you have the Logicon Caries Detector software installed.
	 Negative	Negative icon: Click to apply an inverse video effect to an image.
	 Cosmetic module	Cosmetic module icon: Click to add cosmetic treatments to color images. Note: This tool is available only if you have the Cosmetic Imaging Module software installed.
	 Cephalometric Tracing	Cephalometric Tracing icon: Click to launch the automatic cephalometric tracing tool. Note: This tool is available only if you have the Tracings Module software installed.

Drawing and Annotations toolbar: Contains icons for functions that you can apply to a selected image.

		Select icon: Use this tool to select a drawing or measurement that you want to modify. The first mouse click selects the object, and the second mouse click shows the control points.
		Straight line icon: Click to draw a straight line on an image.
		Multi-segment line icon: Click to draw a multi-segment line on an image.
		Freehand line icon: Click to draw a freehand line on an image.
		Spline drawing icon: Click to draw a spline curve that is basically a freehand line that has editable points.
		Circle icon: Click to draw a circle on an image.
		Ellipse icon: Click to draw an ellipse on an image.
		Filled ellipse icon: Click to draw a filled ellipse on an image.
		Rectangle icon: Click to draw a rectangle on an image.
		Filled rectangle icon: Click to draw a filled rectangle on an image.
		Landmark point icon: Click to add a point on an image.
		Arrow line icon: Click to draw an arrow on an image.
		Straight line measurement icon: Click to draw a straight line measurement on an image.
		Multi-segment line measurement icon: Click to draw a multi-segment line measurement on an image.
		Angle measurement icon: Click to draw an angle measurement on an image.
		Orthogonal measurement icon: Click to draw an orthogonal line measurement on an image.
		Text icon: Click to add a text object to an image.

Implant icon group		Mandibular canal icon: Click to draw a mandibular canal on an image.
		Implants icon: Click to add an implant to an image.
		Calibration icon: Click to calibrate an image.
		Undo icon: Click to undo an action.
		Redo icon: Click to counteract the Undo function.
		Delete icon: Click to delete selected drawings, annotations, or measurements.
		Color and Thickness icon: Click to change object color and line thickness.

CS Imaging Software Main Toolbar



Scanner Status Indicator: Shows the status of the active scanner. The following status options are available:

- Green: Ready to scan.
- Yellow: Blinks when tagging a plate and when a new image is transferred to CS Imaging Software.
- Red: Error in the active scanner.
- Grey: Active scanner is not connected.

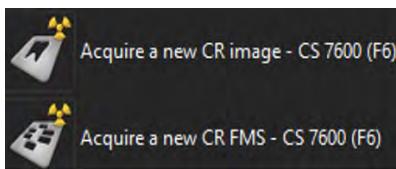


CS 7600-Configure: Click to open the CS 7600 configuration window. See “[Imaging Plate System Configuration Window](#)” on [page 20](#).

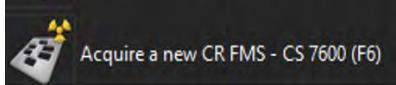


New CR image: Click the arrow button to select between the two options:

- CS 7600 acquisition (CR)
- CS 7600 FMS acquisition (CR2). After the option is selected, click to open the CS 7600 image Acquisition software in the FMS mode. See “[Full Mouth Series Image Acquisition Interface](#)” on [page 28](#).



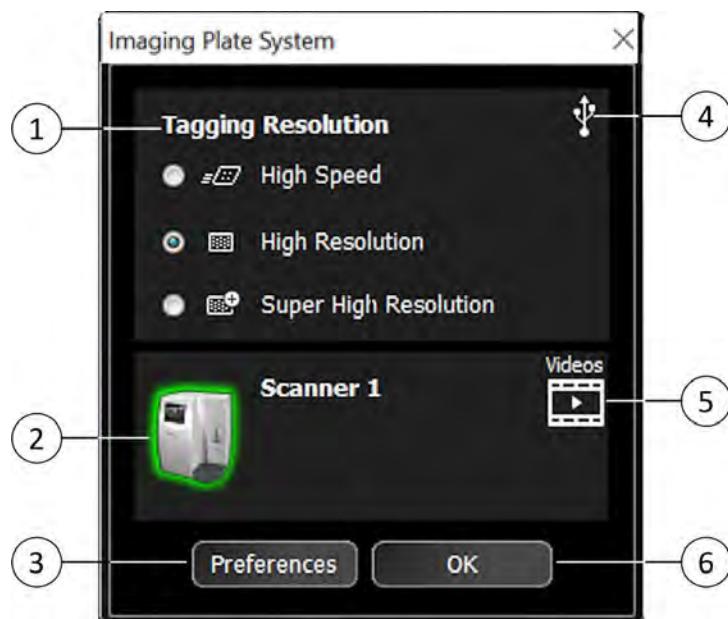
Acquire a new CR image - CS 7600 (F6)



Acquire a new CR FMS - CS 7600 (F6)

Imaging Plate System Configuration Window

The **Imaging Plate System** configuration window is opened when you click the **CS 7600 - Configure** button on the **CS Imaging Software** main toolbar.



- ① **Tagging Resolution:** Select one of the three available resolutions for the next tagging resolution. Available only if Scan & Go is connected.
- ② **Scanner Status Indicator:** Displays the status of the active scanner.
 - Green highlight: Scanner is ready for operation.
 - Grey: Active scanner is not connected.
 - Red: Active scanner error.
- ③ **Preferences:** Click to open the **CS 7600 Preferences** window.
- ④ **Scan & Go Status Indicator:** Displays the status of the Scan & Go device.
 - White: Scan & Go device is connected.
 - Grey: Scan & Go device is not connected.
- ⑤ **Videos:** Click to open the training videos.
- ⑥ **OK:** Click to save the selected settings and close the **Imaging Plate System** configuration window.

4 Scanner Interface Overview

This chapter explains the scanner interface and how to use it.

Computer System Requirements



Important: It is **MANDATORY** to check that the computer system configuration is compatible with the computer minimum system requirements specified in the Safety, Regulatory, and Technical Specifications User Guide. If necessary, you must update your computer system configuration.

CS 7600 Scanner Interface Overview

The CS 7600 scanner interface is used primarily for scanning the exposed imaging plates and provides easy-to-understand prompts.

The scanner interface also provides the option of changing the scanner default settings as described in the CS 7600 installation guide.

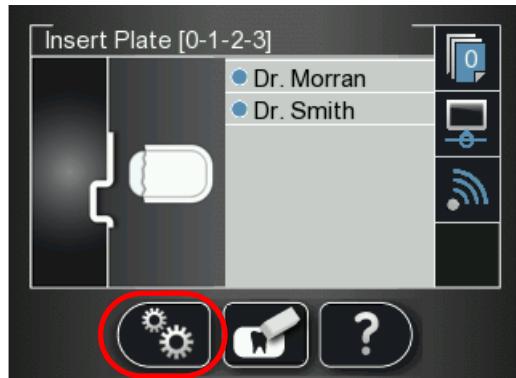
All scanner functions are applied using the three buttons beneath the LCD.

The functional buttons are used for navigating the LCD screens and menus. The buttons are also used to apply your selections.



Scanner Interface Icons

Figure 11 Example of Insert Plate Screen



The following table lists the icons that are part of the various LCD screens.



Stored images counter and available memory status. Blue background indicates available scanner memory.



Stored images counter and available memory status. Red background indicates scanner memory is either nearing its full capacity or is already used up.



Network connection state, connected.



Network connection state, disconnected.



Network connection state, limited connection.



Scanner is paired (connected peer-to-peer) to a workstation.



Scan & Go state indicator. Blue indicates the scanner supports Scan & Go smart scanning. When scanning recorded imaging plates, this icon blinks.



Scan & Go state indicator. White indicates the scanner does not support Scan & Go smart scanning or that the scanned imaging plate does not contain Scan & Go recorded information.

Scan resolution

The image scan resolution:



High speed (HS)



High resolution (HR)



Super high resolution (SHR)



Press the scanner's left function button to access the Settings menu. For information about Settings, see ["Scanner Settings" on page 49](#).



Press the scanner's middle function button to manually erase the imaging plate. For more information, see ["Erasing the Imaging Plates" on page 26](#).



Press the scanner's middle function button to return to the Insert Plate screen.



Press the scanner's right function button to access scanner information such as scanner name, IP address, and total scans performed by the system, as well as the system's set date and time.



Press the scanner's left function button to scroll down/forward.



Press the scanner's right function button to scroll up/backward.



Press the scanner's right function button to unpair the scanner from the workstation.



Press the scanner's right function button to confirm your selection.



From SP4 you can delete images from the scanner using the Viewer. Press the scanner's right function button to delete the image being viewed.



To change the scan resolution for the current exam acquisition (when acquiring images without a Scan & Go device), press the right scanner function button and toggle to the required scan resolution after inserting the imaging plate. (If another exam acquisition is selected, the scanner reverts to its default resolution.)



Image number in the Plate Viewer



Plate size (in the Plate Viewer)

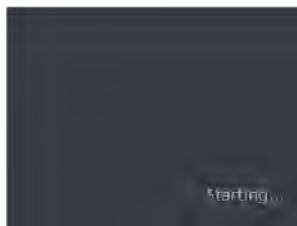
Working with the Scanner

The following procedures are explained here:

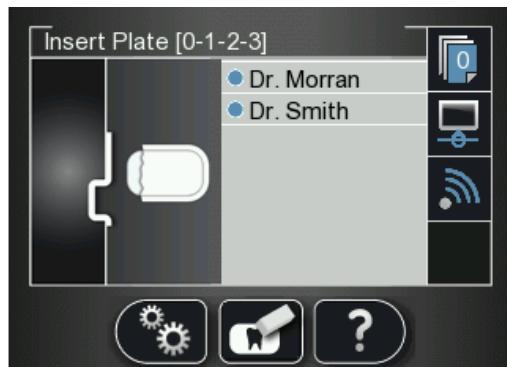
- Turning on the Scanner, see “Turning On the Scanner” on page 24.
- Image Acquisition, see “Image Acquisition” on page 24.
- Scanner Info, see “Scanner Info” on page 25.
- Erasing the Imaging Plates, see “Erasing the Imaging Plates” on page 26.

Turning On the Scanner

After turning on the scanner, you are presented with the **Starting** screen.



Then the **Insert Plate** screen opens.



The following three functions are presented:

-  Scanner Info, see “Scanner Info” on page 25.
-  Erase Imaging Plate, see “Erasing the Imaging Plates” on page 26.
-  Scanner Settings, see “Scanner Settings” on page 49.

Image Acquisition

When image acquisition is performed without a Paired status or Scan & Go:

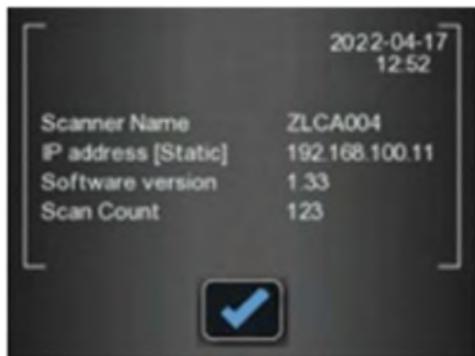
- 1 Press  to select a patient.
- 2 Press  to select a scan resolution.

3 Press  to scan the imaging plate. The imaging plate is scanned.

For more information, see “[Acquiring a Single Image](#)” on page 34.

Scanner Info

1 Press  **Info**. The **Scanner Info** screen opens.



The following information is presented:

- System's set date and time
- Scanner Name
- IP address
- Software Version
- Scan Count: Total scans performed by the system

2 To close the **Scanner Info** screen, press . The **Scanner Info** screen closes, and you return to the **Insert Plate** screen.

Erasing the Imaging Plates

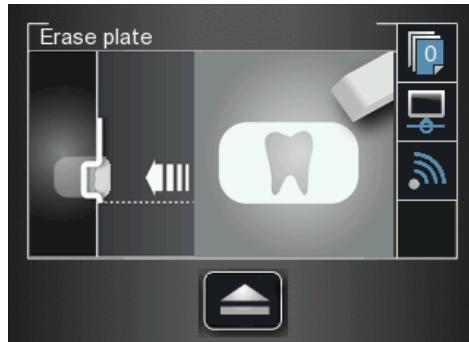
The imaging plates are automatically erased and ejected after they are scanned. If the imaging plate is exposed to light for an extended period of time (one week or more) or to strong light for even a short amount of time, the plate will need to be manually erased before use.

To erase the imaging plate manually, follow these steps:



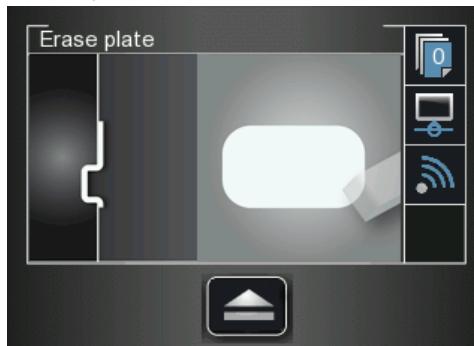
- 1 Press , the scanner's middle function button.

The LCD displays the **Erase plate** screen:

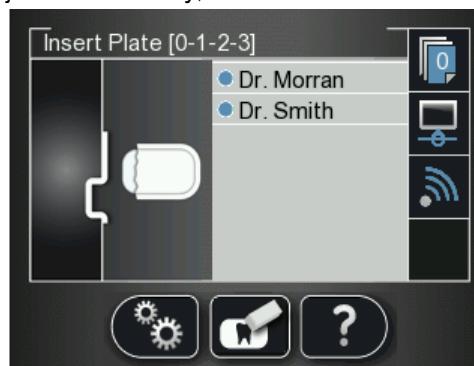


- 2 Insert the imaging plate into the scanner's insertion slot without the hygienic sheath (for information on how to insert the imaging plate, see "["Inserting the Imaging Plate" on page 35](#)).

The **Erase plate** screen is displayed.



The erased imaging plate is ejected to the tray, and the scanner reverts to the **Insert Plate** screen.



- 3 Collect the imaging plate while taking care to maintain hygienic protocol and minimal exposure to light.
- 4 Repeat steps 1 to 3 for any other imaging plates that need erasing.

5 CS 7600 Image Acquisition Interface

CS 7600 Imaging Software Overview

The CS Imaging Software is a user-friendly working interface that was designed and developed specifically for radiological diagnosis. It is the common imaging platform for all our digital systems for dentistry.

The CS Imaging Software provides management of the patients and image database.

To open your CS Imaging Software: On your desktop, double-click the CS Imaging Software icon, or click **Start > All Programs > Carestream > CS Imaging Software**.

For more information, see your CS Imaging Software documentation.

CS 7600 Image Acquisition Interface Overview

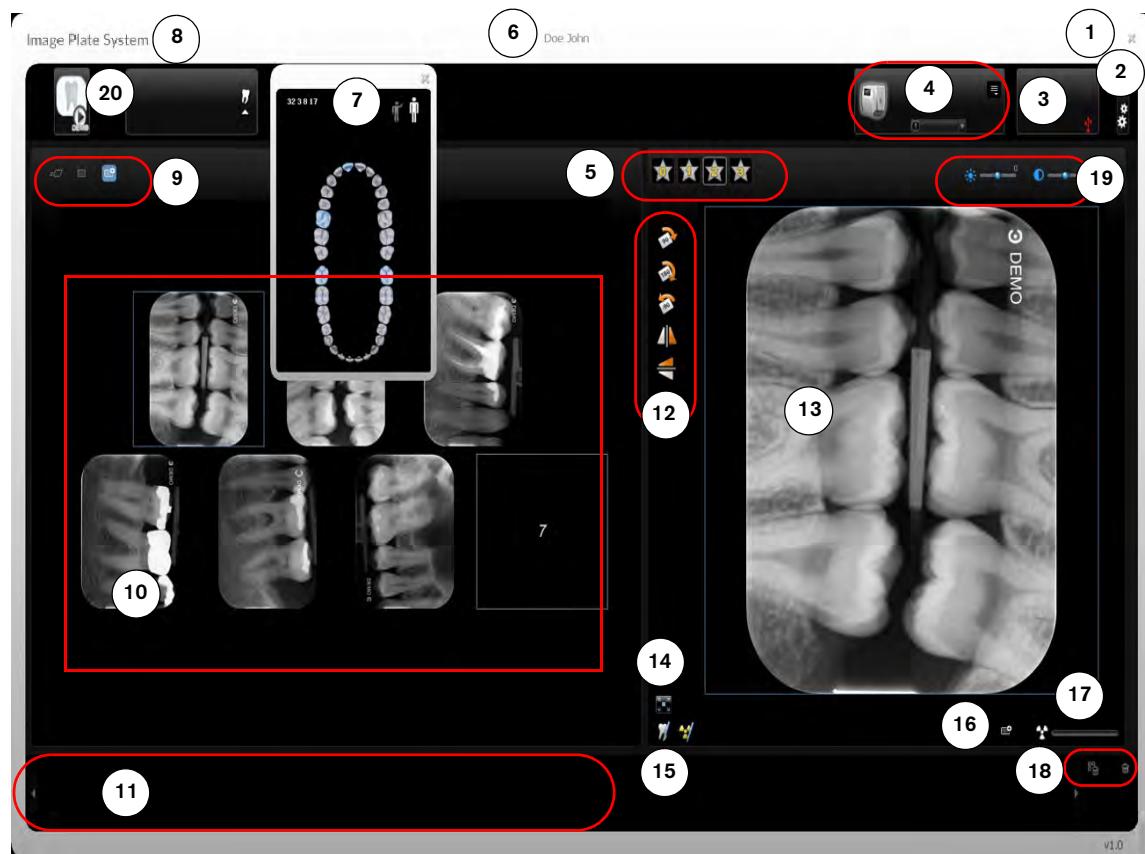
The CS 7600 image Acquisition interface is a user-friendly application designed and developed specifically for the CS 7600 intraoral imaging system. It provides a rich array of image processing options in addition to the acquisition functions.

The image Acquisition interface provides one mode:

Full Mouth Series: Full series of frames, according to one of the available industry standard templates for full mouth series, selected in the **General Settings** tab.

Full Mouth Series Image Acquisition Interface

Figure 12 Image Acquisition Interface - Full Mouth Series Mode



Scanner List



Tip: Selected and active options are highlighted in blue.

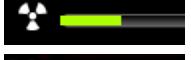
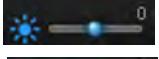
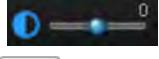
Table 2 Image Acquisition Interface Key

1	Exit	Click  to exit the CS 7600 image Acquisition interface.
2	Settings	Click Settings  to customize the default settings. See "Working with Settings" on page 53.
3	Scan & Go Status	The Scan & Go's active connection status (white color indicates connection, red indicates no connection).  USB (connected)  USB (not connected)
4	Scanner Area	Enables browsing of all active connected scanners (if there are multiple scanners in the same network). Click Scanner List  to list all scanners.  Green frame indicates a connected scanner.  Grey frame indicates a disconnected scanner.  Red frame indicates a scanner in error state. (Click the scanner icon to display the error tool tip.) Click the arrow   to display the images in the memory of the selected scanner. To retrieve the required image, pull the image to the Image Display Area.
5	Favorite Filters Buttons	Click to enhance a different zone of interest:  Click to enhance the display of periodontal tissue.  Click to enhance contrast at the canals and roots (produce brighter images).  Click to optimize contrast at crowns, amelo-dental junctions, and roots.  Click to enhance contrast at the canals and roots.
6	Patient Information	Displays the patient information.
7	Tooth Selection	FMS or Image Acquisition template. When using an FMS template, the tooth associated with the selected frame is highlighted blue in the panoramic arch icon. When using Image Acquisition, clicking the arrow (under the Toothpicker icon) allows selecting individual teeth in either child  or adult  dentitions. (To clear the selection, click the tooth again.)

Table 2 Image Acquisition Interface Key

8	Imaging Software Details	Clicking the  icon provides the imaging software details.
9	Scan Resolution	The scan resolution to apply when tagging information on an imaging plate with the Scan & Go device. To change the scan resolution for the current exam acquisition, click the required icon before you tag the imaging plate:
		 High Speed (HS)
		 High Resolution (HR)
		 Super High Resolution (SHR)
10	Image Display Area	This area displays the images according to one of the dental standard layouts determined by the Default template selection in the “General Settings Tab.”
11	Image Gallery	Useful for storing images when rearranging the layout or for discarding an image when necessary.
12	Orientation Buttons	 Click to rotate the selected image 90 degrees clockwise.  Click to rotate the selected image 180 degrees.  Click to rotate the selected image 90 degrees counter clockwise.  Click to flip the selected image vertically (mirror inverted images).  Click to flip the selected image horizontally (mirror inverted images).
13	Preview Panel	Displays the active frame's image (if frame is populated). You can apply the processing and comments to the preview image.
14	Full Screen	 Click to display the image in a separate, full screen window (dark room mode).
15	Comments & Exposure Values	 Click to add a comment to the image. (The comments will be added to the DICOM tags of the image and can be viewed later using the Imaging Software or DICOM viewer.)  Click to enter custom X-ray exposure values. This information is inserted in the image's DICOM header. Otherwise, the default exposure values as defined in the “General Settings Tab” are inserted in the DICOM header.

Table 2 Image Acquisition Interface Key

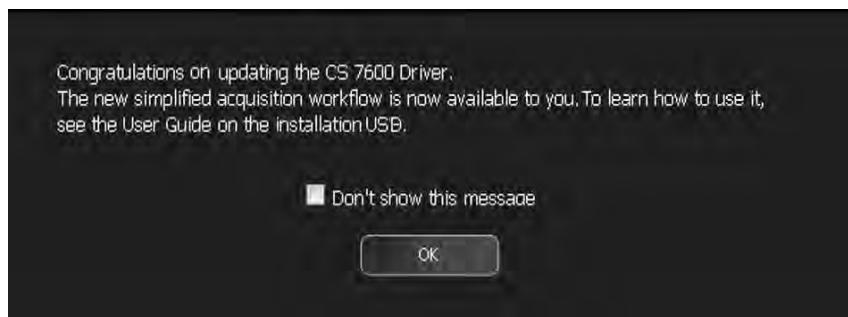
16	Selected Image Resolution	Indicates the selected image's resolution level (in the preview image panel):  High Speed (HS)  High Resolution (HR)  Super High Resolution (SHR)
17	X-ray Exposure Indication	Partly red, indicates an underexposed image. Review the X-ray technique and consider increasing the exposure values for better image quality and diagnosis.  Green, indicates good exposure values.  All red, indicates that the image is overexposed. Review the X-ray technique and consider lower exposure values for better image quality and diagnostics. 
18	Delete	 Click to delete ALL images from the Image Gallery.  Click to delete the selected image from the Image Gallery.
19	Image Brightness and Contrast	 Use the brightness slider to manually adjust the image's brightness.  Use the contrast slider to manually adjust the image's contrast.  Click to apply an automatic optimization of brightness and contrast.
20	Demo Mode	 Populates one frame in the Image Display Area with a demo image each time the icon is selected.
21	Refresh	 Click to refresh the Scanner List.
22	Close Scanner List	 Click to close the Scanner List.



Tip: Image Brightness and Contrast can also be adjusted by holding the mouse button over the image and dragging vertically, for contrast, and horizontally, for brightness.

Image Acquisition Interface

When you open the Dental Imaging Software or CS 7600 image Acquisition software for the first time, the following window is displayed.



- 1 Click **OK**.



Note: Do not select the **Don't show this message again** option.

The **Image Adjustment** window is displayed.



- 2 Select a default scan resolution option.

The filter number with a blue checkmark will be applied to the next image acquisition.

- 3 To change these settings, click **OK** and open **CS Adapt** to modify.

6 Acquiring Images Without Scan & Go

Introduction

This chapter describes the acquisition procedures for configurations without the optional Scan & Go device.

A typical workflow consists of the following steps:

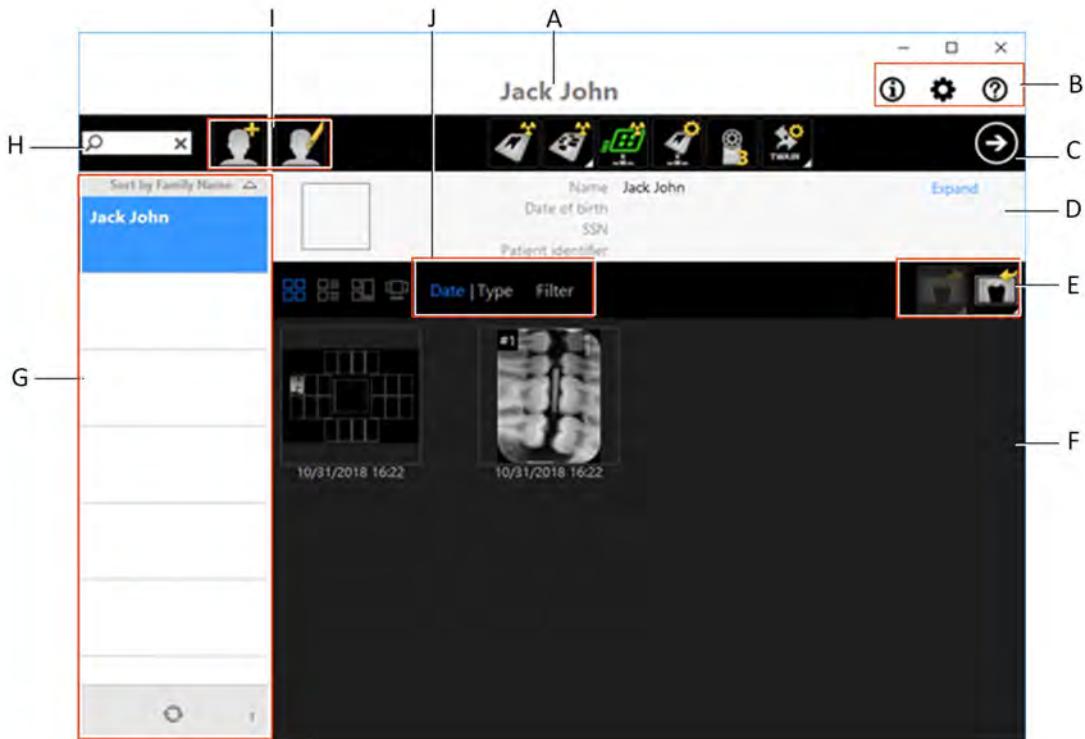
- Accessing the imaging window. See [“Starting the Imaging Software” on page 34](#).
- Preparing the imaging plates. See [“Preparing the Imaging Plates” on page 35](#).
- Inserting the imaging plate into a hygienic sheath and sealing it. See [“Inserting the Imaging Plate” on page 35](#).
- Placing the imaging plate in the patient’s mouth behind the selected tooth or teeth. See [“Performing the X-rays” on page 36](#).
- Exposing the imaging plate to X-ray. See [“Performing the X-rays” on page 36](#).
- Removing the imaging plate from the patient’s mouth. See [“Performing the X-rays” on page 36](#).
- Disinfecting the hygienic sheath. See [“Disinfecting the Hygienic Sheath and the Imaging Plates” on page 66](#).
- Scanning the imaging plate. See [“Scanning the Imaging Plates” on page 37](#).
- Storing the image in the CS Imaging Software. See [“Storing the Images” on page 48](#).

Acquiring a Single Image

Starting the Imaging Software

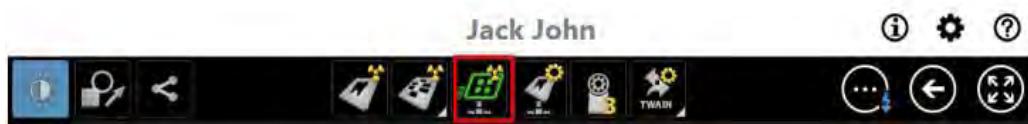
To start the Imaging Software, follow these steps:

- 1 On your desktop, double-click the **CS Imaging Software** icon, or click **Start > All Programs > CS Imaging Software**.
- 2 Create or open an existing patient record:
 - **To open an existing patient record:** In the Patient Browser search field (**H**), start typing to search for a patient card.



- **To create a new patient record:** Click the **Create New Patient Card** button alongside the search field to create a new patient card.

- 3 Once you have selected or created a patient, in the Patient Browser Toolbar (**C**), click the arrow button to open the Imaging application. The Patient Browser window remains open, and the Imaging window is displayed.
- 4 Wait for the Scanner Status icon to turn green on the **Imaging** window toolbar, indicating that the CS 7600 scanner is connected to the workstation and is ready for acquisition.



The newly created patient becomes an existing patient. Click **Patient > Find**, select the newly created patient from the list, and click the **Imaging Software** button to proceed.

Preparing the Imaging Plates

To prepare the intraoral imaging plate, do the following:

Select an imaging plate of the right size for your examination.



Important: Use only intraoral imaging plates from Carestream Dental and hygienic sheaths from Carestream Dental. The use of plates or hygienic sheaths from a third-party supplier may cause a malfunction of the system and void the warranty.



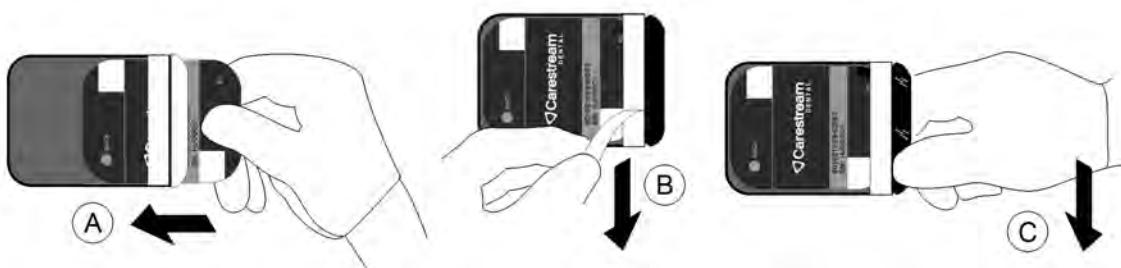
Tip: If the imaging plate has not been used for a while, proceed to erase it first. See ["Erasing the Imaging Plates" on page 26](#).



Important: If you select a size 4 imaging plate, make sure the scanner has the size 4 insertion slot panel installed. For information on replacing the insertion panel, see ["Cleaning the Detachable Insertion Panels" on page 68](#). There is no need to power off the system when replacing insertion panels.

Inserting the Imaging Plate

- 1 Insert the disinfected imaging plate (See ["Disinfecting the Hygienic Sheath and the Imaging Plates" on page 66](#)) into its protective hygienic sheath with the inactive side facing the adhesive strip, so the imaging plate's size number is seen through the transparent side of the hygienic sheath and the orientation dot is visible in the bottom corner (A).
- 2 Peel the adhesive strip's protective paper to seal the hygienic sheath (B). Handle the imaging plate by holding the hygienic sheath's empty edge (C) (where the foam strip is).



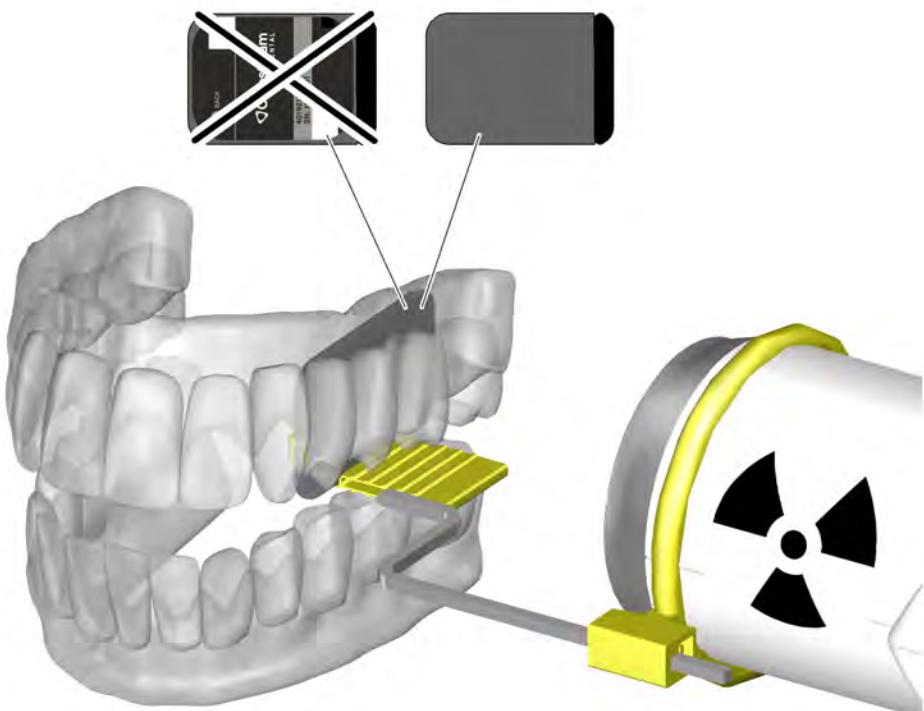
Performing the X-rays

Perform the required X-rays according to your clinical procedure.

It is recommended to continue using X-ray positioning techniques and tools to ensure the resulting image is complete and includes all the information required for diagnosis. It is recommended to use the Rinn Suresoft holder or equivalent products available on the market. To facilitate matching the orientation of the image in the software to the clinical reality, we recommend positioning the imaging plate in the mouth of the patient with the orientation mark always towards the bottom.



Important: Make sure the active side of the imaging plate is facing the patient's teeth.



Scanning the Imaging Plates

To scan the imaging plate, follow these steps:

- 1 Remove the imaging plate from the patient's mouth. **Do not remove the imaging plate from its hygienic sheath.** Wipe and disinfect the exposed imaging plate's hygienic sheath. (See "Disinfecting the Hygienic Sheath and the Imaging Plates" on page 66.) Keep the imaging plate in its hygienic sheath to minimize exposure to light.



Important: If the imaging plate is exposed to light, it could result in degradation of image quality. Do not remove the imaging plate from its hygienic sheath until you insert it in the scanner's insertion slot.

- 2 At the scanner location, tear open the hygienic sheath (A) and insert the exposed imaging plate into the scanner by positioning the open side of the sheath in the insertion panel slot (B) with the foam side to the right. Push out the tip of the imaging plate from its hygienic sheath (C). The imaging plate (without its protective sheath) is drawn into the insertion slot by the scanner, and the scanner preview shows the scan progress.





Important: If the user inserts the plate incorrectly, there is a possibility of the plate falling into the scanner. If the plate falls into the scanner, see "Retrieving a Fallen Imaging Plate" on page 78.

- 3 Dispose of the used protective hygienic sheath (D).

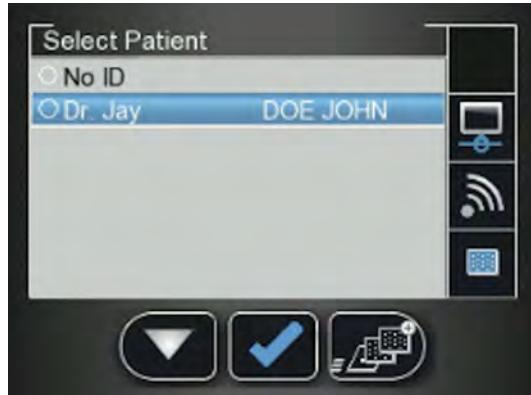
If the scanner is linked peer-to-peer with a workstation, the image is sent automatically to the workstation to which it is linked.

- 4 Select the patient from the list. If the required patient does not appear in the list, select the **No ID** option.



Note: For information on retrieving the No ID images, see "Clearing Scanner Memory" on page 62.

- 5 Press the middle function button to scan the imaging plate.

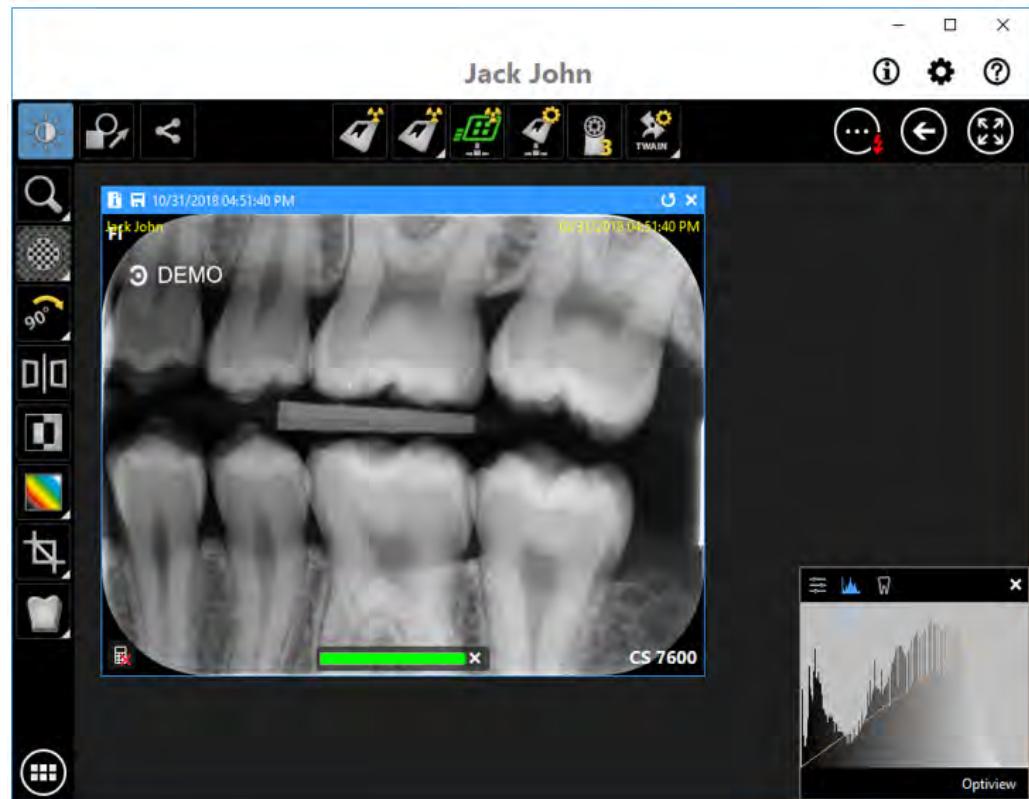


- 6 Collect the ejected imaging plate from the lower tray after it is scanned, insert it into a new sheath, seal the sheath, and store it in the storage box for the next use.

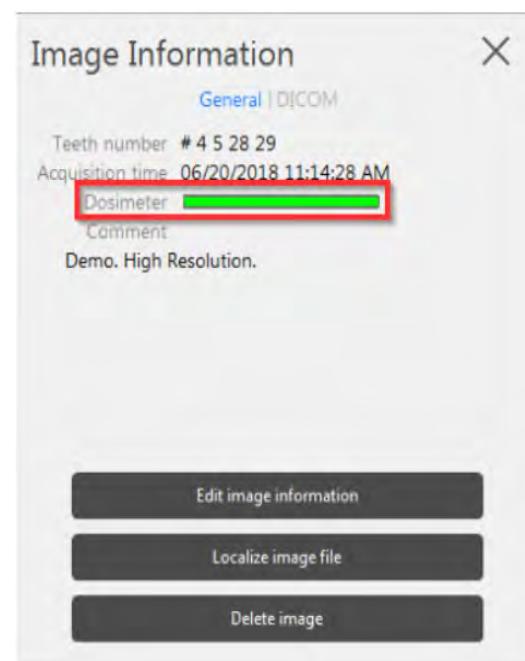
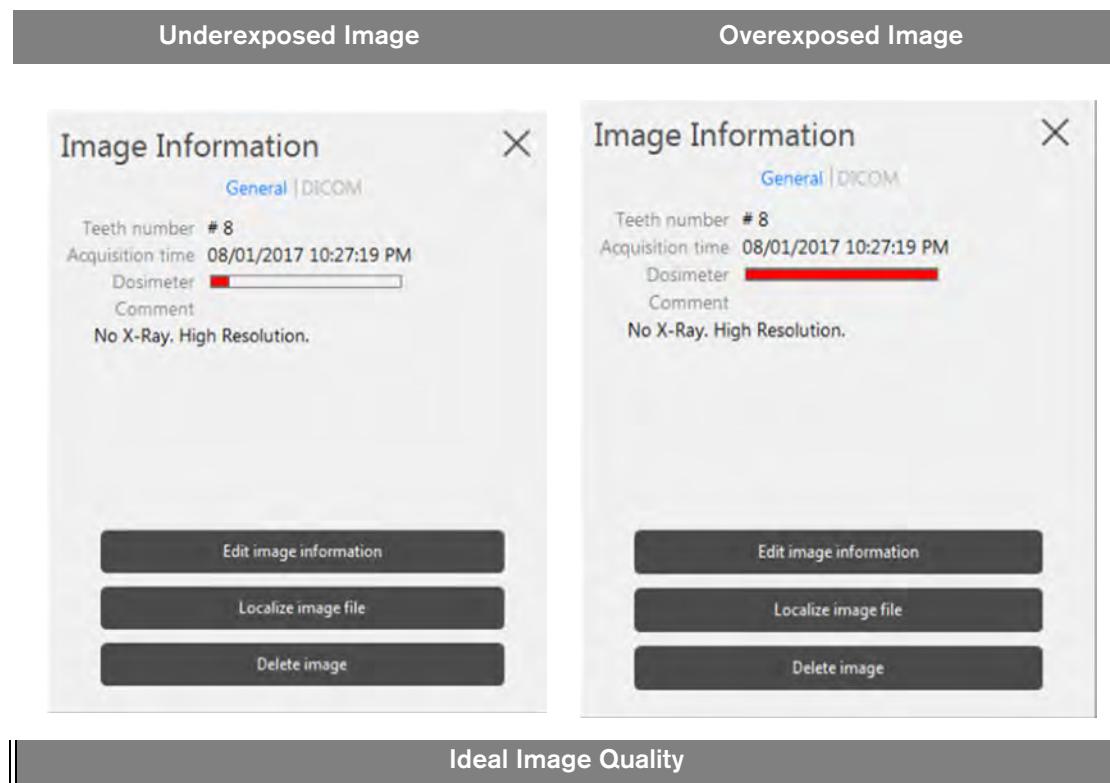


Important: After scanning the image, the scanner erases the imaging plate before ejecting it. The imaging plate is ready for re-use.

- 7 Check the image quality.



The ideal image quality is when the indicator of the quality of exposure is a full green bar in the Control Panel. Avoid underexposed or overexposed images indicated by a partial or full red bar.

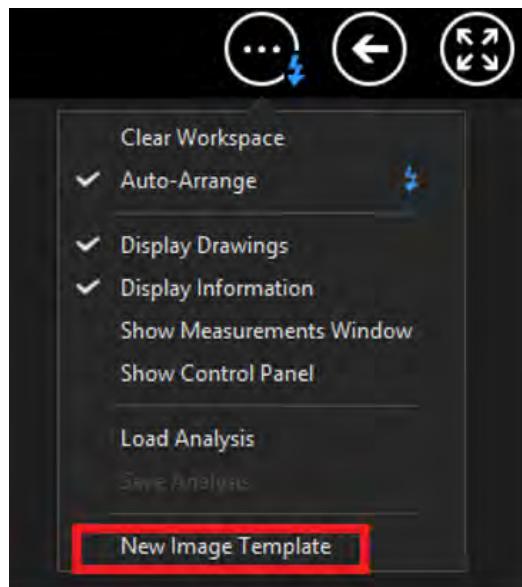


Acquiring Multiple Images

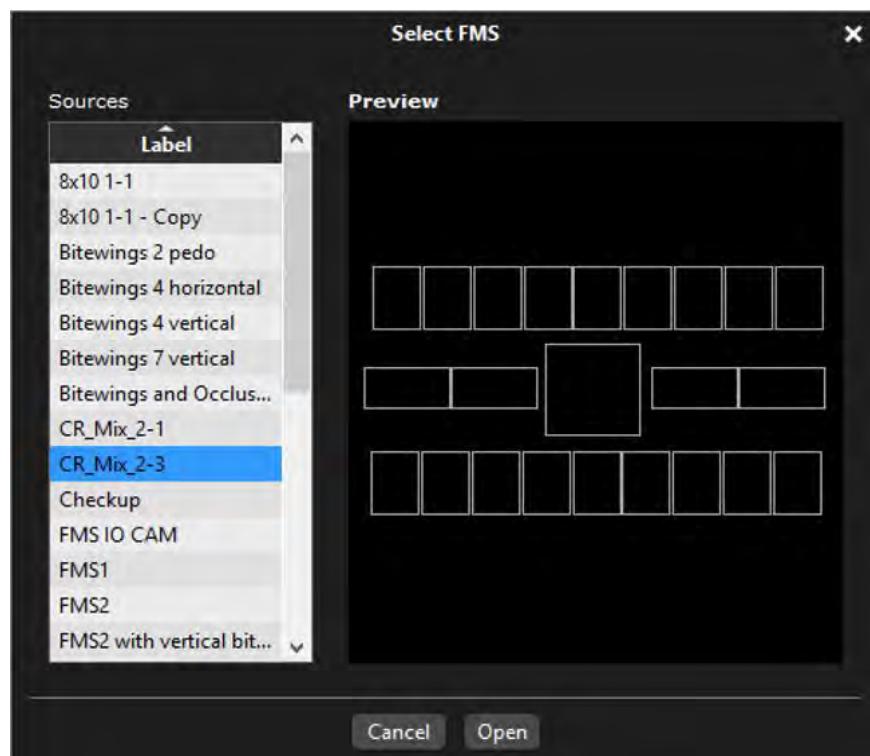
Preparing Acquisition of FMS Images

To prepare the acquisition of FMS images, follow these steps:

- 1 Access the **CS Imaging Software**. See “[Starting the Imaging Software](#)” on page 34.
- 2 Click **New Image Template** to access the **Select a format** window.



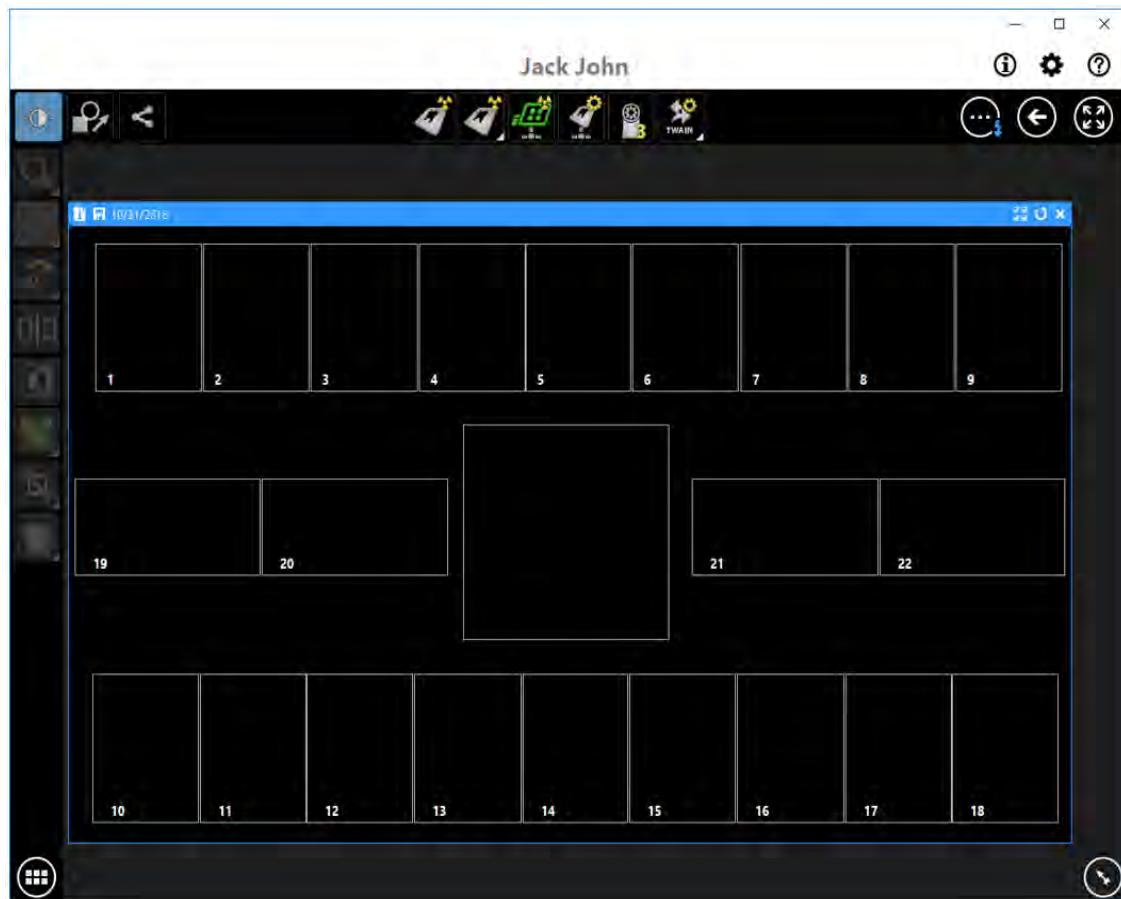
- 3 From the list of available formats (templates), select the required template and click **Open**.



If you try to change the FMS template after you have finished your image acquisitions, you are prompted with a warning that indicates that you risk losing some of the images.



The selected format is loaded and displayed in the Dental Imaging window. The first frame for scan is highlighted in green.



7

Acquiring Images Using Scan & Go

Introduction

This chapter describes the acquisition procedure for configurations with the Scan & Go device.



Note: Using the Scan & Go option streamlines and shortens the scanning process. The scanned image reaches its destination automatically; there is no need to select the destination workstation when scanning the imaging plate. In FMS mode, the image automatically populates its designated frame in the template.

A typical workflow consists of the following steps:

- Accessing the imaging window. See “[Starting the Imaging Software](#)” on page 34.
- When working with multiple images, selecting or “[Opening the Image Acquisition Interface](#)” on page 45.
- Preparing the imaging plates. See “[Preparing the Imaging Plates](#)” on page 35.
- Tagging the imaging plate with the Scan & Go. See “[Tagging the Imaging Plate with the Scan & Go](#)” on page 44.
- Placing the imaging plate in the patient’s mouth behind the selected tooth or teeth. See “[Performing the X-rays](#)” on page 44.
- Exposing the imaging plate to X-ray. See “[Performing the X-rays](#)” on page 44.
- Scanning the imaging plates. See “[Scanning the Imaging Plates](#)” on page 45.
- Removing the imaging plate from the patient’s mouth. See “[Performing the X-rays](#)” on page 44.
- Disinfecting the hygienic sheath. See “[Disinfecting the Hygienic Sheath and the Imaging Plates](#)” on page 66.
- Reviewing the scanned image on the image Acquisition interface. See “[Processing the Images](#)” on page 47.
- Storing the image in the CS Imaging Software. See “[Re-Tagging Imaging Plates](#)” on page 48.

Acquiring a Single Image Using Scan & Go



Note: Keep the image Acquisition interface open throughout your exam acquisition session; close it only after you have completed scanning and optimizing all images.

Starting the Imaging Software

Start your Imaging software. See “[Starting the Imaging Software](#)” on page 34.

Preparing the Imaging Plates

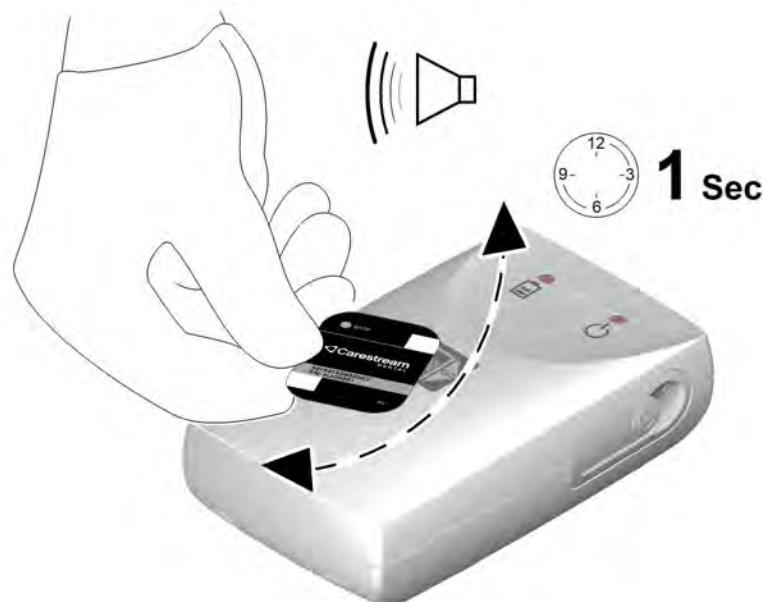
Prepare the intraoral imaging plate. See “Preparing the Imaging Plates” on page 35.

Tagging the Imaging Plate with the Scan & Go

To tag the imaging plate using a Scan & Go device, follow these steps:

- 1 Place the imaging plate near the Scan & Go device to record the exam acquisition data. The image Acquisition interface marks the corresponding frame as recorded (frame color changes to indicate recorded status).

Two audible beeps and two successive blinks of the green LED indicate the exam acquisition information was recorded.



- 2 Perform step 1 for each imaging plate.



Tip: To display the imaging plate's tagged information at any time, place the imaging plate on top of the Scan & Go device, and check the Imaging plate Scan & Go information in the **Settings-Imaging plate information** tab.

To record exam acquisition data on an imaging plate that was already recorded, see “Acquiring Multiple Images (FMS) Using Scan & Go” on page 45.

Performing the X-rays

Perform the required X-rays according to your clinical procedure. See “Performing the X-rays” on page 36.

Scanning the Imaging Plates

To scan the imaging plates:

- 1 Perform steps 1 - 3 of "Scanning the Imaging Plates" on page 37.



Note: After the imaging plate has been scanned, the image is sent straight to the previously assigned workstation.

- 2 Perform steps 6 - 7 of "Scanning the Imaging Plates" on page 37.

Acquisition-Related Procedures

See "Processing the Images" on page 47.

Acquiring Multiple Images (FMS) Using Scan & Go

Starting the Imaging Software

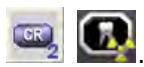
Start your Imaging software. See "Starting the Imaging Software" on page 34.

Opening the Image Acquisition Interface

To open the image Acquisition interface, follow these steps:

- 1 Click the **Imaging** window icon. (Alternatively, double-click the selected patient name.) The patient's imaging window opens.
- 2 To access the image Acquisition interface, select one of the following two modes:

CS 7600 FMS mode (Template mode), examples of the icons



- 3 To change the scanning resolution for this exam acquisition (for non Scan & Go configurations), go to the scanner resolution settings (see [page 55](#)).
- 4 Verify that the Scan & Go device is connected.

Preparing the Imaging Plates

Prepare the intraoral imaging plate. See "Preparing the Imaging Plates" on page 35.

Tagging the Imaging Plate with the Scan & Go

See "Tagging the Imaging Plate with the Scan & Go" on page 44.

Performing the X-rays

Perform the required X-rays according to your clinical procedure.

Scanning the Imaging Plates

After the imaging plate has been scanned, the image is sent to the previously assigned workstation to the proper frame it was tagged to in the FMS. See "Scanning the Imaging Plates" on page 37.

Acquisition Related Procedures

See "Processing the Images" on page 47.

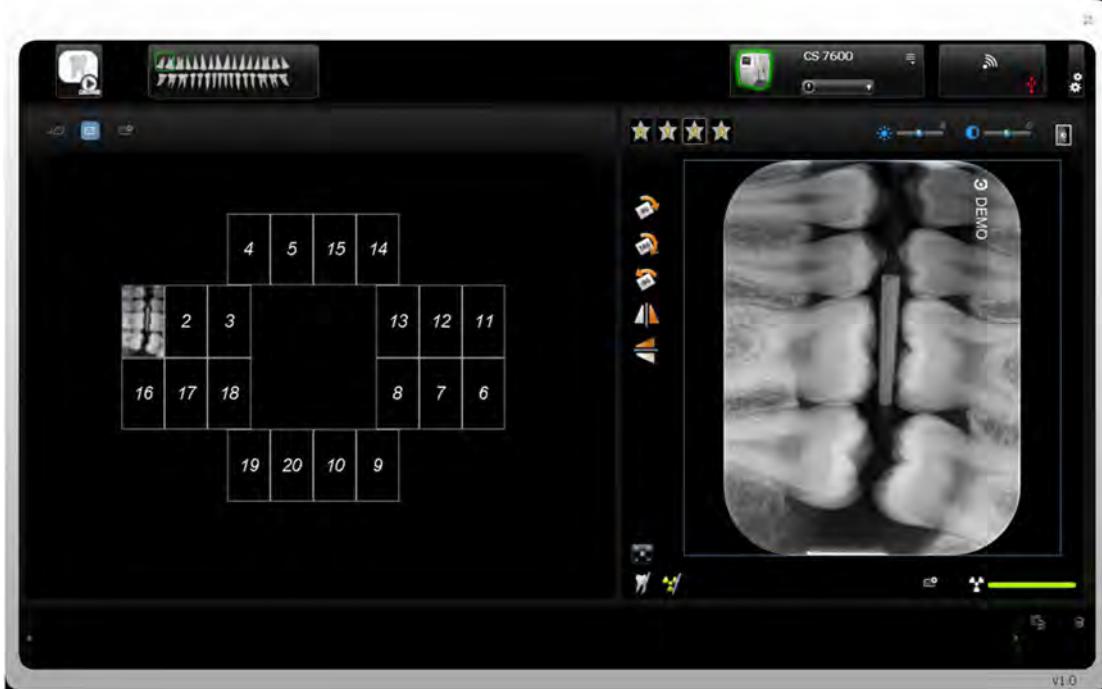
8 Acquisition-Related Procedures

Processing the Images



Important: The imaging plate has a marker attached to its inactive side. It will indicate if the imaging plate has been exposed from the wrong side contrary to its intended use. If the shadow of the marker is visible in the X-ray image, the imaging plate was exposed from the inactive side contrary to its intended use. The image orientation can be corrected using the mirroring tool in the acquisition software. If a diagnosis is not possible in the area of the marker, the X-ray should be repeated.

Figure 13 Image Acquisition Interface



To process the scanned images from your workstation, follow these steps:

- 1 The scanned image populates the first available frame. If there is no such frame (all frames are occupied, applicable only when working with FMS mode), the image is routed to the Image Gallery. In image acquisition mode, a new frame is added to the images layout.

For manual reordering of the frames, drag and drop the image to the desired frame. If the frame is populated with an image, the former image in the frame will be moved automatically to the Image Gallery when the new image is dropped within it.



Note: When exiting the image Acquisition interface, images stored in the Image Gallery are sent to the Imaging Software database.

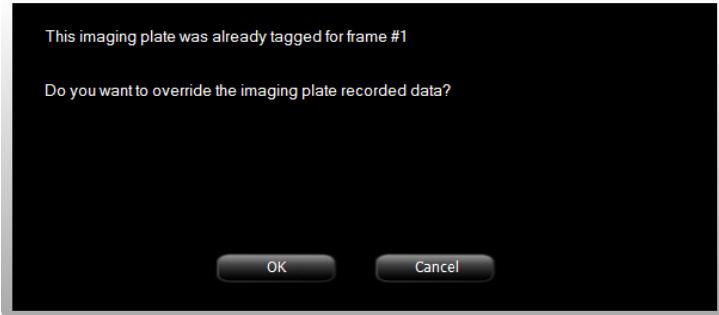
- 2 Use the image Acquisition interface processing options to optimize the image. See “CS 7600 Image Acquisition Interface Overview” on page 27.

- 3 Click **×** **Close** (top-right corner) to exit the image Acquisition interface and return to the Imaging Software. Images are transferred from the CS 7600 image Acquisition interface to the Imaging Software automatically.

Re-Tagging Imaging Plates

To tag an imaging plate that was already recorded with exam acquisition information (re-tagging), follow these steps:

- 1 Place the imaging plate on the Scan & Go device. The following prompt is displayed.



- 2 Click **OK** to re-tag this imaging plate. The imaging plate is tagged with the current exam acquisition and the current active frame information. If you do not want to re-tag the imaging plate, either remove the imaging plate from the Scan & Go surface or click **Cancel** in the overwrite prompt. The current tagged data as displayed in this prompt remains unchanged.
- 3 Wait until the exam acquisition information tagging is completed as indicated by audible beeps, successive short flashes of the blue LED, and a change of color in the frame border and number.

Storing the Images

Image management (storage and retrieval) is performed through the Imaging Software. See your CS Imaging Software documentation.

Clearing Scanner Memory

When the CS 7600 image Acquisition interface is open at the designated workstation, the scanned imaging plate image is automatically routed to the correct exam acquisition.

If the CS 7600 image Acquisition interface is closed, the scanned imaging plate image is stored in the scanner's memory. The scanner's storage capacity is 25 images.

To clear the scanner's memory, see ["Clearing Scanner Memory" on page 62](#).

Erasing the Imaging Plates

The imaging plates are automatically erased and ejected after their information is scanned. Exposure to light, and so forth, requires manually erasing the imaging plates before use. To erase the imaging plate manually, see ["Erasing the Imaging Plates" on page 26](#).



Note: Erasing the imaging plate manually does not erase the recorded exam acquisition information.

9 Scanner Settings

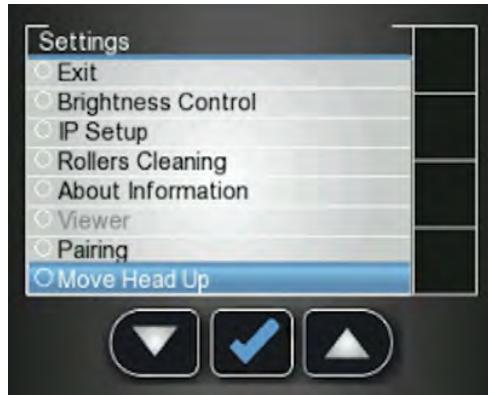
General

The following scanner settings are explained in this chapter:

- Brightness Control. See “[Brightness Control](#)” on page 50.
- IP Setup. See “[IP Setup](#)” on page 50.
- Rollers Cleaning. See “[Cleaning the Scanner Rollers](#)” on page 71.
- About Information. See “[Scanner Info](#)” on page 25.
- Viewer. See “[Viewer](#)” on page 52.
- Pairing, creates a direct PC-to-scanner link for chairside use. See “[Creating a Peer-to-Peer Connection](#)” on page 60 and “[Disconnecting a Peer-to-Peer Connection](#)” on page 61.
- Clearing Scanner Memory. See “[Clearing Scanner Memory](#)” on page 62.

Scanner Settings

To open the scanner settings, press **Settings** . The **Settings** menu is displayed.



In the **Settings** menu, you are presented with the following options:

- **Brightness Control**. See “[Brightness Control](#)” on page 50.
- **IP Setup**. See “[IP Setup](#)” on page 50.
- **Rollers Cleaning**. See “[Cleaning the Scanner Rollers](#)” on page 71.
- **About Information**. See “[Scanner Info](#)” on page 25.
- **Viewer**. See “[Viewer](#)” on page 52.
- **Pairing**, enables you to create a peer-to-peer (P2P) link between a scanner and computer. See “[Creating a Peer-to-Peer Connection](#)” on page 60 and “[Disconnecting a Peer-to-Peer Connection](#)” on page 61.

Brightness Control

- 1 In the **Settings** menu, press  to select **Brightness Control**, and press . The **Brightness Control** screen is displayed.



- 2 Press  and  to lower or raise the brightness, and press . The brightness is set, and you are returned to the scanner **Insert Plate** screen.

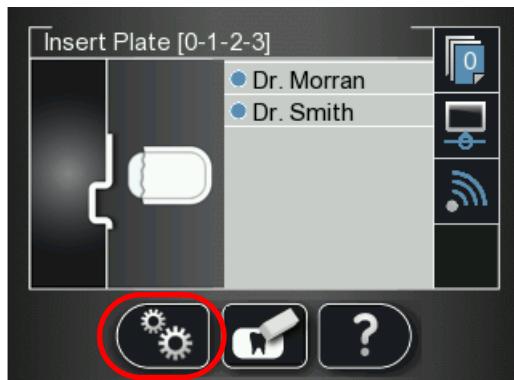
IP Setup



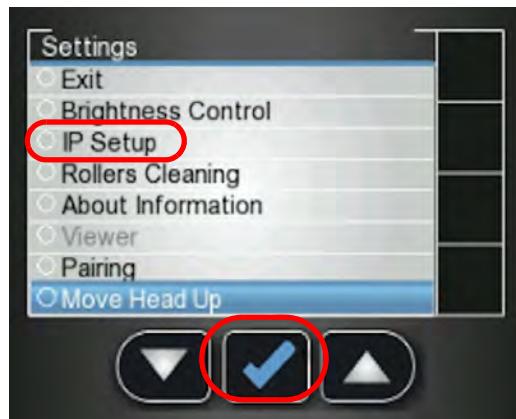
Important: Do not perform any action in the IP Setup without direct supervision from a dental service engineer or Carestream Dental representative.

To manually set the scanner's IP address, follow these steps:

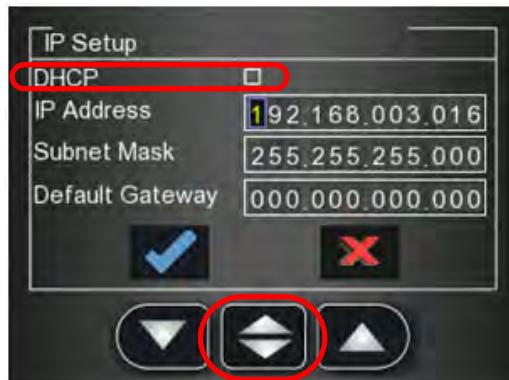
- 1 Press  to access the **Settings** menu.



The **Settings** screen is displayed.



- 2 Press the scanner's left function button to scroll down to **IP Setup**, and press . The **IP Setup** screen is displayed.



Note: The **DHCP** automatically detects the scanner IP address. If you are using a peer-to-peer link, you must leave the **DHCP** option **unchecked**.

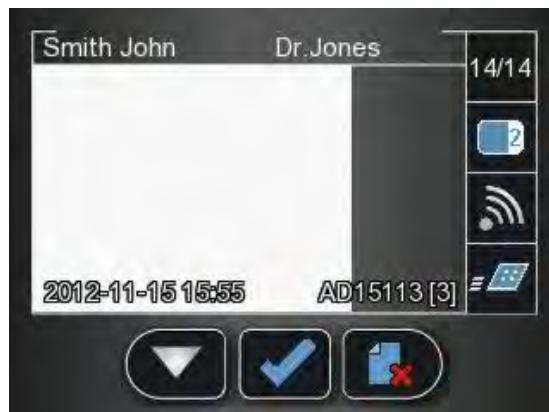
- 3 Press and to find the **DHCP** option, and press to check/uncheck the **DHCP** option.
- 4 Press and to reach the digit you wish to change, and press . The digit is ready to be modified and is highlighted in blue.
- 5 Press and to increase/decrease the value of the selected digit, and press . The digit is modified.
- 6 Navigate to the next digit you need to change, and change it according to the above instructions.
- 7 To apply all changes and exit the **IP Setup** screen, press to reach (highlighted in blue), and press .

8 To exit the **IP Setup** screen without saving changes, press  to reach  (highlighted in blue), and press . The **IP Setup** screen closes, and you are returned to the scanner **Insert Plate** screen.

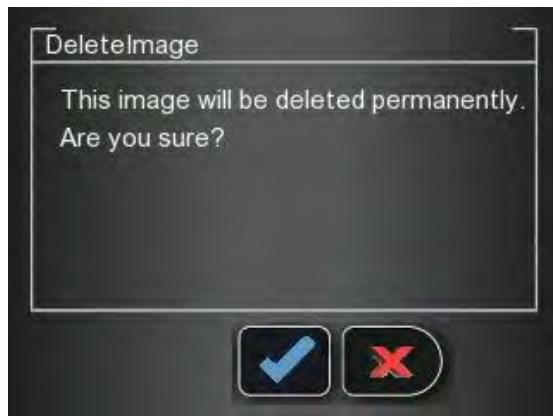
Viewer

The **Viewer** enables you to browse and delete images archived on the scanner's memory.

- 1 In the **Settings** menu, press  to select **Viewer**, and press . The **Viewer** screen is displayed.



- 2 In the **Viewer** menu, press .
- 3 If you reach an image that you want to delete, press , the delete icon. A **Delete Image** confirmation window is displayed.



- To delete, press 
- To cancel the deletion, press 

4 To close the **Viewer**, press 

Working with Settings



To open the **Settings** window, click **Settings** 

You are presented with three tabs:

- **General Settings.** See “General Settings Tab” on page 53.
- **Scan & Go.** See “Scan & Go Tab” on page 57.
- **Scanners Connections.** See “Scanners Connections Tab” on page 58.

General Settings Tab

In the **General Settings** tab you are able to set the defaults for image acquisition.

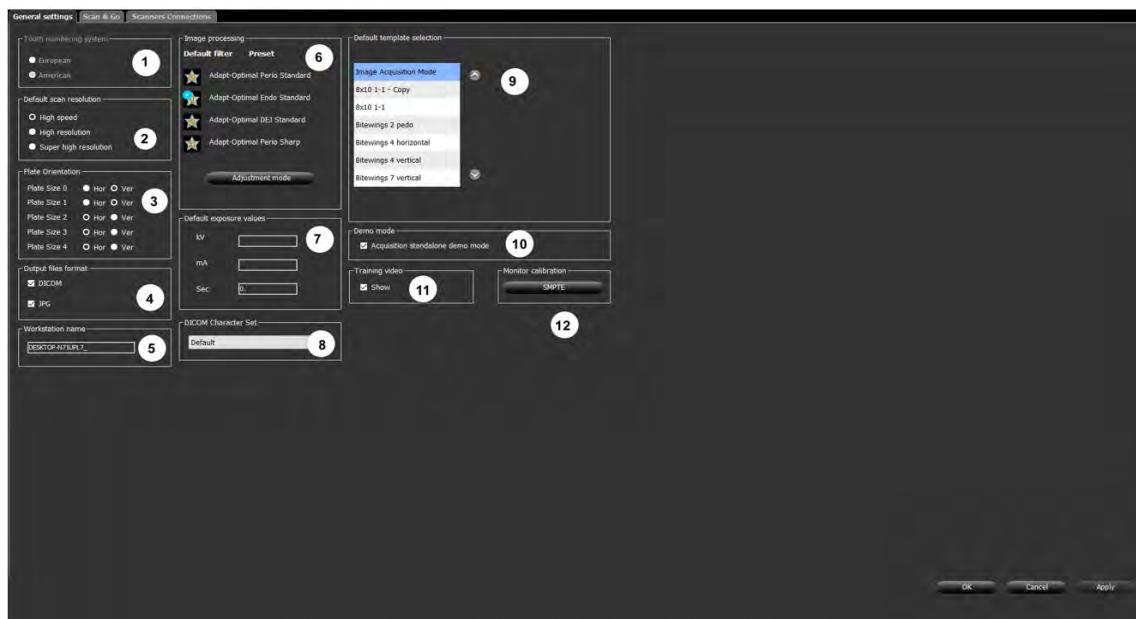


Table 3 Image Acquisition Interface General Settings Key

1	Tooth Numbering System	Set the tooth numbering system (European or American). When using individual tooth selection, the tooth number is stored in the image's DICOM tags.
2	Default Scan Resolution	<p>Set the default scan resolution for images to be scanned.</p> <p>Note: This does not change the scanner's default resolution, which is for images scanned when the image Acquisition interface is not connected to the scanner (No ID images). The scanner's default resolution is High Speed.</p> <p>Note: Any changes made in the image Acquisition interface when the scanner is linked peer-to-peer to the image Acquisition interface automatically change the scan resolution in the scanner.</p>
3	Plate Orientation	Set the default plate orientation to vertical or horizontal to ensure correct orientation.
4	Output Files Format	The scanned image save file format. Scanned images are always saved as DICOM files, and there is also an option to save the scanned image in JPEG format.
5	Workstation Name	If needed, change the workstation name by entering the new name.
6	Image Processing	<p>Default filter and Preset:</p> <p>Set the default filter to be applied to the acquired image. (The installation default is Endo). The image processing is managed by CS Adapt.</p> <ul style="list-style-type: none"> • Perio (Periodontal) filter: Designed to assist in detecting disease or inflammation in the interface between the gum (gingival part) and the bone. • Endo (Endodontic) filter: Provides overall good contrast and look of the image, with a high-quality view of the root canals. It reveals any diseases or injuries that affect the root tips or nerves in the teeth. • DEJ (dentine to enamel junction) filter: Designed to improve the contrast resolution between the dentine and the enamel. It enables the dentist to detect small caries and evaluate the inspected region. <p>Preset enables setting default image processing filter presets that are applied after the image is acquired.</p> <ul style="list-style-type: none"> • Sharp: Sharpening filter for the sharpest look, contrast transition emphasis. • Soft: Soft look, smooth transition from high to low density. • Standard: Intermediate processing, between sharp to soft. <p>Adjustment mode: Imaging processing adjustment mode enables setting the optimal filter and preset combinations for each filter type.</p> <p>Note: If you acquire images in Adjustment mode, they are saved under the patient in the imaging software database.</p>
7	Default Exposure Values	Enter the default X-ray exposure values to be added to all scanned images' attributes (DICOM tags).
8	DICOM Character Set	<p>Note: Only your IT administrator should change these settings.</p> <p>Select the correct DICOM character set encoding for the country and area to ensure the information is rendered correctly on DICOM viewers.</p>
9	Default Template Selection	Set the template used when opening a new exam acquisition, or change the current template (applicable to a newly opened acquisition session ONLY, before images have been retrieved from the scanner).

Table 3 Image Acquisition Interface General Settings Key

10	Demo Mode	This option puts the Demo Mode icon  in the top-left corner of the Image Acquisition window and populates one frame in the Image Display Area with a demo image each time the icon is selected. Tip: Use for setting default presets in Adjustment mode.
11	Training Video	Select the option to show the training video.
12	Monitor Calibration	Displays an SMPTE screen for monitor calibration.

Working with the General Settings Tab

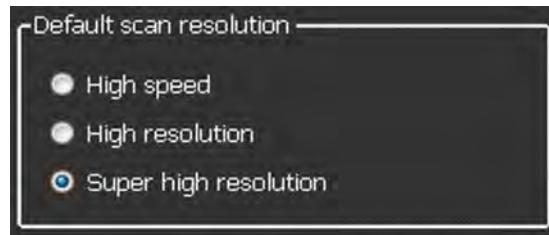
To work with the **General Settings** tab, follow these steps:

- 1 Click **Settings**  to open the **General Settings** tab.
- 2 In the **Tooth Numbering System** area, select the **European** or **American** option.
- 3 In the **Default Scan Resolution** area, select the default resolution for scanning.
- 4 In the **Default Orientation** area, select the direction that the image is to be turned, clockwise or counter clockwise.
- 5 In the **Output Files Format** area, select the **JPG** option if you want the images to be saved in JPEG format as well as the default DICOM format.

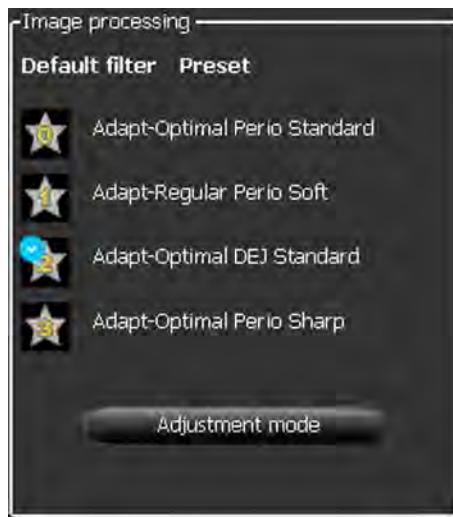


Note: In the **Output Files Format** area, the **DICOM** selection box cannot be deselected.

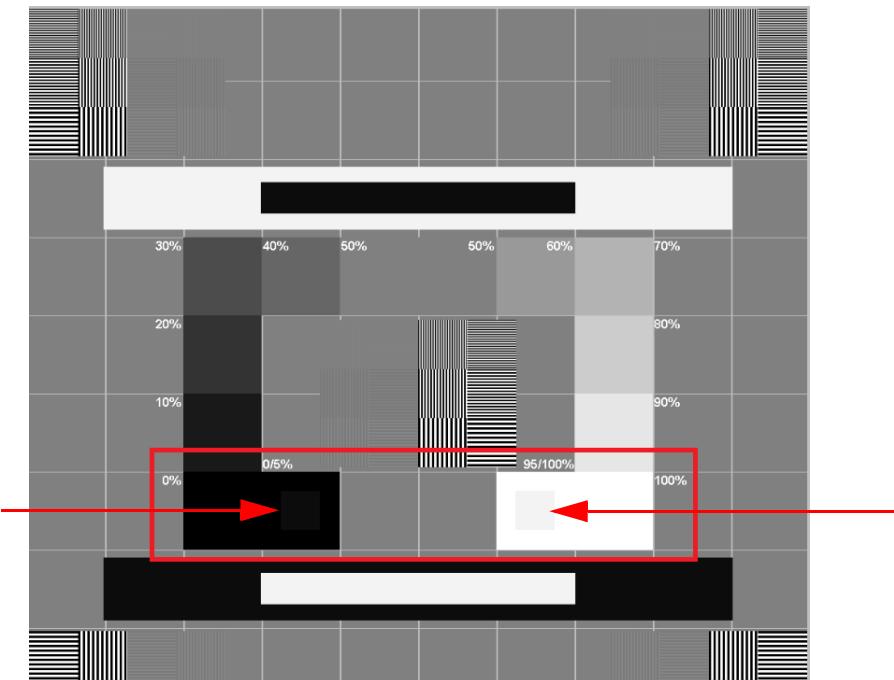
- 6 To select a default scan resolution and CS Adapt filters, do the following:
 - In the **Default scan resolution** area, select **High Speed**, **High Resolution**, or **Super High Resolution** for the scan resolution.



- Click **Adjustment Mode** to change the default filter in CS Adapt.



- To display the SMPTE screen, in the Monitor calibration area, click **SMPTE**. The SMPTE window is displayed.

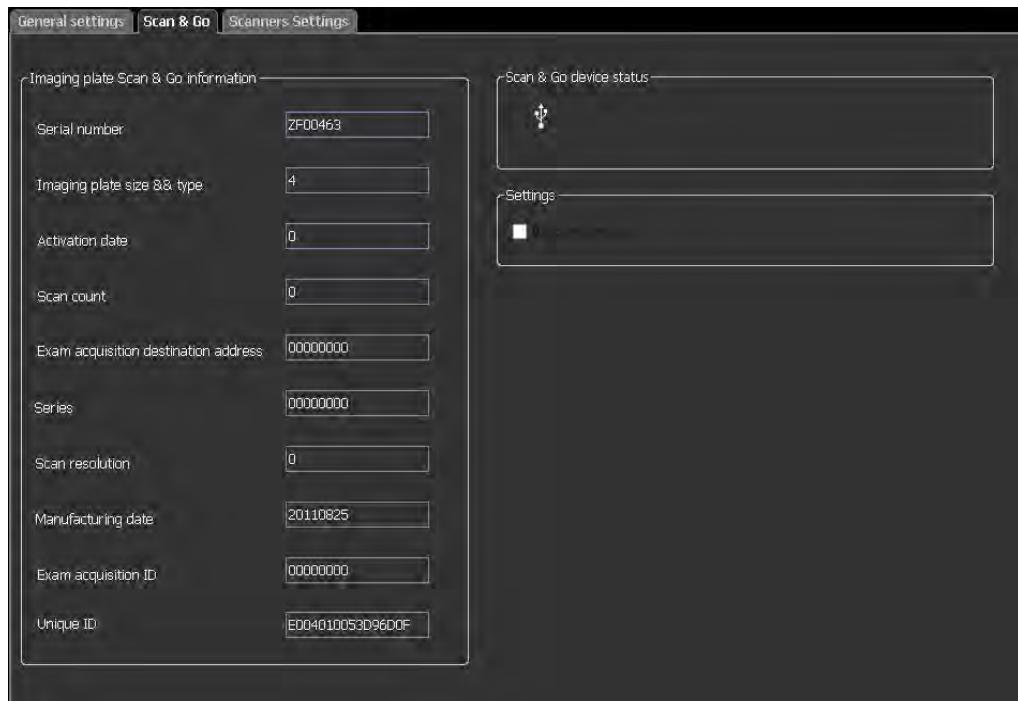


- Use the monitor brightness & contrast controls until you clearly see the 5% and 95% calibration squares located in the 0% and 100% areas (indicated by red arrows in the image above).
- In the **Settings** tab, when you have finished selecting your general settings, click one of the following:
 - Click **Apply** to apply your settings.
 - Click **Cancel** to exit to the main screen without saving changes.
 - Click **OK** to save the changes and exit to the main screen.

Scan & Go Tab

The **Imaging plate Scan & Go information** fields are populated with the imaging plate's identifying information when it is placed on the Scan & Go device.

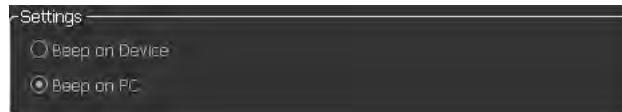
Figure 14 Scan & Go Tab



The **Scan & Go** tab contains the following information:

- **Serial Number**
- **Imaging Plate Size & Type**
- **Activation Date**—The date of the first time the plate was used.
- **Scan count**—The number of times the plate has been scanned.
- **Exam Acquisition destination address**
- **Series**—Frame identification number.
- **Scan resolution**
- **Manufacturing date**—The date the plate was manufactured.
- **Exam Acquisition ID**
- **Unique ID**
- **Scan & Go device status**—Shows if the Scan & Go is connected  (white icon) or not connected  (red icon).

- **Beep on Device** option—When the **Beep on Device** option is selected, the Scan & Go makes a sound each time an imaging plate is tagged. If the **Beep on PC** option is selected, a sound is made on the PC each time an imaging plate is tagged.



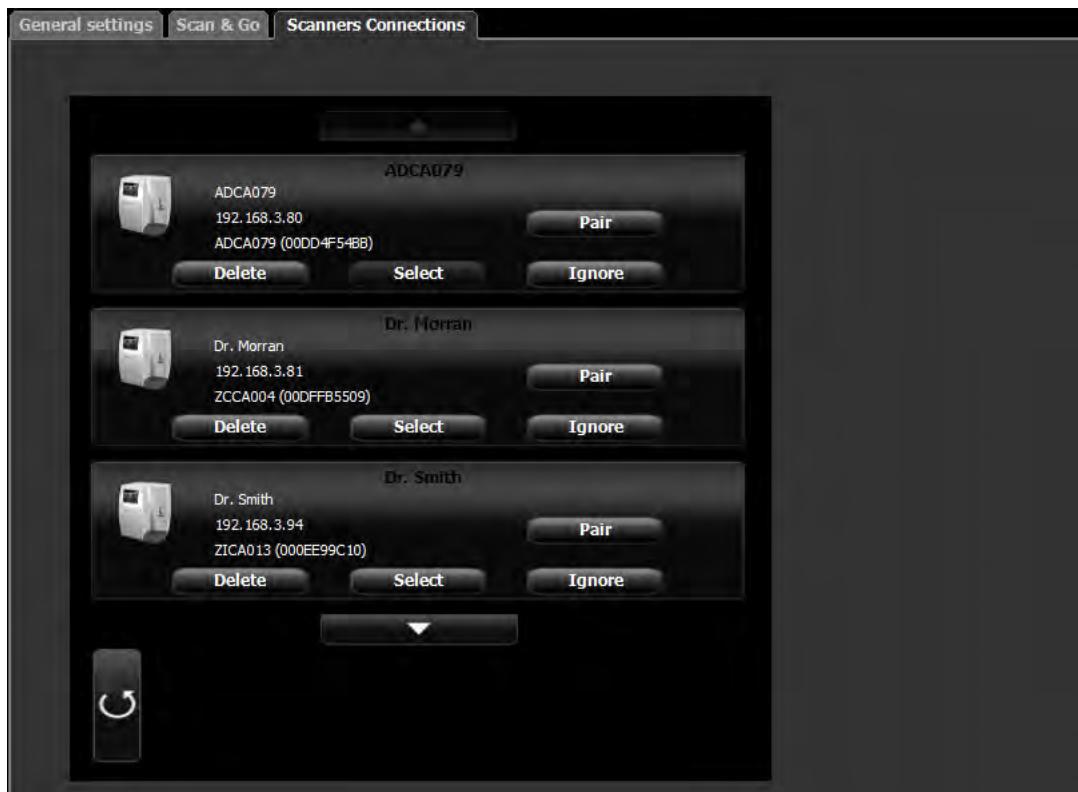
Note: The Imaging plate Scan & Go information in the **Scan & Go** tab is read-only.

Scanners Connections Tab

In the **Scanners Connections** tab, you are able to perform the following:

- **Delete** a scanner connection that is no longer being used (after a scanner has been replaced).
- **Pair/Unpair** a peer-to-peer link between a scanner and a workstation.
- **Connect/Ignore** a scanner from the active Scanner List.
- Rearrange the Scanner List by clicking the **Select** button, which moves the scanner to the top of the Scanner List.

Figure 15 Scanners Connections Tab



Working with the Scanners Connections Tab

To work with the **Scanners Connections** tab, follow these steps:

- 1 To remove a scanner from the **Scanner List**, click **Ignore**.
- 2 To add a scanner to the **Scanner List**, click the **Connect** button for that scanner.



Note: If there are scanners on the network which you do not want to use, click **Ignore**.

- 3 To completely remove a scanner that is no longer being used from the **Scanners Connections** tab and the image Acquisition interface, click **Delete**.



Note: Scanners connected to the system will still be detected and added to the list of scanners in the **Scanners Connections** list after restarting the image Acquisition interface.

- 4 In the image Acquisition interface, click one of the following:
 - Click **Apply** to apply your settings.
 - Click **Cancel** to exit to the main screen without saving changes.
- 5 Click **OK** to save the changes and exit to the main screen.

About Peer-to-Peer Connection

A peer-to-peer (P2P) connection creates a dedicated link between a scanner (or more than one scanner) and a dedicated workstation. When a plate is scanned with a peer-to-peer connection, there is no need to select a workstation/room or press the middle scanner button. The scanner automatically scans the plate as soon as it is fed into the scanner and sends the image to the paired workstation.



Tip: If your workstation is the only one using a particular scanner, you can save time—not having to select a scanner each time you make a scan—by making a peer-to-peer link from the scanner to the computer.

There are four possible peer-to-peer statuses:

- **Available for Peer-to-Peer connection**—The scanner is available for a direct peer-to-peer connection. This status may be identified when the **Pair** button is available.
- **Paired**—The scanner is connected peer-to-peer to this workstation. This status may be identified when the **Paired** message is shown and the **Unpair** button is available.
- **Paired to Doctor x**—The scanner is already connected peer-to-peer to another workstation.
- **Unavailable for Peer-to-Peer**—This status is displayed when a scanner in the **Scanner List** is not connected to your workstation or any other workstation and is not available for connecting to your workstation. This may be identified by the absence of the **Pair** button , **Paired** , and **Paired to** messages.



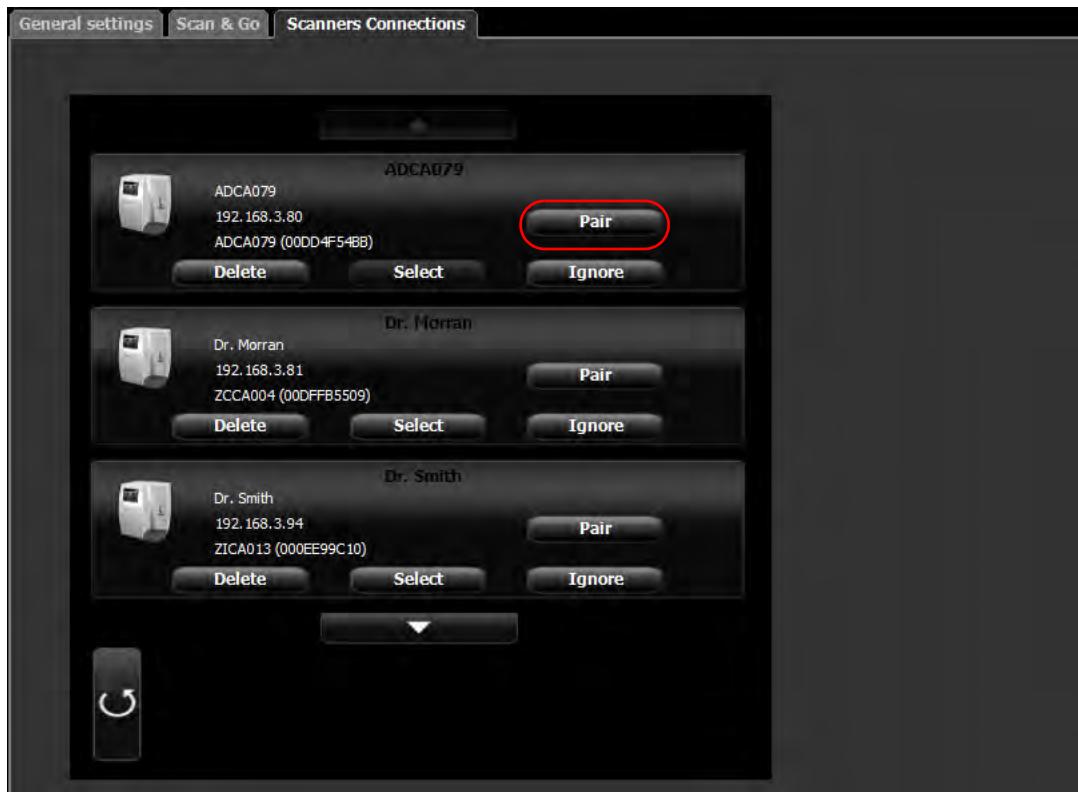
Note: The tagged imaging plate is sent to the proper room, defined by Scan & Go, even when in peer-to-peer mode.

A peer-to-peer connection makes a scanner dedicated to a workstation. This saves time by not having to select a scanner each time you make a scan.

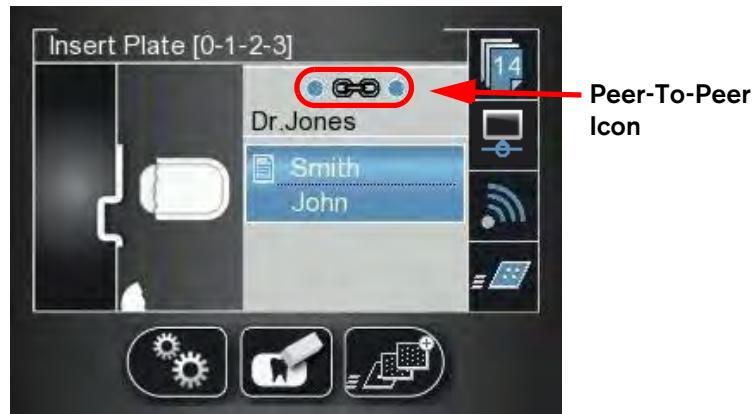
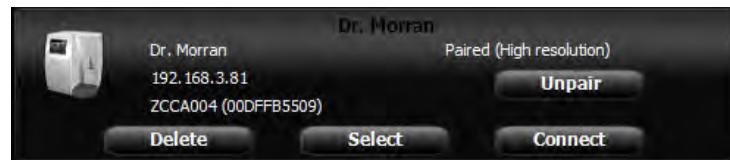
Creating a Peer-to-Peer Connection

To create a peer-to-peer connection, do the following:

- 1 In the **Scanners Connections** tab, click the **Pair** button on the scanner you want to pair with the image Acquisition interface.



The status (located above the **Pair/Unpair** button) changes from **Connected** to **Paired**, and the **Pair** button changes to **Unpair**.



The peer-to-peer icon is displayed on the scanner.



Note: If you change the resolution on the Scanner LCD, the change in resolution will only take place upon the next scan or image acquisition.

Disconnecting a Peer-to-Peer Connection

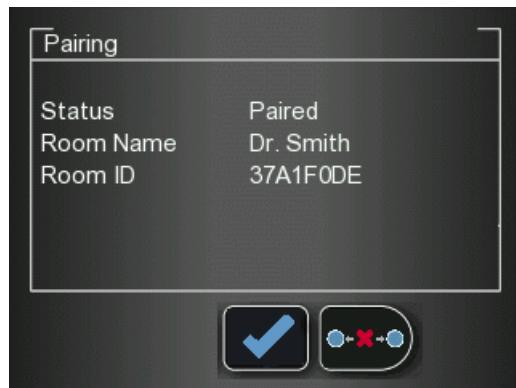
Disconnecting a peer-to-peer connection can be done from the image Acquisition interface or from the **Scanner** interface.

To unpair the scanner, follow these steps:

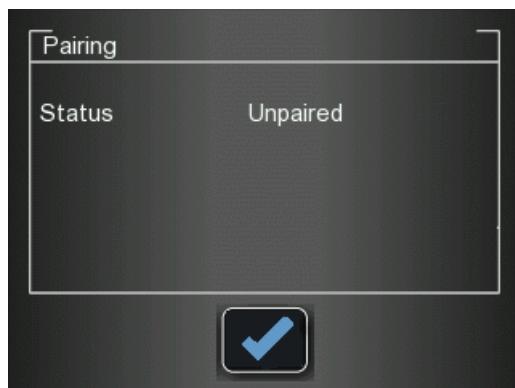
- 1 In the **Scanner** interface, press  **Settings**. The **Scanner Settings** menu opens.



2 Press  to select **Pairing**, and press . The **Pairing** status screen opens and shows a **Paired** status.



3 Press  and press . The **Pairing** status screen shows an **Unpaired** status.



Clearing Scanner Memory

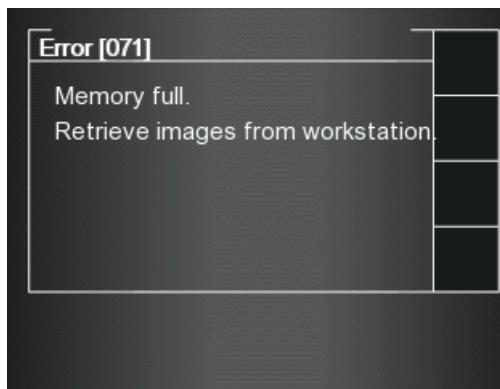
The scanner's storage capacity is 25 images. Images are stored in the scanner's memory in the following cases:

- When **No ID** is selected in the scanner's Select patient screen.
- When the destination workstation is not available due to network problems and so forth.

When the scanner's memory nears its limit, the scan number icon changes to red.



When the memory is full, error **071: Memory full. Retrieve images from workstation** is displayed.



To clear the scanner's memory, follow these steps:

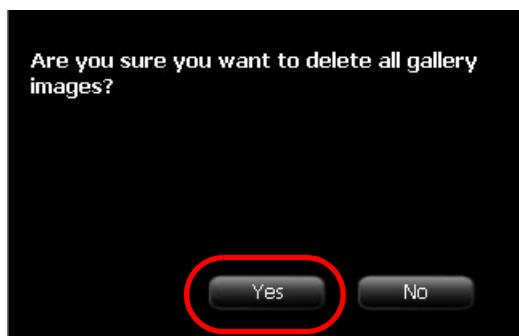
- 1 Start the CS 7600 image Acquisition interface.
- 2 Open the exam acquisition to which the images belong, or, alternatively, create a new temporary exam acquisition in which you will save these images.
- 3 Select the scanner; it is indicated by the following full memory/error state icon:



- 4 In the **Scanner List**, select the desired scanner and click the small arrow . The list of No ID images for this scanner is displayed.
- 5 In the scanner memory panel, select the image you want to clear. Drag the image to the desired frame in the images area template, or delete the image by dropping it in the Image Gallery.



- 6 To delete all the images in the Image Gallery, click . A prompt is displayed.



- 7 To confirm, click **Yes**. All the images are removed from the Image Gallery. The scanner is now



highlighted green , indicating that the scanner is ready for use.

10 Maintenance

Imaging Plate Care

If used with care, the imaging plates can be used indefinitely until physically damaged. However, the imaging plates will show wear over time due to continuous use. Inspect the imaging plates regularly and replace them if they are scratched and/or show signs of excessive wear.



CAUTION: To prevent damage to the imaging plates and the possibility of image artifacts, avoid contact between the imaging plates and the following materials/solutions/solvents: Isopropyl alcohol, hydrogen peroxide, and other peroxides; citrus-based cleaners, hand lotions, and waterless hand sanitizers, as well as surfactants and lubricants.

Handling and Storage of Imaging Plates

- Imaging plates should be stored in their original packing or storage box when they are not in use. Always store imaging plates in a dark and dry place.
- Do not expose the imaging plates to light for long periods as this can have a degrading effect.
- Do not store imaging plates in hot or moist conditions.
- Do not fold, crease, or bend the imaging plates.
- Avoid touching the active side of the imaging plates, and be careful not to drag the active side of the imaging plate across any surface, as this will damage the imaging plate.
- Do not leave imaging plates where they can become damaged by liquid or chemical spills.
- Do not autoclave.

Cleaning the Imaging Plate



CAUTION: Read and follow the instructions in the Safety Data Sheets (SDS) for Screen Cleaner P/N 1030428.

Clean the imaging plate to remove dirt, dust particles, fingerprints, and so forth, that could affect image quality.

Cleaning Materials

- Clean, dry, non-abrasive, lint-free wipes or cloths
- Screen Cleaner P/N 1030428 (Ask your Carestream Dental representative.)

Cleaning Method

To clean the imaging plates, follow these steps:

- 1 Fold a non-abrasive, lint-free wipe or cloth and dampen with a small amount of the solution. Be careful not to pour the solution directly on the imaging plate. Excessive amounts of the screen cleaner may damage the imaging plate.
- 2 Wipe the imaging plate thoroughly dry with a clean, dry, non-abrasive, lint-free cloth to remove residual cleaner. DO NOT LEAVE THE IMAGING PLATE TO AIR-DRY. Apply pressure to remove persistent dirt, if necessary.

Disinfecting the Hygienic Sheath and the Imaging Plates



CAUTION: Do not soak the hygienic sheath in any cleaning or disinfecting solutions. Do not autoclave; autoclaved hygienic sheaths must be discarded.

Frequency of Disinfection

The hygienic sheath is the primary means of infection control and protection from contaminated imaging plates.

Disinfect the imaging plate **after every use** (after the image plate is scanned), before it is inserted in the hygienic sheath for the next use.

Disinfection Solutions

To disinfect, use either a self-prepared solution or a commercially prepared product that adheres to the following specifications and restrictions:

- Diluted bleach solution: Dilute one part 5.25% sodium hypochlorite with ten parts of water.
- A commercially prepared equivalent solution of diluted bleach that does not contain any ingredients (Isopropyl alcohol, hydrogen peroxide and other peroxides; citrus-based cleaners, hand lotions, and waterless hand sanitizers, as well as surfactants and lubricants) that can cause damage to the hygienic sheaths and imaging plates.

Disinfection Method



CAUTION: If a commercially prepared equivalent solution of diluted bleach is used, follow the manufacturer's specifications and warnings.

To disinfect the hygienic sheaths and imaging plates, follow these steps:

- 1 Moisten thoroughly (but not dripping) a non-abrasive, lint-free cloth with the prepared diluted bleach and wipe the hygienic sheath clean.
- 2 After one minute, wipe off the bleach residue with a new, soft, lint-free cloth dampened with water.
- 3 Wipe dry with a non-abrasive, lint-free cloth.

Disposing of the Imaging Plate



Important: The imaging plate contains Barium and should be considered hazardous or special waste in specific conditions at the end of its useful service life. For disposal or recycling information, contact your local authorities.

Scanner Care

Cleaning the Scanner Body

Use disinfection wipes for medical equipment to clean the scanner body thoroughly from all sides, including the tray.



WARNING: It is the user's responsibility to disinfect the imaging plates tray daily to prevent cross contamination.

Cleaning the Detachable Insertion Panels

The CS 7600 makes use of three insertion panel sizes according to the inserted plate size (0, 1-3, and 4). The maintenance procedure is identical for all insertion panels.



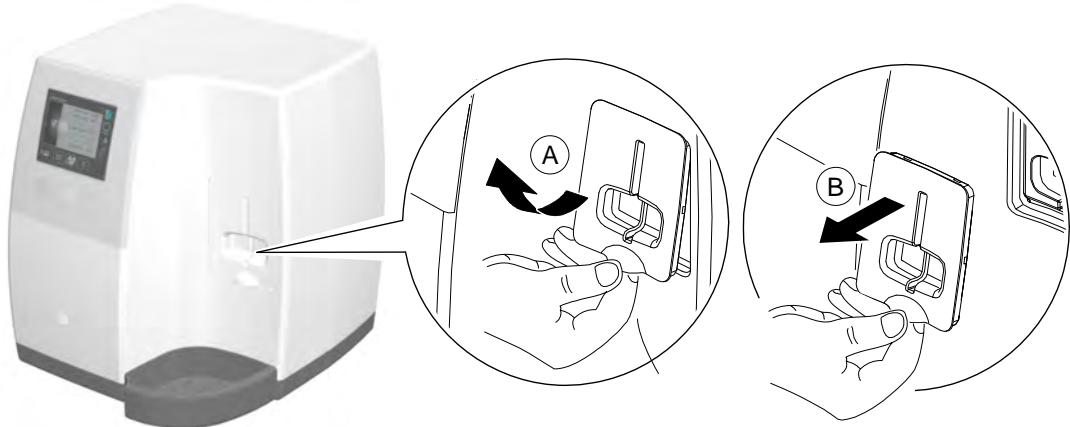
WARNING: It is the user's responsibility to disinfect the detachable insertion panel(s) daily to prevent cross contamination.



CAUTION: Do not autoclave; autoclaved detachable insertion panel(s) must be discarded.

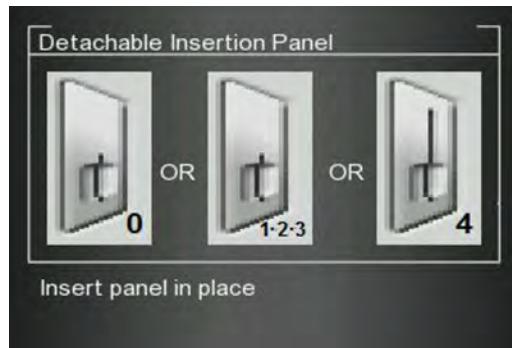
To clean and disinfect the insertion panels, follow these steps:

- 1 Remove the installed insertion panel by inserting a finger in the designated removal depression at the bottom of the insertion panel (A) and lifting out the insertion panel (B).

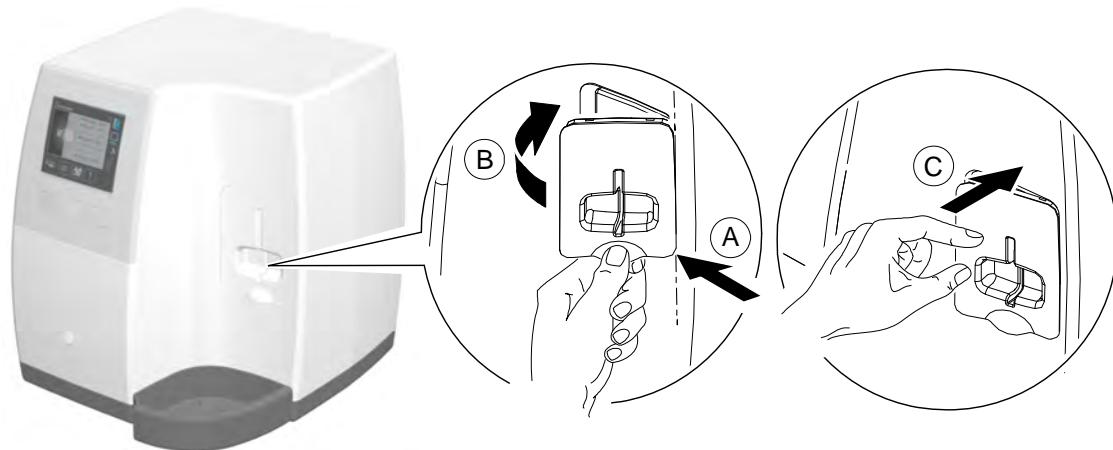


- 2 Use disinfection wipes for medical equipment to clean the detachable insertion panels thoroughly from all sides, including the slot.

3 The scanner displays a prompt to insert a size 0 (left figure in prompt), size 1-3 (middle figure in prompt), or a size 4 (right figure in prompt) insertion panel.



4 Install the cleaned and disinfected insertion panel by positioning the insertion panel at a 45 degree angle to the right side of the insertion panel's housing (A) and pressing the insertion slot panel in from right to left (B) until it is completely inserted (C).



The scanner displays an insertion confirmation.



5 Do one of the following:

- For size 0, press the left function button  to confirm and return to the main screen.
- For size 1-3, press the right function button  to confirm and return to the main screen.

If insertion panel 4 is inserted, the scanner displays the following insertion confirmation.



- For size 4, press the middle function button  to confirm and return to the main screen.

Cleaning the Scanner Rollers



Note: Before you perform this procedure, make sure you have the rollers cleaning plate.

The scanner rollers should be cleaned in the following cases:

- When the scanner prompts to clean the rollers (after every 1000 cycles).
- When there are dirt-related artifacts on the scanned image.

To clean the scanner rollers, follow these steps:

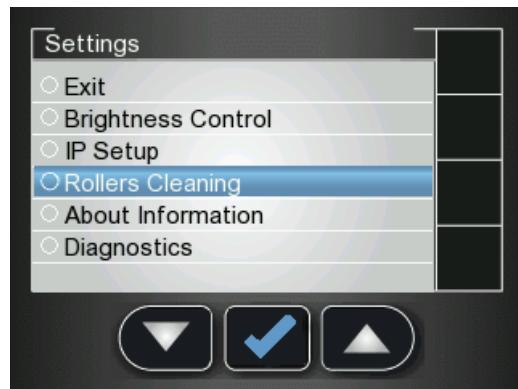


Note: Cleaning the rollers requires using the size 4 insertion slot.

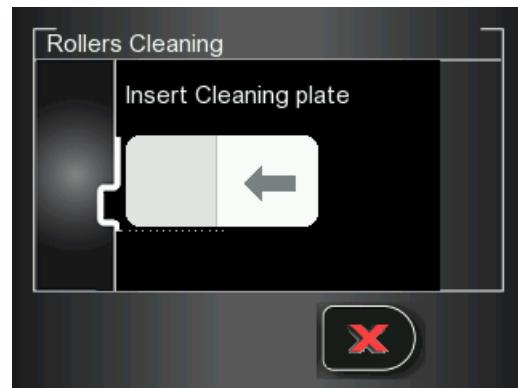
- 1 If the size 4 insertion slot is not installed, replace the insertion slot with the size 4 insertion slot. (See [page 68](#).)
- 2 Press the scanner's left function button to access the **Settings** menu.



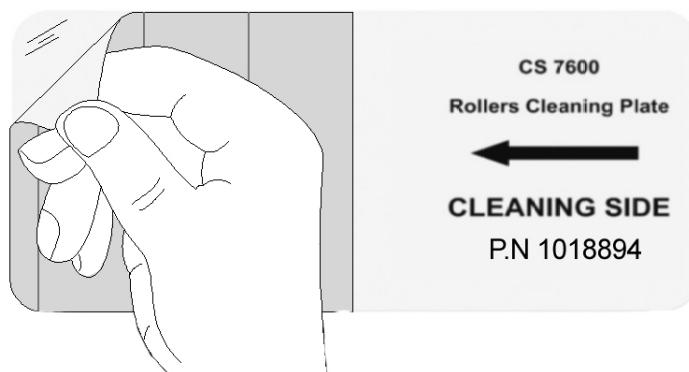
3 Select **Rollers Cleaning**.



4 Press the middle function button  to confirm the **Rollers Cleaning** message. The **Rollers Cleaning** screen is displayed.



5 Peel the adhesive protective sheet from the rollers cleaning plate.



- 6 Gently insert the rollers cleaning plate into the size 4 insertion slot with the adhesive side first and the black stripe facing downwards until the rollers draw the rollers cleaning plate in.



When the cleaning procedure is completed, the scanner displays a message that the roller cleaning is done.



- 7 Remove the rollers cleaning plate from the insertion slot.



Tip: Repeat the cleaning procedure 3 times to ensure the rollers are thoroughly cleaned.

Scan & Go Device Care

Cleaning the Scan & Go

Use disinfection wipes for medical equipment to clean the Scan & Go device thoroughly from all sides.

Quick Troubleshooting

The Quick Troubleshooting section guides you through actions you need to take to correct malfunctions you may encounter and that do not require authorized technical support. For errors and malfunctions not detailed in this section, contact technical support.

The following table lists the malfunctions that are displayed on the scanner's LCD and in the image Acquisition interface, and details the corrective action.

Table 4 Quick Troubleshooting

Malfunction	Possible Cause	Action
 or  on scanner display and/or  in the image Acquisition interface	Limited or no connection to scanner (physical connection is intact, but the IP address is not correct).	<ul style="list-style-type: none"> Check that the network cable is connected to its RJ45 port in both the scanner and workstation computer. Check the local network connectivity. Check the computers' firewall settings and disable the firewall. Replace the network cable. Check the scanner's network configuration.
	No connection to scanner after launching image Acquisition interface.	<ul style="list-style-type: none"> Check that the scanner's power supply is connected. Check that the network cable is connected to its RJ45 port in both the scanner and workstation computer. Check the local network configuration. Check the computers' firewall settings and disable the firewall. Exit the image Acquisition interface and relaunch the application. Check the scanner's network configuration by checking in the scanner's Settings-IP Setup screen to see if DHCP is enabled or not, and consult with your system administrator as to what the scanner configuration should be. Replace the network cable. If the scanner icon frame does not change to green within 40 seconds, restart the scanner by turning it off and then on again.
Scanner Error # 071	Scanner memory full.	See "Clearing Scanner Memory" on page 62. Also see "Brightness Control" on page 50.

Table 4 Quick Troubleshooting (Continued)

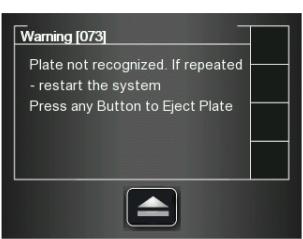
Malfunction	Possible Cause	Action
Scanner Error # 073	Imaging plate loading failure.	
	<ul style="list-style-type: none"> Press the middle function button to eject the imaging plate, and then reinsert the imaging plate again. Replace imaging plate if reinsertion does not work. 	<p>Important: Do not insert any tools into the scanner. If any tool is inserted into the scanner, the warranties are null and void.</p>
Scanner Error # 087	Imaging plate inserted incorrectly	<p>To retrieve a fallen imaging plate, follow these steps:</p> <ul style="list-style-type: none"> Turn off the scanner and disconnect the scanner from the mains power source. Disconnect the scanner from the network. Unscrew the crosshead screw which is holding the rear service cover. Open the rear service cover, and put it to one side. Gently insert your hand and remove the fallen plate, as shown in picture below.
		<p>Important: If the plate is not in the location shown in the above picture, do not continue to look for the plate. Call service.</p> <ul style="list-style-type: none"> After the imaging plate has been removed, replace the rear service cover and reinstall the crosshead screw firmly so that there is no possibility of light penetration. Connect the scanner to the mains power supply. Reconnect the scanner to the network. Replace the cover over the network and power sockets. Turn on the scanner. Wait for the Insert Plate message. The scanner is ready for use. In case Error 41 displays, check that the rear service cover is closed properly.

Table 4 Quick Troubleshooting (Continued)

Malfunction	Possible Cause	Action
Scanner Error # 008	Either the imaging plate is inserted incorrectly, or the imaging plate hygienic sheath is inserted in the wrong direction.	<ul style="list-style-type: none"> • Make sure you are using Carestream Dental imaging plates. • Make sure you follow the preparation and scanning instructions in the Acquiring Images procedures to prevent incorrect insertion of the imaging plates. • Reinsert the imaging plate in the right direction: With the active side facing outwards. • Turn the hygienic sheath around to switch between the open side of the sheath with the foam strip to the sealed side, and then position it correctly in the insertion slot.
Scanned images do not populate frame.	The scanned image was routed to the scanner's memory.	Use the image Acquisition interface to check the selected scanner's unclaimed images and retrieve the required images. In addition, the system can be interfaced with patient data management software applications. For more information, see Scanner Area in "Image Acquisition Interface Key" on page 29 .
Imaging plate is blocked when inserting an imaging plate into the insertion panel.	Incompatible insertion panel size.	Check if the insertion panel size is compatible with the imaging plate size.
Artifacts (black dots or smeared lines) on scanned image.	Scanner rollers have accumulated grime.	See "Cleaning the Scanner Rollers" on page 71 .
For Scan & Go configurations only, the image Acquisition interface displays: 	No USB connection to Scan & Go device.	<ul style="list-style-type: none"> • Press the Scan & Go device On/Off button for 1.5 seconds. If the icon color changes from red to white, connection is established. • Disconnect the USB cable from the Scan & Go device and reconnect it. If the icon color changes from red to white, the connection is established. • If this is the first time the Scan & Go device is detected, insert the Scan & Go device in an alternative USB port in your workstation. When the icon color changes from red to white, the connection is established. • Reinstall the image Acquisition interface and leave the Scan & Go connected.

Retrieving a Fallen Imaging Plate



Important: Do not insert any tools into the scanner. If any tool is inserted into the scanner, all warranties are null and void.

To retrieve a fallen imaging plate, follow these steps:

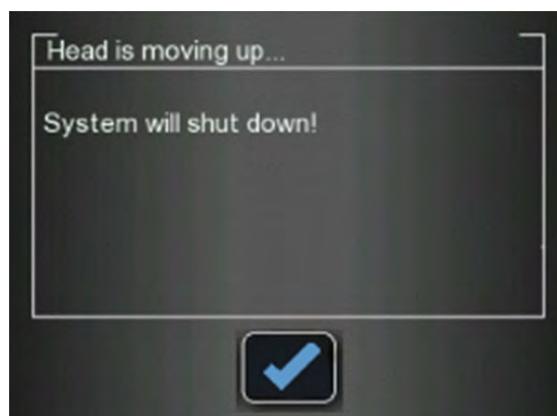
- 1 Tap the **Settings**  button.



- 2 Select **Move Head Up** and press **OK** 



The optical head moves up, and the scanner shuts down.



3 Position the scanner so that you have access to the service door and cable compartment.



4 Remove the cable compartment cover.



- 5 Using the Phillips PH2 screwdriver, unscrew the Phillips screw that attaches the service door to the rear cover, and remove the service door.



- 6 Tilt the scanner backwards, until the plate falls out of the scanner into your hand.



Important: If the plate is not in the location shown in the above picture, do not continue to look for the plate. Call Service.

- 7 After the imaging plate has been removed, replace the rear service cover and reinstall the crosshead screw firmly so that there is no possibility of light penetration.
- 8 Connect the scanner to the mains power supply.
- 9 Reconnect the scanner to the network.
- 10 Turn on the scanner.
- 11 Wait for the **Insert Plate** message. The scanner is ready for use.



Important: In case Error 41 displays, check that the rear service cover is closed properly.

CS 7600 Consumables and Accessories

P/N	Description	Quantity
5942610	CS 7600 hyg. sheaths size 0	200 pcs.
5942628	CS 7600 hyg. sheaths size 1	200 pcs.
5942636	CS 7600 hyg. sheaths size 2	200 pcs.
5942644	CS 7600 hyg. sheaths size 3	200 pcs.
5942651	CS 7600 hyg. sheaths size 4	200 pcs.
5942511	CSD Smart Plate Size 0 V2	4 pcs.
5942537	CSD Smart Plate Size 1 V2	4 pcs.
5942545	CSD Smart Plate Size 2 V2	4 pcs.
5942552	CSD Smart Plate Size 3 V2	4 pcs.
5942560	CSD Smart Plate Size 4 V2	2 pcs.
1014513	CS 7600 imaging plate transport box & pad	1
1015098	CS 7600 imaging plate pad	1
1044445	CS 7600 slot panel size 0 only	1
1023704	CS 7600 slot panel size 1-3	1
1023712	CS 7600 slot panel size 4	1
1014497	CS 7600 wall mount adapter	1
1018894	CS 7600 roller cleaning plate	1
8607020	Carestream X-Omat screen cleaner 177 mL, 6 Fluid Ounces	1
1023720	CS 7600 quality control tool	1

Scanner Manager

The **Scanner Manager** is mainly for use by technicians or under direct supervision of a dental service technician.



Note: For information on the **Scanner Manager** for technicians, see the CS 7600 Service Guide.

Accessing the Scanner Manager

To access the **Scanner Manager**, follow these steps:

- 1 On the desktop, double-click the **Scanner Manager** icon .

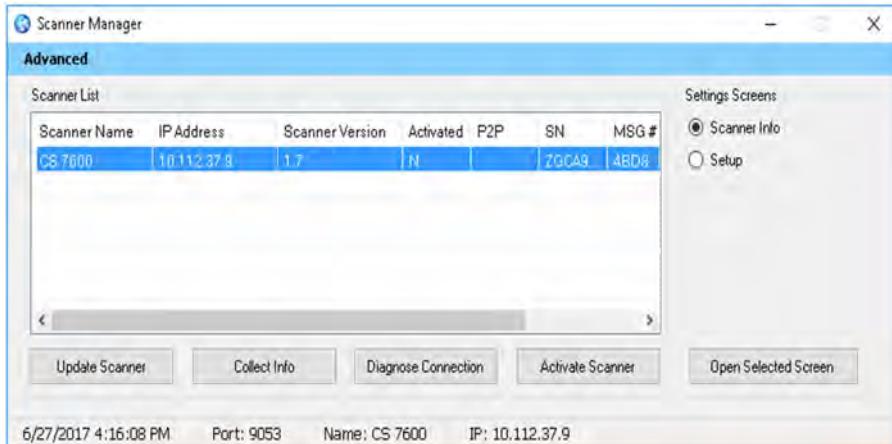
OR

Click **Start > Programs > IP Image Acquisition > Scanner Manager**. The **Scanner Manager** is displayed.



Tip: To create a desktop shortcut for the **Scanner Manager**, click **Start > Programs > IP Image Acquisition > Scanner Manager** and drag and drop the **Scanner Manager** to the desktop.

Figure 16 Scanner Manager



Note: The connected scanner or scanners are shown in the **Scanner List**.

- 2 Select a scanner from the **Scanner List**. If the message **Scanner not found** is displayed, check scanner connectivity. See “[Quick Troubleshooting](#)” on page [75](#).

The following functions can be selected from the **Scanner Manager** window:

- “[Scanner Info](#)” on page 83—Presents general system information.
- “[Scanner Setup](#)” on page 84—Enables setting of scanner name, user language, time and date.
- “[Update Scanner](#)” on page 85—Upgrades the scanner’s embedded software version to the latest version.
- “[Collect Info](#)” on page 87—Enables you to collect the necessary log files from the scanner and from the workstation for inspection.

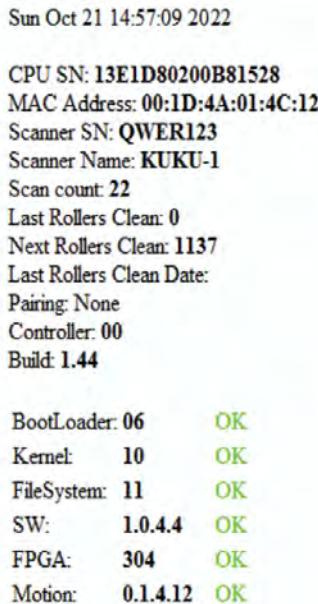
Scanner Info

You must provide this information to your Carestream Dental distributor upon request.

To open the **Scanner Info** screen:

- 1 In the **Settings Screens** area, select the **Scanner Info** option.
- 2 Click **Open Selected Screen**. The **Scanner Info** screen opens.

Figure 17 Scanner Info Screen



Sun Oct 21 14:57:09 2022

CPU SN: **13E1D80200B81528**
MAC Address: **00:1D:4A:01:4C:12**
Scanner SN: **QWER123**
Scanner Name: **KUKU-1**
Scan count: **22**
Last Rollers Clean: **0**
Next Rollers Clean: **1137**
Last Rollers Clean Date:
Pairing: **None**
Controller: **00**
Build: **1.44**

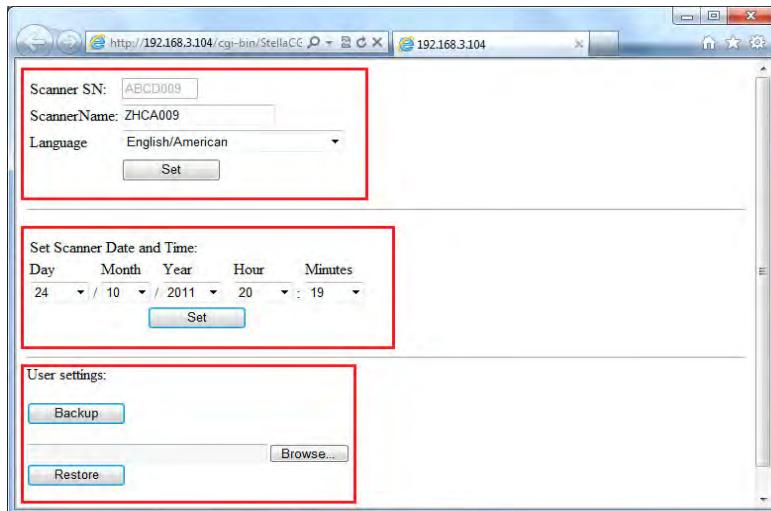
BootLoader:	06	OK
Kernel:	10	OK
FileSystem:	11	OK
SW:	1.0.4.4	OK
FPGA:	304	OK
Motion:	0.1.4.12	OK

Scanner Setup

To open the **Scanner Setup** screen, follow these steps:

- 1 In the **Settings Screens** area, select the **Scanner Setup** option.
- 2 Click **Open Selected Screen**. The **Scanner Setup** screen is displayed.

Figure 18 Setup Screen



Note: The scanner serial number cannot be changed.

The **Scanner Setup** screen enables you to set the following:

- Scanner serial number, scanner name, and LCD user interface language
- Scanner date and time
- Backup and restore user settings (File name is - **CS7600_UserBackup.tar.gz.**)



Important: Restoring scanner settings is to be performed under direct supervision of a dental service engineer.

Update Scanner



Important: Updating the scanner is to be performed under direct supervision of a dental service engineer.



Note: Not all USB devices are recognized by the scanner. We suggest that you update the scanner using the **Scanner Manager** tool.

There are two options for updating the scanner embedded software:

- Using a USB storage device plugged into the USB socket located at the back of the system.
Not all USB devices are recognized by the scanner.
- By using the **Scanner Manager** tool.

Updating the Scanner Using the USB Storage Device



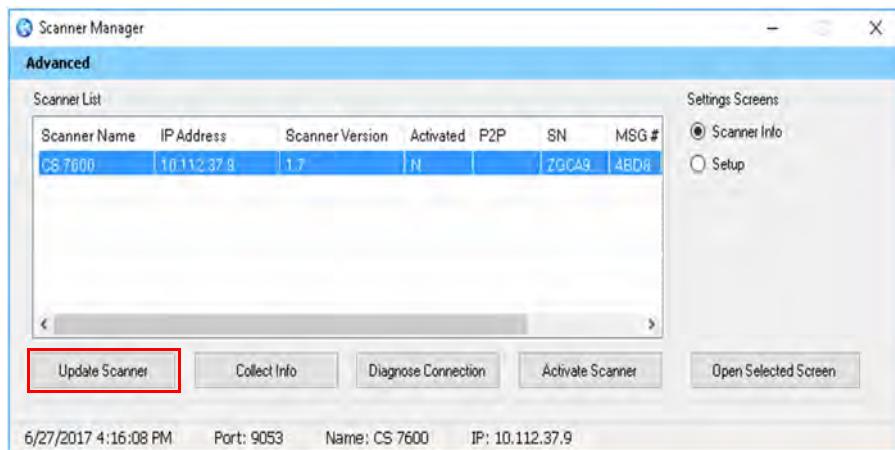
Note: Before starting this procedure, make sure that the system is turned off. Not all USB devices are recognized by the scanner.

To upgrade the scanner using a USB storage device, follow these steps:

- 1 Copy the file **Reader_EMBEDDED_xxx.upgrade** from the installation disc located in the **UPGScanner** folder or from the CS 7600 folder at <http://infotec.carestreamdental.com> to a USB storage device. Make sure to use only the relevant file from the installation disc.
- 2 Press simultaneously on the On/Off button and on the extreme left and right navigation buttons of the scanner.
- 3 Wait until **Starting** is displayed on the LCD display, and then release the buttons. The process starts automatically and continues until you are requested to reset the scanner.
- 4 To check that the scanner is updated to the desired software version, click on the right button sign with “?”
- 5 Disconnect the USB storage device, and continue to work with normal operation mode.

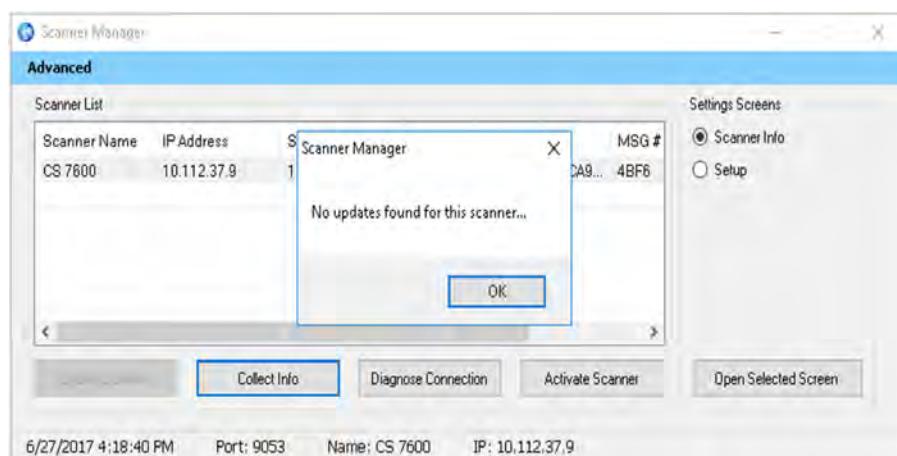
Updating the Scanner Using the Scanner Manager Tool

The scanner version (embedded software) can be updated with the **Scanner Manager** tool by selecting the **Update Scanner** button.

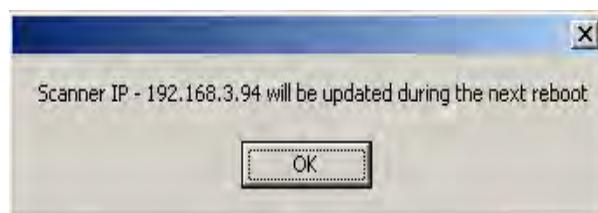


To upgrade the scanner, follow these steps:

- 1 Select the scanner and click **Update Scanner**. Wait while the scanner updates.



The file named **Reader_EMBEDDED_xxx.tar** is copied from the **UPGScanner** folder to the scanner. The process starts and takes approximately one minute. Then the **Reboot** screen is displayed.



- 2 Click **OK** and reboot the scanner. After the scanner is restarted, the scanner has been updated.
- 3 Press the right navigation button sign with "?" The scanner info screen with the new version is displayed. After the update process is completed, the scanner is ready for scanning.

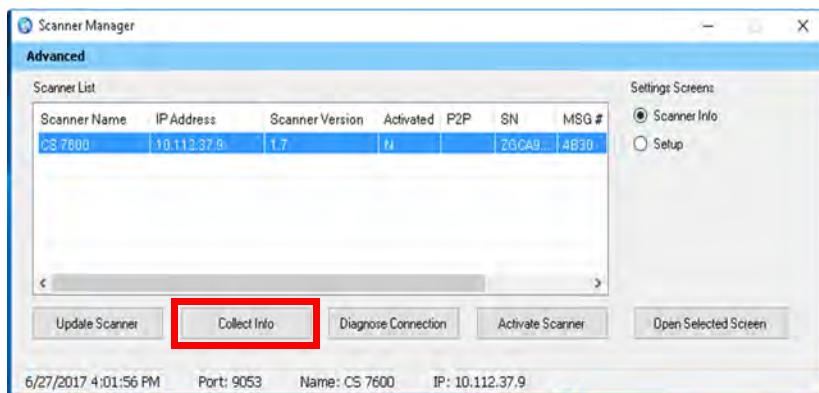
If the scanner is already up to date, the following message is displayed.



- 4 Click **OK**.

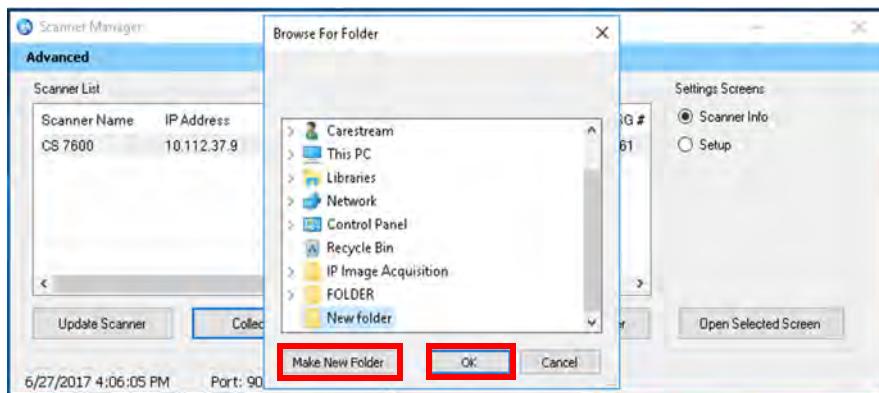
Collect Info

This tool collects the necessary log files from the scanner and from the workstation, and then the dental service engineer or user is able to save the zip file on the local PC and send it for inspection.



To use the **Collect Info** tool, follow these steps:

- 1 Select the scanner and click **Collect Info**.
- 2 Create a new folder with the scanner name (recommended). A browse window is displayed.



- 3 Click on the folder and press **OK**. The process begins and takes a few minutes until it is completed. Upon completion, you are able to send the file for inspection. The zip file that was created by this tool is called **CollectInfo.tar.gz**

- 4 Select a destination folder for the information to be stored and click **OK**.
Wait a few minutes as the information is being collected.



- 5 When the **Information Collected Successfully** message is displayed, click **OK**. The information is stored in the selected destination folder.

Diagnose Connection



Important: Diagnose connection is to be performed under direct supervision of a dental service engineer.

To diagnose the connection between the scanner and computer, follow these steps:

- 1 Click **Diagnose Connection**. After a few minutes, the following message is displayed:



Note: If more than 3% of packets are lost, a **Network Test Failed** message is displayed. Click **OK** and contact your system administrator.

- 2 Click **OK**.

Activate Scanner

- 1 Click **Activate**. CS Licensing is launched.
- 2 Follow the activation process.

12 Contact Information

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